



**Proposed
Outer Continental Shelf
Oil & Gas Leasing Program
2012-2017**

November 2011

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Abbreviations

Act	Outer Continental Shelf Lands Act
AEO	Annual Energy Outlook
ANWR	Arctic National Wildlife Refuge
ARRA	American Recovery and Reinvestment Act
AWL	Areawide Leasing
AWLH	Areawide Leasing Half
Bbbl	billion barrels
BBO	billion barrels of oil
BBOE	billion barrels of oil equivalent
BOE	barrels of oil equivalent
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BOP	Blowout preventer
BSEE	Bureau of Safety and Environmental Enforcement
Btu	British thermal unit
CDE	Catastrophic Discharge Event
CFR	Code of Federal Regulation
CO ₂	carbon dioxide
CZMA	Coastal Zone Management Act
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DPP	Draft Proposed Program
E&D	Exploration and Development
EFH	Essential Fish Habitat
EIA	Energy Information Administration
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESI	Environmental Sensitivity Index
ESPIS	Environmental Studies Program Information System
FMV	Fair Market Value
GDP	gross domestic product
GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act
HAPC	Habitat of Particular Concern
IPCC	Intergovernmental Panel on Climate Change
LNG	liquefied natural gas
Mcf	thousand cubic feet
MMbbl	million barrels
MMBOE	million barrels of oil equivalent
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act

NAA	No Action Alternative
NAAQS	National Ambient Air Quality Standards
NAB	North Aleutian Basin
NEPA	National Environmental Policy Act
NEV	Net economic value
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO ₂	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NSV	Net Social Value
NTL	Notice to Lessees and Operators
N/TS	Nomination/Tract Selection
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OECM	Offshore Environmental Cost Model
ONRR	Office of Natural Resources Revenue
PM ₁₀	particulate matter up to 10 micrometers
PSD	Prevention of Significant Deterioration
SEMS	Safety and Environmental Management System
O ₂	sulfur dioxide
TAPS	Trans Alaska Pipeline System
Tcf	trillion cubic feet
UERR	Undiscovered Economically Recoverable Resources
USCG	U.S. Coast Guard
USDOC	U.S. Department of Commerce
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey

Proposed Outer Continental Shelf Oil & Gas Leasing Program 2012-2017 Preamble

This is the Department of the Interior's Proposed Outer Continental Shelf Oil and Gas Leasing Program for 2012-2017, which the Bureau of Ocean Energy Management (BOEM) has prepared pursuant to the Outer Continental Shelf Lands Act (the Act).¹ Under the Act, the Secretary of the Interior has the responsibility to "prepare and periodically revise, and maintain an oil and gas leasing program" in order to "best meet national energy needs," and taking a range of important considerations into account.

This Proposed Program, which includes a schedule of offshore oil and gas lease sales in six planning areas on the United States Outer Continental Shelf (OCS) spanning five years from 2012 to 2017, is designed to achieve the careful balance required under the Act to ensure that "[m]anagement of the Outer Continental Shelf shall be conducted in a manner which considers economic, social, and environmental values of the renewable and nonrenewable resources contained in the Outer Continental Shelf, and the potential impact of oil and gas exploration on other resource values of the Outer Continental Shelf and the marine, coastal, and human environments."

There are two primary guiding principles that underlie this Proposed Program.

First, the Proposed Program is designed to promote the diligent development of the Nation's offshore oil and gas resources, which are and will remain central to the Nation's energy strategy, economy, and security. The Proposed Program is in alignment with the Obama Administration's *Blueprint for a Secure Energy Future*, announced earlier this year, which aims to promote the Nation's energy security and reduce oil imports by a third by 2025 through a comprehensive national energy policy that includes a focus on expanding safe and responsible domestic oil and gas production.

Second, this Proposed Program is grounded in the lessons learned from last year's *Deepwater Horizon* tragedy, which caused the deaths of 11 workers and resulted in the release of nearly five million barrels of oil into the Gulf of Mexico (GOM). The Department of the Interior (DOI) has made significant progress in accelerating reforms that have improved the safety and environmental protection of the OCS since the *Deepwater Horizon* blowout and oil spill in improving both the safety of offshore drilling to reduce the risk of another loss of well control in our oceans, and our collective ability to respond to a blowout and spill. While offshore oil and gas exploration and development will never be risk free, these activities can be conducted safely and responsibly, with appropriate measures to protect human safety and the environment.

¹ This document has been prepared by the Bureau of Ocean Energy Management (BOEM) of the Department of the Interior. With the exception of publications whose title includes the agency name or as otherwise noted, all references in the document to BOEM include its predecessor agencies, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) and the Minerals Management Service (MMS).

Based on these principles, the Proposed Program provides for lease sales in six offshore areas where there are currently active leases and exploration and where there is known or anticipated hydrocarbon potential. This strategy makes more than 75% of undiscovered technically recoverable oil and gas resources estimated on the OCS available for development.

In addition to proposing a leasing schedule designed to make substantial resources available, this Proposed Program encourages prompt development and production and ensures that the American public receives fair market value for these shared resources. Lease sales conducted under the program would include a modified minimum bid structure that BOEM has developed, after rigorous economic analysis, to ensure that operators invest in the OCS acreage that they believe is most likely to lead to discoveries and production and reduce the amount of leased acreage that sits idle. The BOEM will also continue to use lease terms that incentivize industry to diligently and promptly operate their leases.

The Proposed Program is also tailored to support development that is commensurate with the maturity of the infrastructure necessary to support offshore oil and gas activity, including for spill containment and response. Of the 15 lease sales included in the Proposed Program, 12 are in the Gulf of Mexico, where infrastructure is best-developed and where resource potential is best understood. In Alaska and off its coast, government and industry are actively working towards the development of infrastructure, and limited exploration activities that may proceed in the near future would help to identify further needs. The Proposed Program schedules one sale each in the Beaufort and Chukchi seas, deliberately set late in the program to allow time for further study and infrastructure development.

Accordingly, this Proposed Program provides the following schedule for offshore oil and gas lease sales during the period 2012 to 2017:

Gulf of Mexico

Western GOM: A total of five annual areawide lease sales beginning in the fall of 2012 that make available all unleased acreage.

Central GOM: A total of five annual areawide lease sales beginning in the spring of 2013 that make available all unleased acreage.

Eastern GOM: A total of two sales, in 2014 and 2016, in areas of the Eastern GOM not currently under congressional moratorium.

Offshore Alaska

Beaufort Sea: One sale in 2015 that is scheduled late in the five year period to provide additional opportunity to evaluate and obtain information regarding environmental issues, subsistence use needs, and infrastructure capabilities. The expectation is that the lease sale would be tailored to offer areas that have significant resource potential while appropriately weighing environmental protection and subsistence use needs.

Chukchi Sea: One sale in 2016 that is scheduled late in the five year period to provide additional opportunity to evaluate and obtain information regarding environmental issues,

subsistence use needs, and infrastructure capabilities. The expectation is that the lease sale would be tailored to offer areas that have significant resource potential while appropriately weighing environmental protection and subsistence use needs.

Cook Inlet: One special interest sale including the entire planning area, which is initially scheduled for 2013, but may be moved to later in the program depending on industry interest in the sale.

Offshore Drilling Safety, Spill Preparedness and the Lessons of Deepwater Horizon

The *Deepwater Horizon* blowout and oil spill exposed the overconfidence in the safety of offshore drilling that had developed over time. Because there had not been a major blowout or drilling accident in U.S. waters in decades, both government and industry underestimated the well control issues posed by offshore drilling, particularly in deep and ultra-deepwater.

This Proposed Program is informed by both our better understanding of the risks posed by offshore drilling and the substantial measures that have been implemented since the *Deepwater Horizon* event to address and reduce those risks. Immediately after *Deepwater Horizon*, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) – with its functions now divided between BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) – imposed heightened standards for offshore drilling operations, which included new requirements for well design and integrity and the testing and maintenance of blowout preventers (BOPs). The BOEMRE also introduced, for the first time in U.S. waters, new performance-based standards that require operators to develop Safety and Environmental Management Systems programs that, among other things, systematically and thoroughly evaluate the hazards involved with offshore facilities and operations and implement measures to address those hazards. These new and heightened standards are designed to help prevent a loss of well control or a spill from happening.

While these measures have made offshore drilling safer, the risk of an accident cannot be eliminated and government and industry must be prepared in the event of a loss of well control or a spill. After *Deepwater Horizon*, BOEMRE issued new guidance to operators that revised the methodology for calculating the worst case discharge potential of individual wells to provide more accurate estimates of true worst case scenarios. Operators must submit Oil Spill Response Plans that demonstrate sufficient response capacity to address these revised worst case discharge estimates, as well as other enhancements based on experience with the response to *Deepwater Horizon*.

Most significantly, unlike prior to *Deepwater Horizon*, operators using subsea BOPs or drilling from a floating facility must demonstrate in advance that they have access to and can deploy an effective subsea containment system in the event of a loss of well control. This includes systems, such as a capping stack, to shut in the well and, if necessary, to capture and contain flow from a well. Industry has developed these systems, and they are available for every covered well in the Gulf of Mexico that has been permitted since *Deepwater Horizon*.

The government's oversight of offshore oil and gas operations has also undergone broad and substantial reforms. Prior to *Deepwater Horizon*, the Minerals Management Service (MMS) had jurisdiction over offshore activities, was severely under-resourced, and saddled with multiple, sometimes conflicting missions that included responsibility for leasing and environmental reviews, safety oversight, and the collection of revenue from offshore operations. Soon after the *Deepwater Horizon* explosion, the Secretary of the Interior abolished MMS. In its place, the Secretary established BOEMRE and announced that the DOI's management of OCS resources and oversight of offshore energy activity would be reorganized into three new agencies – BOEM, BSEE, and the Office of Natural Resources Revenue (ONRR).

That reorganization is now complete, and three strong, independent agencies with clear and distinct missions have been established to manage and oversee safe and environmentally responsible offshore activity that helps to meet the Nation's energy needs and provides a fair return to the public. The BOEM is charged with managing the nation's offshore resources in a balanced way that promotes prompt and environmentally responsible development. The BSEE is a safety authority responsible for enforcing safety and environmental protection standards. Finally, ONRR is responsible for collecting the public's share of revenue from resource development on public lands and waters. These new agencies will provide more effective and appropriately balanced management and oversight of the nation's offshore oil and gas resources.

Leasing Strategies Appropriate for Specific Regions

The Proposed Program represents a leasing strategy that is tailored to specific regions in order to best achieve the dual goals of promoting prompt development of the Nation's oil and gas resources and ensuring that this development occurs safely and with the necessary protections for the marine, coastal and human environments. This region-specific strategy, consistent with the President's *Blueprint*, is reflected in the Proposed Program's approach to offshore areas across the Nation's offshore regions – an approach which accounts for issues including current knowledge of resource potential, adequacy of infrastructure including oil spill response capabilities, accommodation of regional interest and concerns, and the need for a balanced approach to our use of natural resources.

Region-specific considerations supported our decisions to focus leasing activities on six offshore regions, and to remove six other areas that were included in an earlier Draft Proposed Program (DPP) for 2010-2015, which was released on January 16, 2009, and was the first in a sequence of three documents to be issued prior to the ultimate establishment of the next 5-Year Program. This Proposed Program is the second in that sequence. There are four planning areas in the Atlantic OCS that have been excluded from consideration – North Atlantic, Mid-Atlantic, South Atlantic, and Straits of Florida. In addition, areas off the Pacific coasts have been excluded from consideration.

The Gulf of Mexico

The resource potential of the Western and Central GOM, as well as the portion of the Eastern GOM made available for leasing by the Gulf of Mexico Energy Security Act (GOMESA), is the best understood of the OCS planning areas. The GOM currently supplies more than a quarter of

the Nation's oil production. Current and ongoing evaluation of offshore resources, including seismic surveys, in the GOM is extremely sophisticated, and contributes significantly to industry's and BOEM's understanding of these regions' oil and gas potential. Moreover, the infrastructure supporting the oil and gas industry, including subsea containment and oil spill response resources, is the most mature and well developed in these regions. Therefore, the Proposed Program schedules regular, areawide lease sales in the Western and Central GOM throughout the five-year leasing program.

The Proposed Program also includes lease sales gauged to accommodate anticipated industry interest in the portion of the Eastern GOM that is not currently subject to congressional moratorium. Other areas in the Eastern GOM – including the Straits of Florida – are not included in this Proposed Program because they are under a Congressionally-mandated leasing moratorium until June 30, 2022.

Alaska

The Proposed Program includes one lease sale each in the Beaufort and Chukchi Sea planning areas for late in the five-year schedule as well as one special interest sale in Cook Inlet if industry interest is sufficient to warrant such a sale. This schedule is designed to allow for the development of a leasing approach that is appropriate for these Arctic areas and fully considers their resource potential, their specific environmental needs and sensitivities, and concerns related to Native Alaskan culture and the reliance of many Arctic communities on ocean resources such as marine mammals and fish for subsistence.

The later scheduling of the potential sales in the Beaufort and Chukchi Sea planning areas represents a balanced and careful approach to leasing in the Arctic that takes into account the significant inventory of as-yet-undeveloped offshore leases in the Beaufort and Chukchi Seas, and the view that it is prudent to work off largely-untapped, existing leases in these frontier areas before holding additional lease sales. This approach provides the added benefit of allowing time for further work in a number of critical areas.

First, this schedule allows time for further scientific study and environmental assessment of the Arctic. In June 2011, the United States Geologic Survey issued its *Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska*, requested by the Secretary of the Interior. The report recognizes that a substantial body of scientific work and knowledge exists with respect to the Arctic and recommends areas of focus for ongoing and future study, as well as further synthesis of existing scientific information from various sources within and outside of the government. Moreover, this approach is consistent with Executive Order 13580, which was issued by President Obama in July 2011 and established a high-level Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska. This working group is chaired by the Deputy Secretary of the Interior and is focused on facilitating coordinated and orderly decision making in Alaska, including development and sharing of scientific information in support of regulatory processes.

Second, planning and designing lease sales in the Beaufort and Chukchi Seas should take into account any information about geology and resource potential that may be developed as a result of exploration under current leases in those areas. Exploration may provide valuable data for defining the best areas for potential development and for assessing reservoir characteristics such as volumes and pressures that are central to ensuring that appropriate safety measures and spill response resources are in place.

Third, as offshore exploration and development in the Arctic moves forward, so too must the development of spill response preparedness and infrastructure. Current spill response planning is focused on certain, limited near-term proposed drilling operations in the Arctic OCS. Longer term planning and infrastructure development are also necessary, particularly if major oil deposits are found and producers seek to engage in year-round production activities. Longer term planning is another major focus of the interagency working group. The potential evolution towards additional drilling activities in offshore waters in the Arctic would raise significant additional complexities regarding the availability of adequate response capability and infrastructure in this difficult frontier environment. Prudence suggests that future leasing activities should account for further progress towards resolving some of these fundamental issues. This Proposed Program provides time for contingency planning and infrastructure development that is needed to address these issues.

Finally, OCS leasing should not be “one size fits all,” and lease sales in the Beaufort and Chukchi Seas should be specifically tailored to those regions. The traditional areawide leasing model that has been used in the Western and Central GOM may not be appropriate for the Arctic. The Proposed Program is designed to allow time for BOEM to evaluate alternative leasing strategies that are designed specifically for the Arctic in order to focus potential leasing on areas that have significant resource potential while also mitigating the impact of offshore oil and gas activity on the unique Arctic environment and its subsistence resources.

Atlantic

This Proposed Program does not include lease sales in the North-Atlantic, Mid-Atlantic, and South-Atlantic planning areas based on, and in alignment with, the principles that underlie the entire program. Many Atlantic states expressed concerns about oil and gas development off their coasts. While an OCS development strategy announced in 2009 included the Mid- and South-Atlantic under consideration for potential inclusion in the Proposed Program, a number of specific considerations supported the Secretary’s decision not to include these areas.

First, the oil and gas resource potential in the Mid- and South Atlantic is not well understood and surveys of these areas are incomplete and out of date. Prior to scheduling lease sales in these planning areas, it is prudent to develop information evaluating the oil and gas resource potential of these regions. Accordingly, BOEM is moving forward expeditiously to facilitate resource evaluation in these areas, including conducting a programmatic Environmental Impact Statement relating to seismic surveys in the Atlantic.

Second, there are complex issues relating to potentially conflicting uses, including those of the Department of Defense, which should be addressed so that any potential future leasing activity in these areas is designed appropriately.

Finally, the Mid- and South Atlantic regions currently lack the infrastructure necessary to support oil and gas exploration and development, including that infrastructure necessary for spill preparedness and response. While evaluation of the resource potential of these areas moves forward, so too should analysis and planning regarding the spill response infrastructure and resources that would be necessary to prepare for such activity.

Pacific

Areas off the Pacific coast are not included in this Proposed Program, which, consistent with Section 18 of OCSLA, gives priority leasing consideration to areas where the combination of previous experience; local, state, and national laws and policies; and expressions of industry interest indicate that potential leasing and development activities could be expected to proceed in an orderly manner. The Proposed Program specifically seeks to accommodate the recommendations of governors of coastal states and of state and local agencies. The exclusion of the Pacific Coast is consistent with state interests, as framed in an agreement that the governors of California, Washington, and Oregon signed in 2006, which expressed their opposition to oil and gas development off their coasts. Western states have continued to voice these concerns, including in formal comments on the DPP.

Conclusion

This Proposed Program represents a balanced strategy designed to promote the discovery and production of oil and gas resources on the OCS while incorporating lessons learned – in the areas of drilling safety and environmental protection, safety oversight, and blowout containment and spill response – as a result of the *Deepwater Horizon* event. The OCS resources are, and will remain, key components in the Nation’s overall energy strategy and their development will continue to provide substantial benefits to the U.S. economy and energy security. As a result of the new standards and reforms implemented since the *Deepwater Horizon* oil spill, offshore oil and gas exploration and development, though not risk-free, is now significantly safer and more responsible.

Overview

Management of the oil and gas resources of the Outer Continental Shelf (OCS) is governed by the OCS Lands Act (Act), which sets forth procedures for leasing, exploration, and development and production of those resources. Section 18 of the Act calls for the preparation of an oil and gas leasing program indicating a 5-year schedule of lease sales designed to best meet the Nation's energy needs. The BOEM is the bureau within the Department of the Interior (DOI) that is responsible for implementing these requirements of the Act related to preparing the leasing program.

The BOEM is in the process of preparing a 5-Year Program for 2012-2017. This document constitutes the Proposed Program, which is the second 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 5-Year Program for 2012-2017. The document consists of the parts described below.

- Part I presents a summary of the Proposed Program as decided by the Secretary. It briefly describes the location and timing of potential OCS oil and gas lease sales proposed for 2012-2017, discusses procedures for ensuring the receipt of fair market value (FMV) for leases as required by section 18, and provides additional information related to the preparation of this 5-year Proposed Program.
- Part II describes the framework for developing the new program. It discusses the substantive and procedural requirements that are in place for preparing a program under section 18 and describes BOEM's approach to meeting those requirements. This includes a discussion of the criteria relating to OCS oil and gas resources and environmental 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 history and guidance received from the courts concerning the 5-Year Program.
- Part III presents the options that BOEM prepared based on its analysis of the section 18 criteria. The options form the basis from which the Secretary chooses the Proposed Program for 2012-2017. Each set of options is prefaced with a brief summary of the relevant results of the section 18 analysis, including consideration of the Draft Environmental Impact Statement (EIS) prepared pursuant to the National Environmental Policy Act (NEPA), and consideration of comments that BOEM received from interested and affected parties on the January 2009 Draft Proposed Program (2009 DPP).
- Part IV presents the detailed section 18 analysis executed by BOEM to develop the options presented to the Secretary.
- Appendix A is a summary of the comments received by BOEM in response to its public request for comments on the 2009 DPP and comments received at the four public meetings hosted by the Secretary in April 2009.

- Appendix B provides BOEM's general approach to the consideration of the potential environmental and social costs should there be a catastrophic release event in one of the program areas and supplements the section 18 net benefits and equitable sharing analyses presented in part IV.

I. SUMMARY OF DECISION—PROPOSED PROGRAM FOR 2012-2017

Introduction

Section 18 of the 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 5-year period following its approval or reapproval.” Preparation and approval of a 5-Year Program must be based on a consideration of principles and factors specified by section 18. Those criteria and the manner in which they have been considered in the preparation of this Proposed Program for 2012-2017, are summarized in part II of this document. This document has been prepared by BOEM of the DOI.

This is the second of three proposals to be issued for public review before a new 5-Year Program may be approved. The first proposal was the 2009 DPP for 2010-2015. This second proposal takes into account the comments received concerning the 2009 DPP; as well as events and actions that have occurred in the intervening period. A discussion of the preparatory steps to date as well as the intervening events and actions that are relevant to the preparation of the program is provided at the end of this part. Issuance of the Proposed Program and accompanying Draft EIS is followed by applicable comment periods. The full 5-Year Program preparation process is described in part II of this document. The third proposal will be the Proposed Final Program that will be submitted to the President and Congress for a 60 day review period, accompanied by a Final EIS.

This Proposed Program includes fifteen potential lease sales in six areas, three areas in the Gulf of Mexico (GOM) and three areas offshore Alaska. Maps A and B show the areas proposed for leasing (Proposed Program areas). Table A lists the location and timing of the proposed lease sales.

Table A: Proposed Program for 2012-2017–Lease Sale Schedule

Sale No.*	Area	Year
229	Western Gulf of Mexico	2012
227	Central Gulf of Mexico	2013
233	Western Gulf of Mexico	2013
244	Cook Inlet**	2013
225	Eastern Gulf of Mexico***	2014
231	Central Gulf of Mexico	2014
238	Western Gulf of Mexico	2014
235	Central Gulf of Mexico	2015
242	Beaufort Sea	2015
246	Western Gulf of Mexico	2015
226	Eastern Gulf of Mexico	2016
241	Central Gulf of Mexico	2016
237	Chukchi Sea	2016
248	Western Gulf of Mexico	2016
247	Central Gulf of Mexico	2017

*The sales are not in numerical order for various reasons. As the January 2009 DPP encompassed the 2010-2015 time period, many of the sales listed in that document were carryovers from the latter part of the 5-Year Program for 2007-2012 announced in June 2007. These sales were either held, deleted in the December 2010 Revised Program for 2007-2012, or cancelled under the pre-sale process. Those numbers are no longer available for use in this program. Other sales included in the 2009 DPP are no longer being considered for leasing in this Proposed Program and those sale numbers also are not available. As the assignment of sale numbers is for administrative convenience and efficiency and not related to the section 18 factors of size, timing, and location of potential lease sales, additional numbers may be added as long as the total number of sales in an area does not exceed the number in the 2009 DPP.

**Cook Inlet is listed as a special interest sale. See the description of that process in the text that follows concerning the Alaska areas.

***Sales in the Eastern Gulf of Mexico only include those areas that are not currently subject to moratorium under the Gulf of Mexico Energy Security Act of 2006.

Alaska Region

In the Alaska Region, the Proposed Program schedules a single lease sale in each of the Beaufort Sea and Chukchi Sea planning areas. Multiple sales were scheduled for these areas in the 2009 DPP and the 2007-2012 program as announced in June 2007, with the intent to provide time for exploration between sales. However, ancillary activities are the only postlease activities that have occurred in these Arctic areas in recent years. Exploration may occur as early as the summer of 2012 on some of the existing leases in these areas.² Exploration has the potential to provide additional information about the resources, environmental conditions, and planning needs of the area. This includes developing appropriate strategies for oil spill prevention, preparedness, and response given the challenges associated with exploration and development in a remote Arctic environment.

The Proposed Program schedules one sale in each Beaufort and Chukchi Sea planning area in the later years of the program. This schedule is designed to 1) facilitate the development, synthesis, and consideration of further scientific study relevant to oil and gas exploration and development in the Arctic; 2) allow time for the analysis and evaluation of data collected from any exploration activity under current leases in the Beaufort and Chukchi planning areas; 3) enable further development of spill response preparedness and infrastructure; and 4) support a leasing strategy that is tailored to both the specific resource opportunities and the special environmental and subsistence concerns presented in these regions. Finally, the Governor of Alaska has consistently supported sales in the OCS offshore Alaska and the Beaufort and Chukchi planning area sales in the Proposed Program are consistent with the state's administration of its offshore oil and gas program.

In the Beaufort Sea, the Proposed Program establishes that at least two subsistence whaling deferral areas (Barrow and Kaktovik) will be excluded from leasing. These areas were also deferred in the 2009 DPP and the current 2007-2012 program. In the Chukchi Sea, the Proposed Program establishes that at least a 25-mile nearshore buffer area will be excluded from leasing. This area was also excluded in the 2009 DPP and 2007-2012 Program. Additional deferral areas may be added into the design of individual lease sales. As noted above, the timing of the proposed Beaufort and Chukchi sales late in the program is intended to allow time for the design of an appropriately tailored leasing program in these areas to account for any new resource evaluation and scientific information relevant to making these determinations on a sale-by-sale basis.

As generally is appropriate in the multi-phased process under section 18, decisions at the 5-Year Program stage are broad-based in determining which areas to include in the program. The second stage, lease sale design, is more focused and includes deciding whether to hold or delay

² On August 4, 2011, BOEM issued a conditional approval of Shell's revised exploration plan for the Beaufort Sea to drill up to four shallow water wells starting in July 2012. During the pendency of the Chukchi Sea Sale 193 litigation, BOEM could not approve any postlease drilling activity. The BOEM prepared a Supplemental EIS and on October 3, 2011, as required by the U.S. District Court for the District of Alaska, DOI filed a Record of Decision (ROD) with the Court. The ROD reaffirmed Sale 193. The District Court filed an order lifting the injunction on Sale 193 on October 26, 2011.

the sale, which blocks to offer, and setting the sale terms. To that end, while the Proposed Program provides the option of conducting areawide leasing in the Beaufort and the Chukchi, BOEM is working to develop a more focused leasing approach that would be more targeted to the specific conditions of these Arctic areas than the traditional areawide leasing approach, which includes full program areas.

This approach will allow BOEM to conduct focused environmental analysis reflective of the complexities associated with Arctic resource development and to better collaborate with other federal agencies, such as the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Fish and Wildlife Service (USFWS); as well as with Alaskan Native groups and communities with traditional knowledge of the use of the OCS; the scientific community; industry; and state and local governments. This approach is consistent with the recommendations contained in a June 2011 report requested by Secretary Salazar and prepared by the U.S. Geological Survey (USGS), entitled *Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska*.³

The Cook Inlet planning area is included in the proposed schedule as a special interest sale. The sale is proposed for late 2013. Before BOEM proceeds with steps towards holding a lease sale in the Cook Inlet planning area, it will issue a request for interest and will move forward only after consideration of the comments received in response. At least one company has publicly expressed interest in the OCS in Cook Inlet to complement the increased interest and activity in state waters. However, if the responses to the official request for interest do not support consideration of a sale, the sale date will be postponed and a request for interest will be issued again the following year, and so on through the 5-year schedule, until a sale is held or the schedule expires.

Maps 3, 4, and 5 in part III of this document depict the specific Alaska OCS areas proposed for lease sales.

Gulf of Mexico Region

In the Central and Western GOM planning areas, which remain the two areas of highest resource potential and interest, the Proposed Program includes annual areawide sales of all available, unleased acreage, as has been the practice for many years.⁴ Two lease sales are scheduled in the Eastern GOM planning area. The Proposed Program area encompasses the Sale 224 area, a sale that was mandated by the Gulf of Mexico Energy Security Act of 2006 (GOMESA) and held in 2008, and a triangular-shaped sliver to the southeast that is not otherwise restricted. The majority of the Eastern GOM planning area, within 125 miles of Florida and a small portion of the Central GOM planning area within 100 miles of Florida are subject to congressional moratorium until 2022 pursuant to GOMESA. These areas under moratorium are not included in the Proposed Program.

³ “An evaluation of the science needs to inform decisions on Outer Continental Shelf energy development in the Chukchi and Beaufort Seas, Alaska”, U.S. Geological Survey Circular 1370, 2011.

⁴ In response to comments, particularly from the state of Louisiana, a discussion of possible alternatives to areawide leasing is included in the Fair Market Value section in part III.B of this document. These alternatives may be considered for implementation at the lease sale stage.

Maps 6, 7, and 8 in part III of this document depict the specific GOM program areas proposed for lease sales.

Assurance of Fair Market Value

Section 18 requires that the government receive fair market value (FMV) for OCS oil and gas leases. A series of decisions related to the timing of a lease sale, the leasing framework, sale terms, and bid adequacy provide the foundation for ensuring receipt of FMV. The BOEM intends to use a two-phase post-sale bid evaluation process that has been in effect since 1983 to meet the FMV requirement and will continue to study and evaluate refinements and alternative approaches throughout the next 5-Year Program. Further, the Proposed Program allows BOEM to evaluate alternatives with respect to delaying a sale area, choosing a leasing framework, and setting the fiscal terms and conditions by individual lease sale, based on the bureau's timely assessment of market and resource conditions. Part III.B of this document discusses in detail the considerations that go into these decisions. For example, certain lease sales conducted the latter years of the 2007-2012 program have incorporated a number of enhanced approaches to ensure FMV and provide incentives for diligent development. Examples include adjusting base lease terms and raising minimum bid requirements based on rigorous economic and historical analysis of activity under leases sold at various prices per acre.

Additional Background Concerning Preparation of the 2012-2017 Program

Preparation of a new 5-Year Program usually takes 2.5 to 3 years. The BOEM began the preparation process for the 5-Year Proposed Program by publishing a Request for Information on August 1, 2008 (73 FR 45065). The BOEM then published the 2009 DPP for a 2010-2015 program and a Notice of Intent to prepare an EIS on January 21, 2009 (74 FR 3631) with the statutory-minimum 60-day comment period. By January 2009, oil prices had dropped by more than 50 percent from their peak the previous year. On February 10, 2009, the Secretary extended the 2009 DPP comment period for an additional 180 days to September 21, 2009, and personally hosted four public meetings in April 2009, in order to provide additional time for input from states, affected communities, and other stakeholders. The comments received during the comment period and at the meetings are summarized in Appendix A of this document. Scoping meetings for the EIS, scheduled to be held during the initial 60-day comment period, were postponed.

As a result of the comment period extension and BOEM's reconsideration of existing policies and regulations in light of lessons learned from the *Deepwater Horizon* event on April 20, 2010, the time period to be covered by the new program shifted from 2010-2015 to 2012-2017. The 2009 DPP remains the first of three decision proposals for the program (now for 2012-2017) that will succeed the current 2007-2012 program, following expiration of the current program.

The 2009 DPP proposed sales in 12 of the 26 OCS planning areas, including the three Atlantic planning areas, two of the planning areas offshore California, and the North Aleutian Basin (NAB), offshore Alaska, in addition to the six areas included in this Proposed Program. The 2009 DPP contains the prior section 18 analysis on all 12 planning areas.

On March 31, 2010, the President and the Secretary announced a Comprehensive Strategy for Offshore Oil and Gas Exploration and Development to strengthen the Nation's energy security and reduce dependence on foreign oil, while protecting fisheries, tourism, and areas off U.S. coasts that are not appropriate for development. The Secretary announced that scoping for a 5-year EIS would proceed for 8 of the 12 areas included in the 2009 DPP, including the Beaufort Sea, Chukchi Sea, and Cook Inlet off the coast of Alaska; Western, Central, and Eastern Gulf of Mexico; and the Mid- and South Atlantic. This comprehensive strategy document excluded the North Atlantic, the two areas offshore California, and the NAB. At the same time, the NAB was withdrawn from leasing consideration through June 30, 2017, by the President pursuant to section 12 of the Act and therefore is not available for inclusion in the 5-Year Program under section 18. This decision was sensitive to comments concerning the other three areas received on the 2009 DPP. The States of Delaware and New Jersey, states adjacent to the North Atlantic, voiced their opposition to oil and gas activities off their coasts and pointed to state policies and initiatives to encourage development renewable energy sources. In his comments on the 2009 DPP, the Governor of California reiterated the state's long-standing opposition by governors of both parties to new leasing off its coast. This position was also presented by the California Coastal Commission, the state agency with regulatory authority over federal activities on the OCS that affect the state's coastal resources pursuant to the Coastal Zone Management Act (CZMA).

In light of the *Deepwater Horizon* oil spill, President Obama and Secretary Salazar stressed the need to heighten standards for the safety and environmental responsibility of oil and gas operations on the OCS. Recognizing that existing regulations had not kept up with the advancements in technology used in deepwater drilling, BOEMRE – now BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) – quickly issued new, rigorous prescriptive regulations that bolstered offshore drilling safety and heightened efforts to evaluate and mitigate environmental risks.

The BOEM introduced for the first time, performance-based workplace safety standards similar to those used by regulators in the North Sea, to make operators responsible for identifying and minimizing the risks associated with drilling operations. This included the development and implementation of two new rules that raised standards for the oil and gas industry's operations on the OCS.

The Drilling Safety rule, issued in October 2010, heightened standards for well design, casing and cementing, and well control procedures and equipment, including blowout preventers (BOP) among other things. This rule requires operators to have a professional engineer certify the adequacy of the proposed drilling program. In addition, the new Drilling Safety rule requires an engineer to certify that the BOP to be used in a drilling operation meets new standards for testing, maintenance, and performance.

The Workplace Safety rule, also issued in October 2010, requires operators to systematically identify risks and establish barriers to those risks in order to reduce the human and organizational errors that cause many accidents and oil spills. Under the rule, operators must develop a comprehensive Safety and Environmental Management Systems (SEMS) program that identifies the potential hazards and risk-reduction strategies for all phases of activity, from well design and

construction through the decommissioning of platforms. Many companies had developed such SEMS programs on a voluntary basis in the past, but many had not.

In addition, BOEM proposed a follow-up rule that further advances the purposes of the SEMS rule. It addresses additional safety concerns not covered by the original rule and applies to all oil and natural gas activities and facilities on the OCS. The proposed rule includes procedures that authorize any employee on a facility to cause the stoppage of work – frequently called Stop Work Authority – in the face of an activity or event that poses a threat to an individual, to property or to the environment. The proposed rule also establishes requirements relating to the clear delineation of who possesses ultimate authority on each facility for operational safety; establishes guidelines for reporting unsafe work conditions that give all employees the right to report a possible safety or environmental violation and to request a BSEE investigation of the facility; and requires third-party, independent audits of operators’ SEMS programs.

In addition to these important new rules, BOEM issued Notices to Lessees (NTL) to provide additional guidance to operators on complying with existing regulations. NTL 2010 - N06 outlines the information that must be provided in an operator’s oil spill response plan, including a well-specific blowout scenario, a worst-case discharge scenario, and the assumptions and calculations behind these scenarios. Operators are required to revise their oil spill response plans, if necessary, to address revised calculation of the worst case discharge potential of proposed wells under NTL 2010-N06.

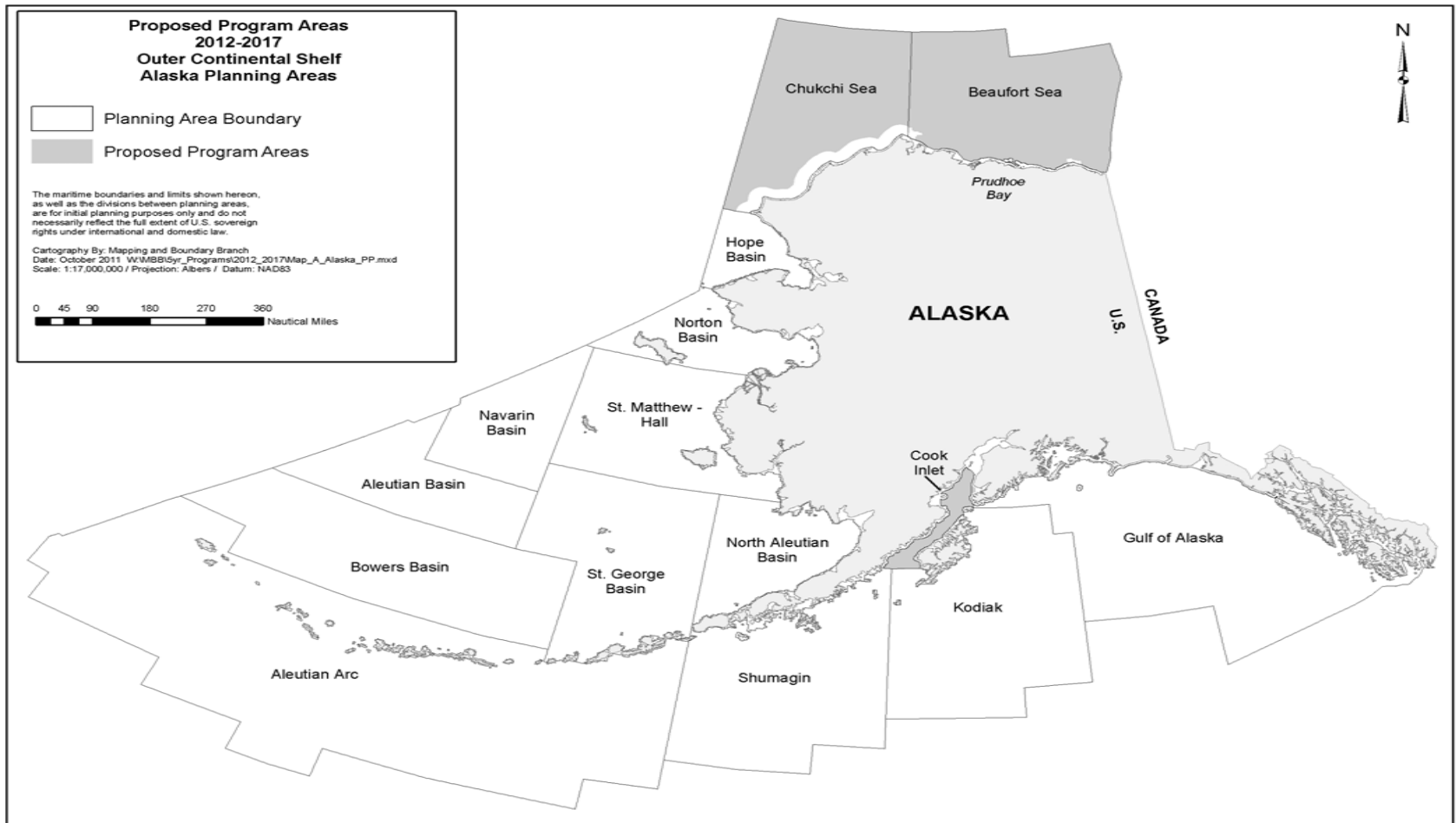
NTL No. 2010-N10 requires a corporate compliance statement and review of subsea blowout containment resources for drilling operations using a subsea BOP or a surface BOP on a floating facility. In order to obtain a permit to conduct such a drilling operation, operators must demonstrate that they have access to, and can deploy, subsea containment resources that would be sufficient to promptly respond to a deepwater blowout or other loss of well control.

The *Deepwater Horizon* event and requirements of NTL No. 2010-N10 also created new impetus for industry-driven containment technology. For example, the offshore oil and gas industry has formed two consortia – the Marine Well Containment Company and the Helix Well Containment Group – to develop and make available to operators subsea containment systems, including capping stacks and systems for the capture of flow from a well. The BSEE requires all operations covered by NTL-2010-M10 to demonstrate the ability – in advance of obtaining a drilling permit for each individual well – to deploy the systems necessary to respond to a loss of well control.

Reform efforts have also focused on strengthening the institutions responsible for managing offshore resources and enforcing compliance with safety standards. On May 19, 2010, Secretary Salazar signed a Secretarial Order that directed the division of MMS into three separate organizations – BOEM, BSEE, and the Office of Natural Resources Revenue (ONRR), each with separate and clearly defined missions. Following the completion of that re-organization on October 1, 2011, BOEM manages the environmentally and economically responsible development of the Nation’s offshore resources, including preparation and maintenance of the 5-Year Program. The BSEE is responsible for safety and environmental oversight of offshore oil and gas operations, including permitting and inspections and ONRR handles revenue collection.

Consistent with these critical reforms, the Secretary proposed a revised strategy to focus the program on offshore areas that currently have leases, support from the adjacent state and local governments, and known or well-understood hydrocarbon potential. On December 1, 2010, the Secretary announced a revised OCS strategy that limited scoping for the 5-year EIS to six planning areas, including the Western GOM; the areas of the Central and Eastern GOM not included in the congressionally-mandated leasing moratorium; and the Beaufort Sea, Chukchi Sea, and Cook Inlet, offshore of Alaska. While the Governors of Virginia, North Carolina, and South Carolina showed support for oil and gas activities off of their shores, the potential and location of oil and gas resources in the Mid- and South Atlantic planning areas are not well-known. There exist significant potential conflicts between oil and gas activity and other uses, including related to national defense, that are unresolved, and the region currently lacks infrastructure to support oil and gas activity, including spill response resources. Therefore, these areas were removed from the scoping process, while BOEM continues to move forward with an environmental analysis of potential seismic studies to support the evaluation of the oil and gas resource potential in these areas. Industry generally carries out such studies as information-gathering precursors to any lease sale planning with the data available to the government on a proprietary basis.

In developing this Proposed Program, BOEM carefully considered the risks associated with oil spills; the measures needed to reduce the likelihood of their occurrence and mitigate damage in the unlikely event of a blowout; and the significant safety and environmental improvements that have resulted from the reforms that BOEM and BSEE implemented since the *Deepwater Horizon* event, as well as improved industry capabilities such as the development of subsea containment systems. The Draft EIS includes extensive consideration of these reforms, as well as discussion of how the current standards compare with what regulations previously required. It concludes that the new measures create a more robust regulatory system that strikes the right balance to ensure that energy development is conducted safely and in an environmentally responsible manner, while also being more efficient, transparent, and responsive. For a more detailed description of the regulatory, policy, and procedural actions taken since the *Deepwater Horizon* event in order to mitigate risks, see Section IV.A of the Draft EIS for the 2012-2017 Program.



Map A – Alaska Program Areas



Map B – Lower 48 State Program Areas

II. FRAMEWORK FOR FORMULATING THE PROPOSED PROGRAM FOR 2012-2017

A. Procedural Requirements

The development of the Proposed Program is one of several steps in the process of preparing the new 5-Year Program. This document is the second of three decision proposals of OCS lease sales for the 2012-2017 timeframe. Before a new 5-Year Program may be approved and implemented, BOEM must receive and consider comments on a Draft Proposed Program (DPP), issue for public review a Proposed Program and Draft EIS, and then issue a Final EIS and a Proposed Final Program to submit to the President and the Congress. The key steps in preparing a new 5-Year Program under section 18 of the Act and section 102(2)(C) of NEPA are described below.

Request for Comments and Suggestions

On August 1, 2008, BOEM published in the *Federal Register* (73 FR 45065) a request for comments and information regarding the preparation of a new 5-Year Program for 2010-2015, to commence two years before the expiration of the current 5-Year Program for 2007-2012, and announced the start of scoping for the associated EIS. The BOEM also sent letters to the governors and the heads of interested federal agencies requesting their input by September 15, 2008.

Draft Proposed Program

The 2009 DPP included various analyses of the section 18 factors (see parts IV and V of the 2009 DPP) and was offered as the initial proposal for the 5-Year Program for 2010-2015. The BOEM announced the 2009 DPP and notice of intent to prepare an EIS in the *Federal Register* on January 21, 2009, (74 FR 3631) and distributed it to governors, heads of interested federal agencies, and interested and affected parties for a statutory-minimum 60-day comment period. The Secretary later extended the comment period to 240 days and it closed on September 21, 2009. Comments received are summarized in Appendix A of this document and include those received at the four public meetings that the Secretary convened in April 2009. Extension of the comment period and other intervening events precluded a final program from covering the originally-proposed 2010-2015 time frame.

Proposed Program

This Proposed Program is based on further section 18 analyses and consideration of the comments received concerning the 2009 DPP. The BOEM announces the Proposed Program in the *Federal Register* and submits it, along with supporting analyses and a Draft EIS, to the governors, heads of interested federal agencies, Congress, and other interested and affected parties, for a minimum 90-day comment period. The BOEM also gives the governors written responses to their comments on the 2009 DPP. The Secretary's Proposed Program is explained in part I of this document.

Proposed Final Program

The Proposed Final Program will be the third of the Secretary's proposals and will be based on further section 18 analyses and consideration of the comments received by BOEM concerning

the Proposed Program. The BOEM will announce the Proposed Final Program in the *Federal Register* and submit it to the President and the Congress, along with supporting analyses, summaries of any comments received, and an explanation of the responses to any recommendations received from state and local governments and to the Attorney General and other federal agencies. The BOEM will issue a Final EIS with the Proposed Final Program.

Program Approval

Sixty days after the Proposed Final Program is submitted to the President and the Congress, the Secretary may approve the new 5-Year Program.

B. Substantive Requirements

Section 18 of the Act sets forth specific principles and factors that guide 5-Year Program formulation by providing the foundation for the 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 determined to best meet national energy needs. A brief overview of those section 18 requirements is presented below.

Energy Needs

Section 18(a) states that the purpose of the 5-year OCS oil and gas leasing program is to help meet the Nation's future energy needs. Part IV.A presents an analysis of the Nation's anticipated energy needs. The analysis includes discussions of the U.S. Department of Energy's (DOE) projections of national energy needs in the *Annual Energy Outlook 2011*, the potential contribution of OCS oil and natural gas production in meeting those needs, alternatives to OCS production, and considerations relating to regional energy needs.

Environmental Considerations, Social and Economic Value

Section 18(a)(1) requires that the Secretary manage the OCS "in a manner that considers the economic, social and environmental values of the renewable and nonrenewable resources. The program analyses summarized in part IV of this document are conducted to ensure that economic, social and environmental values of the OCS are incorporated as important parts of the program's development. The Act also requires the Secretary to consider potential impacts that OCS activities could have on oil and natural gas resources and on the marine, coastal, and human environments. Part IV.B presents the environmental information, including issues and concerns that have been raised by commenters, and presents information relating to safe and sound operations, as well as pertinent findings of the Draft EIS for the 5-Year Program for 2012-2017 and other relevant NEPA documents.

Economic Value

Economic value is realized from decades of oil and natural gas activity and production that results from activity on leases awarded during the program. There are several metrics used to calculate economic value, such as net economic value 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 surplus⁵ related to potentially

⁵ As explained under the Net Benefits heading in part IV of this document, consumer surplus, a standard term in economics, represents the difference between the price actually charged for a service or product and the higher price

lower domestic oil and natural gas prices resulting from OCS production. Economic values are primarily discussed in the Assurance of Fair Market Value Options section in part III and the Comparative Analysis of OCS Planning Areas section in part IV of this document.

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 produce the greatest social value, the program is being efficiently managed. Social value is negatively impacted (a social welfare loss) when OCS resources are not developed in the interest of conservation or when program activities result in costs to society, as from the results of air pollution or from a damaging event like an oil spill. Energy substitutes for foregone 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 include both economic and environmental values and are components of all the substantive requirements analyses but are especially relevant in the Comparative Analysis of OCS Planning Areas and Assurance of Fair Market Value sections in part IV of this document, as well as in the Draft EIS.

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 Draft EIS for the 2012-2017 Program considers environmental value in describing the potential impact of oil and gas activity on natural capital in the marine, coastal and human environments. In addition, the substantive requirements analyses presented herein discuss environmental sensitivity, marine productivity, predictive information, and relevant environmental impacts and their importance on environmental value. When monetized for the benefit-cost analysis in the Comparative Analysis of OCS Planning Areas in part IV of this document, by the nature of the unit of measurement, environmental value is expressed in terms of social value, but BOEM attempts to capture the full value both by the nature of the valuation and by the assessment of environmental value in the other analyses.

The BOEM is supporting ongoing research to consider options and potential new approaches to defining and measuring environmental value including assessments of relative environmental sensitivity as called for in section 18 (a)(2)(G) of the Act. Findings from new research may lead to changes in the model in advance of the Proposed Final Program.

Factors for Determining Timing and Location of Leasing

consumers would be willing to pay for a service or product if they had to. In this context, an action or event that lowers the price of a good or service will increase consumer surplus by the change in price times the quantity purchased at that lower price.

Section 18(a)(2) lists eight factors to be considered in deciding the timing and location of oil and gas activities among the different areas of the OCS. While some of these factors lend themselves to quantification to facilitate comparison among planning areas, others do not and need to be considered qualitatively. Each of the eight factors provided in 18(a)(2)(A) through (H) is listed below along with references to the parts of the Proposed Program analysis and the Draft EIS that address them, as appropriate.

(A) Geographic, Geological, and Ecological Characteristics

The main source of information on geographic, geological, and ecological characteristics of the OCS planning areas considered in preparing the Proposed Program is the Draft EIS for the 5-Year Program for 2012-2017. Other sources include recent NEPA documents prepared for leasing and operational activities; the BOEM 2011 resource assessment and associated reports; the MMS cumulative effects report; the 1994 National Research Council report concerning information for Alaska OCS decisions; scientific study results, which are reported in the environmental studies program information system (ESPIS) database; and any information submitted or cited by commenters.

(B) Equitable Sharing of Developmental Benefits and Environmental Risks

Part IV.C briefly analyzes the equitable sharing factor. It discusses the analyses and findings of previous 5-Year Programs and briefly cites new developments and their potential influence on the nature and distribution of benefits and risks associated with the size, timing, and location options available for consideration.

Equitable sharing is affected by the long-term withdrawal of and moratoria on leasing certain areas. The only existing moratorium is pursuant to GOMESA and the withdrawals are for the NAB, offshore Alaska, and National Marine Sanctuaries.

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

Part IV.A analyzes regional and national energy needs. Chapter III of the Draft EIS describes the socioeconomic environment for each OCS region, including the existing oil and natural gas infrastructure and its relationship to new leasing. Recent lease sale EISs and other NEPA documents cited at the end of this part 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

Part IV.C discusses competing uses of the OCS. This summary is based on information provided in the Draft EIS for the 2012-2017 Program. Other sources include the 1997 MMS cumulative effects report, recent lease sale EISs and other NEPA documents cited above in paragraph (A), ESPIS results, and any information submitted or cited by commenters.

(E) Interest of Potential Oil and Gas Producers

Part IV.C describes industry interest as indicated in response to the 2009 DPP. The discussions of size, timing, and location options in part III also include summaries of industry interest. Appendix A summarizes all comments received from the oil and gas companies and associations.

(F) Laws, Goals, and Policies of Affected States

The discussions of size, timing, and location options in part III include summaries of the relevant laws, goals, and policies – and federally approved coastal zone management programs and policies – that any state governments may have identified in responding to BOEM requests for comments. Appendix A summarizes all comments received from state governors and government agencies.

(G) Environmental Sensitivity and Marine Productivity

Part IV.C analyzes environmental sensitivity and marine productivity for the six areas included in the Proposed Program, following the process and format used in the Revised Program for 2007-2012, in response to the U.S. District Court for the District of Columbia's remand decision of April 17, 2009, (*Center for Biological Diversity, et al. v. Department of the Interior*, 563 F3d 466 (D.C. Cir. 2009)). This expanded analysis includes information from NOAA's Environmental Sensitivity Index (ESI) for shoreline/coastal habitats, plus additional information regarding the sensitivity of offshore and marine resources. This expanded analysis divides into three components the different areas of the OCS that may be affected by oil and natural gas activities – marine habitats, marine productivity, and marine fauna (i.e., birds, fish, marine mammals, and sea turtles). The expanded analysis also considers sensitivity to oil spills and other impacting factors, such as sound and physical disturbance, and increased sensitivity due to climate change and ocean acidification.

“Sensitivity” is not a well-defined term in ecology or environmental science. Sensitivity can be considered from at least two perspectives: 1) the vulnerability of ecological components (such as species) to potential impacts (such as harm to individual animals) and 2) an ecosystem's ability to resist fundamental change and recover from an impact. While the former vulnerability approach or “component response” approach provides a relatively straightforward and quantifiable measure of potential impacts, it does not consider the cumulative effect that the impacts have on an ecosystem's ability to resist fundamental, or “state,” change, a characteristic known as “resilience”, which is captured in the second approach and would focus more on a “system response.” In past analyses, BOEM has focused on a vulnerability or component response approach to evaluating sensitivity. In an effort to constantly improve the basis for decisionmaking, BOEM is supporting ongoing research to consider options and potential new approaches to defining and measuring environmental value including assessments of relative environmental sensitivity as called for in section 18 (a)(2)(A) of the Act. Findings from new research and analysis may lead to changes in the model in advance of the Proposed Final Program.

As used in this Proposed Program, the term “sensitivity,” refers to “sensitivity, as measured by indicators of vulnerability to impact.” Hereafter “sensitivity, as measured by indicators of vulnerability to impact,” will be indicated by use of the term “sensitivity*.”

(H) Environmental and Predictive Information

Part IV.B presents an analysis of environmental concerns that references relevant information and findings from the Draft EIS for the 5-Year Program for 2012-2017, the most recent lease sale EISs and other NEPA documents, as well as other BOEM reports and studies. Part III.A presents selected information and findings from the Draft EIS relevant to each Proposed Program area.

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

Section 18(a)(3) requires the Secretary to render decisions on the timing and location of OCS leasing that strike a balance between the potential for environmental damage, the potential for discovery of oil and gas, and the adverse impact on the coastal zone. Part V.C of the 2009 DPP addressed the balancing requirement by presenting a comparative analysis of all 26 planning areas. This Proposed Program document compares the six areas being considered for leasing, which are referred to as “program areas.”

An important element of the comparative analysis is an estimation of societal net benefits for each program area. These are derived by first calculating the value of oil and natural gas resources minus the cost to industry and the net environmental and social costs of developing those resources. The BOEM refers to the results of this analysis as “net social value.” Consumer surplus benefits are then added to net social value to produce an estimate of net benefits for each program alternative. See the descriptions of the various types of “value” set out previously in this part. The comparative analysis also ranks the program areas according to quantified information relating to environmental sensitivity and marine productivity and according to the interest of potential oil and natural gas producers. Other section 18(a)(2) factors do not lend themselves as readily to quantification and are treated qualitatively. The comparative analysis also examines additional qualitative information pertaining to the findings and purposes of the 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 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 existing circumstances.

Assurance of Fair Market Value (FMV)

Section 18(a)(4) requires that leasing activities be conducted “to assure receipt of fair market value for the lands leased and the rights conveyed by the Federal Government.” Part III.B of this document discusses the different mechanisms BOEM has in place to ensure receipt of FMV.

C. Judicial Guidance

The new 5-Year Program will be the eighth prepared by DOI. The first three Programs prepared and approved under section 18 were challenged in court—in 1980, 1982, and 1987, as was the 2007-2012 program. The U.S. Court of Appeals for the District of Columbia Circuit decided all of those lawsuits. The new 5-Year Program is being prepared in accordance with guidance provided in those decisions, which are cited below.

California I [California v. Watt, 688 F2d 1290 (D.C. Cir. 1981)];

California II [California v. Watt, 712 F2d 584 (D.C. Cir. 1983)];

NRDC [Natural Resources Defense Council], *et al. v. Hodel*, 865 F2d 288 (D.C. Cir. 1988)]; and

CBD [Center for Biological Diversity, *et al. v. Department of the Interior*, 563 F3d 466 (D.C. Cir. 2009)].

No lawsuits were filed with respect to the 5-Year Programs approved for 1992-1997, 1997-2002, and 2002-2007.

D. Analytic Approach

The analysis underlying development of the Proposed Program for 2012-2017 considers the size, timing, and location of leasing and the provisions for assuring FMV from the six program areas. The 2009 DPP identified program areas for further leasing consideration, consisting of all or parts of 12 of the 26 OCS planning areas. See Maps 1 and 2 in part III of this document for the OCS planning areas. This Proposed Program analysis examines and compares six selected areas in light of the criteria of section 18 of the Act. These six areas are analyzed in the Draft EIS for the 2012-2017 program, prepared pursuant to NEPA to assess the effects of the Proposed Program.

The following guiding principles are consistent with the Act's requirements in section 18, and were applied by the Secretary in selecting options for the size, timing, and location of areas proposed for leasing in this Proposed Program:

- Give priority leasing consideration to areas where the combination of previous experience; local, state, and national laws and policies; and expressions of industry interest indicate that potential leasing and development activities could be expected to proceed in an orderly and productive manner.
- For areas with known estimated hydrocarbon resources, consider leasing if, from a national and regional perspective, anticipated benefits from development substantially outweigh estimated environmental risks.

- Use best available data when committing additional acreage to leasing, especially where there is insufficient confidence in the ability to avoid or mitigate harm to valuable resources and human uses, and enhanced information will allow for better decisionmaking in the next 5-Year Program.
- Seek to accommodate the recommendations of governors of coastal states and of state and local agencies.
- Time sales in frontier areas to make use of information from exploration on existing leases in order to: 1) minimize impacts to the environment and coastal areas; 2) evaluate monitoring data; 3) better assess infrastructure needs; 4) enhance financial return in future lease sales; and 5) better define areas of greatest interest to industry.

The options presented in this document have been formulated and selected in light of these principles and the factors and elements to be considered and balanced under section 18(a) of the Act.

Development of a new 5-Year Program for 2012-2017 is based on analysis of information relating to the criteria of section 18 of the Act, which governs preparation and maintenance of the federal offshore oil and gas leasing program. Parts III and IV of this document discuss in detail the sources of information and the methodologies applied in the Proposed Program analyses. Also, as was stated in the 2009 DPP, much information is incorporated by reference. This information is listed below.

Draft EIS for the Proposed Program for 2012-2017 (November 2011)

Decision Document for the Revised Final Program for 2007-2012 (December 2010)

Decision Document for the Draft Proposed Program for 2010-2015 (January 2009)

Final EIS for the Proposed Final Program for 2007-2012 (April 2007)

Cook Inlet Planning Area Oil and Gas Lease Sales 191 and 199, Final Environmental Impact Statement, OCS EIS/EA, MMS 2003-055, Volumes 1-3, 2003

Structure-Removal Operations on the Gulf of Mexico Outer Continental Shelf, Programmatic Environmental Assessment, OCS EIS/EA, MMS 2005-013, 2005

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IV. PROPOSED PROGRAM OPTIONS

A. Size, Timing, and Location Options

Introduction

This part presents the options from which the Secretary may choose the size, timing, and location of leasing activity for 2012-2017. The BOEM has formulated these options based on its consideration of information relating to the section 18 criteria and based on the results of comments and consultation with interested and affected parties.

The OCS is divided into 26 planning areas, as was addressed in the 2009 DPP. The NAB, offshore Alaska, is subject to Presidential withdrawal from disposition by leasing until after June 30, 2017. Most of the Eastern GOM planning area located within 125 miles of Florida and a portion of the Central GOM planning area within 100 miles of Florida are unavailable for leasing consideration until after June 30, 2022, pursuant to GOMESA. These restricted areas are not being proposed for consideration.

The 2009 DPP considered the NAB, which is subject to Presidential withdrawal, discussed above, as well as two areas offshore California and three areas in the Atlantic OCS. See the discussion in part I of this document concerning those six planning areas, which along with the other two areas in the Pacific, the Straits of Florida, and the eleven other planning areas located off Alaska that were not included for leasing consideration in the 2009 DPP, are not being considered for leasing in this Proposed Program and are not analyzed in this document. This approach is consistent with *California II*, which found that “[i]f the Secretary has already determined that no leasing activity will occur in a particular area there is no need to fully evaluate that area.” Maps 1 and 2 show the areas currently unavailable for leasing.

The section 18 objectives of formulating a program to “best meet national energy needs” and to assure the receipt of FMV for leases and the rights they convey are significant determinants of the size, timing, and location options. The analyses of net social benefits and the factors specified by section 18(a)(2) provide a sound basis for developing options. Those analyses, which are presented in part IV of this document, examine economic, social, and environmental values; oil and gas resource potential and industry interest; distribution of benefits and risks; competing uses of the OCS; regional energy needs; and the laws, goals, and policies of affected states. By considering that information for each area of the OCS available for leasing consideration in the next 5-Year Program, BOEM is able to weigh different resources, values, and policies in formulating reasonable options that can be selected by the Secretary to achieve the balance required by section 18(a)(3).

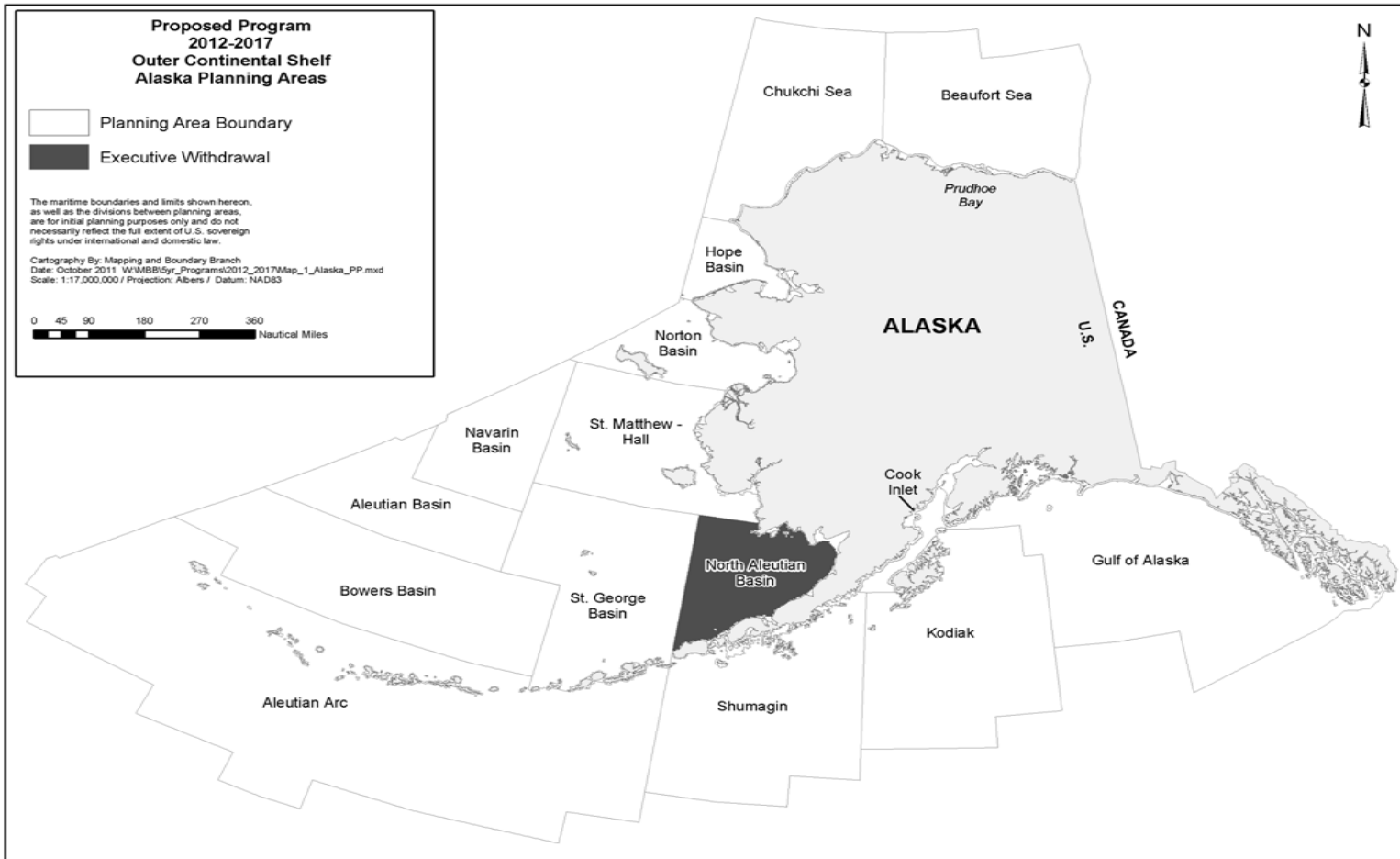
The 2009 DPP proposed sales in 12 of the 26 OCS planning areas, including the three Atlantic planning areas, two of the planning areas offshore California and the NAB, offshore Alaska, in addition to the six areas included in this Proposed Program. In consideration of the requirement to balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone pursuant to section 18(a)(3), the Secretary must decide not only the areas to include but also those to exclude from further leasing consideration. This Proposed Program does not consider 6 of the 12 areas included in the 2009 DPP – the three Atlantic planning areas, the two areas offshore California, and the NAB. The latter area also was withdrawn from leasing consideration through June 30, 2017, by the President pursuant to section 12 of the Act and therefore is not available for inclusion in the 5-Year Program under section 18. See the 2009 DPP for prior section 18 analysis of all 12 DPP areas.

To ensure adequate oversight to limit potential environmental damage and adverse impacts on the coastal zone, the Secretary decided to focus on offshore areas that currently have leases, some level of support from the adjacent state and local governments, and known or anticipated hydrocarbon presence. This decision was made after consideration of various section 18 factors; such as law, goals, and policies of adjacent states, the level of knowledge or lack thereof concerning the potential for recoverable oil and gas resources, and the environmental and other relevant information needed to make informed decisions. In their comments received on the 2009 DPP, the States of Delaware and New Jersey, which are adjacent to the North Atlantic planning area, voiced their opposition to oil and gas activities off their coasts and pointed to state policies and initiatives to move to renewable energy sources. In his comments on the 2009 DPP, the Governor of California reiterated the state's long-standing opposition by governors of both parties to new leasing off its coast. This position also was presented by the California Coastal Commission, the state agency with regulatory authority over federal activities on the OCS that affect the state's coastal resources pursuant to CZMA.

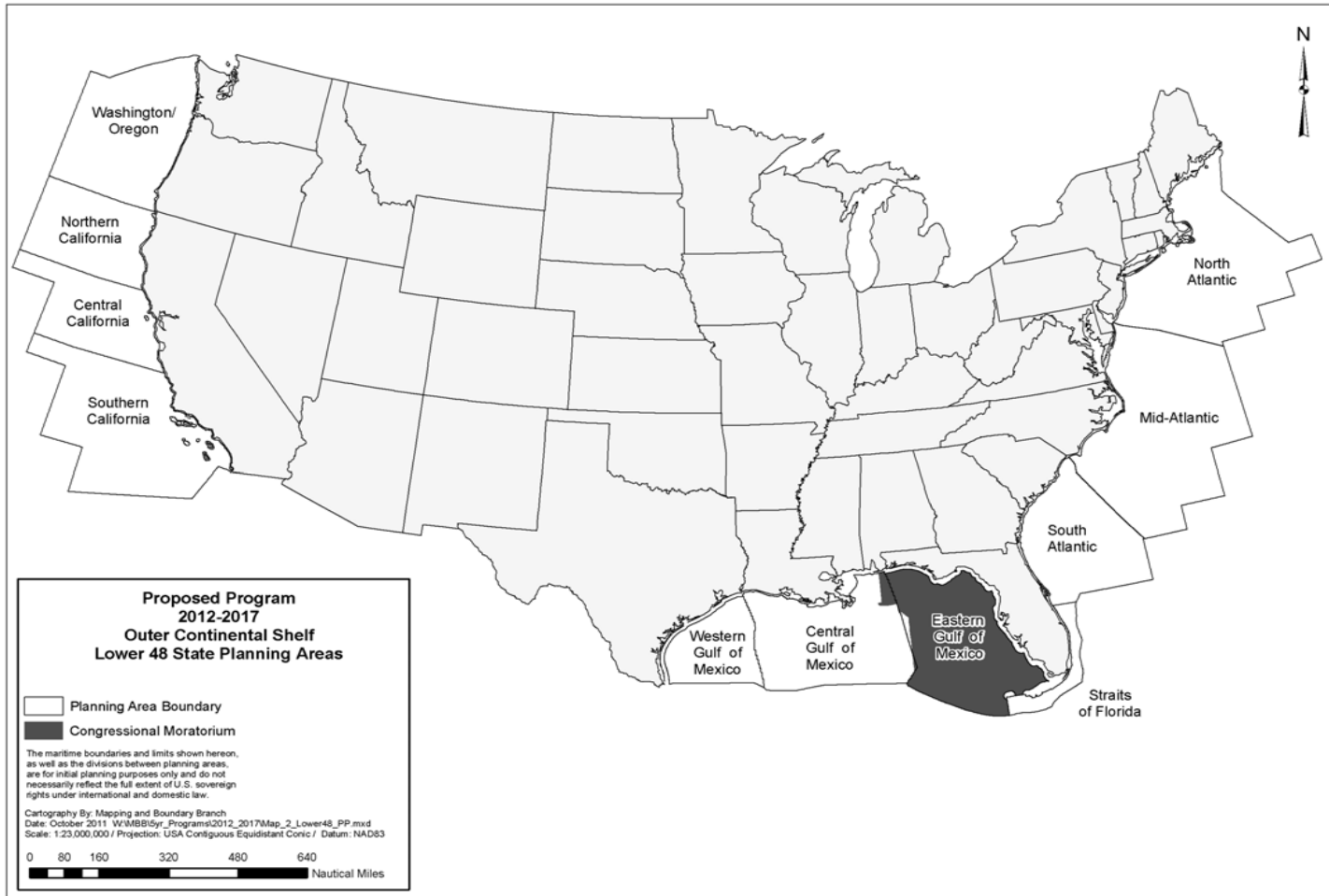
Additionally, as the potential amount and location of oil and gas resources in the Mid- and South Atlantic planning areas are not known, the Secretary decided to remove these two planning areas from the scoping process and instead to move forward with an environmental analysis related to potential seismic studies to support the evaluation of the oil and gas resource potential in these areas. Industry generally carries out such studies as information-gathering precursors to any lease sale planning, with the data available to the government on a proprietary basis. Also relevant to the Secretary's decision not to include the Mid- and South Atlantic planning areas in the scoping for Draft EIS and consideration in the Proposed Program was the need to evaluate conflicts, including related to national defense, in these areas and the need to evaluate the infrastructure necessary to support offshore oil and gas activity, including spill response, in these areas.

As noted in part I, the 2009 DPP encompassed the 2010-2015 timeframe, while this proposal is for 2012-2017. For that reason, the presentation of the DPP options in this document do not list the sale year, only the total number of sales in the 2009 DPP for the particular area. The selected comments summarized for each Proposed Program area were received during the extended

comment period on the 2009 DPP, which closed on September 21, 2009. There has not been a solicitation for comments on the program since that time.



Map 1 – Alaska Planning Areas with restrictions



Map 2 – Lower 48 State Planning Areas with restrictions

Additional Considerations

The location and size of lease sales in a 5-Year Program are largely determined by the configuration of planning areas and program areas for leasing consideration. The OCS planning areas initially were established following the enactment of the OCS Lands Act Amendments of 1978 and have been reconfigured several times over the past 20 years, most recently to correspond to administrative lines announced in the *Federal Register* in January 2006 and announced in the Draft Proposed Program for 2007-2012 (February 2006). That portion of the individual planning area that is being considered for leasing is referred to as the program area. A program area can be the entire planning area as in the Cook Inlet offshore Alaska; a small portion as in the Eastern GOM; or any size in between. The program also provides for the number and timing of sales within and among areas.

The Proposed Program options provide for scheduling lease sales in the Western, Central, and Eastern GOM planning areas and the Beaufort Sea, Chukchi Sea, and Cook Inlet planning areas off Alaska. Each lease sale that is scheduled in the approved 5-Year Program for 2012-2017 will be subject to an established prelease evaluation and decision process in which interested and affected parties may participate. That process examines the proposed lease sale, starting with the area identified as available for leasing consideration in the 5-Year Program, and considers reasonable alternative lease sale configurations within that area. No sale area may be larger than the original proposal. The prelease process leads to the final decision on the size, timing, and location of each OCS lease sale.

Size, timing, and location options are designed also to mitigate drainage of federal oil and gas resources on unleased lands and associated revenue losses that could occur as a result of existing or anticipated development activity on adjacent state leases. Acquisition of new geological and geophysical data is also a relevant consideration. Finally, the scheduling of lease sales must allow time for orderly and deliberate preparation for each sale, including the acquisition and analysis of relevant scientific information, and the completion of the prelease evaluation and decision process.

Proposed Program Options for Scheduling Lease Sales

This decision document offers options for scheduling lease sales for the six Proposed Program areas. Background information on the history of leasing and related activities in each area was included in the 2009 DPP and is not repeated in this document. Summaries of the key results of the comparative analysis and the comments of interested and affected parties precede each set of lease sale options. The comparative analysis summaries are condensed from part IV.C and the comment summaries are adapted from Appendix A.

A discussion of the individual options follows each set of options. Each leasing option is discussed in terms of the anticipated benefits of the proposed leasing and ensuing production, as well as the potential environmental impacts that could be expected. As explained in part IV.C, the valuation of anticipated production differs from the total net benefits analysis in the 2009 DPP. The latter compared the value of all the economically recoverable resources available for leasing in each area while the former compares the value of only those resources that would

reasonably be expected to be discovered and produced given the size and timing of the lease sale(s) specified in each option.

Relationship of Proposed Program Options to the Draft EIS Alternatives

The draft EIS analyzes eight alternatives that correspond to individual lease sale options as follows:

- Alternative 1—The Proposed Action (Option 1 for all areas)
- Alternative 2—Exclude the Eastern GOM from the 2012-2017 program (Option 3)
- Alternative 3—Exclude the Western GOM the 2012-2017 program (Option 2)
- Alternative 4—Exclude the Central GOM from the 2012-2017 program (Option 2)
- Alternative 5—Exclude the Beaufort Sea from the 2012-2017 program (Option 2)
- Alternative 6—Exclude the Chukchi Sea from the 2012-2017 program (Option 2)
- Alternative 7—Exclude the Cook Inlet from the 2012-2017 program (Option 2)
- Alternative 8—No Action (Option 3 for Eastern GOM; Option 2 for all other program areas)

ALASKA REGION

Draft Proposed Program Decision

The 2009 DPP scheduled two sales in the Beaufort Sea, three sales in the Chukchi Sea, and two “special interest” sales in Cook Inlet. See the discussion under the Cook Inlet Proposed Program Options for a description of the proposed special interest sale process.

Proposed Program Options

Beaufort Sea

Key Comparative Results. The net benefits of anticipated production in this Proposed Program area are estimated at \$2.90 billion in the low-price case, \$5.06 billion in the mid-price case, and \$14.82 billion in the high-price case. The area ranks as “More Sensitive* to Impact” as a component of environmental sensitivity when environmental sensitivity is defined based on the vulnerability (e.g. potential harm to individuals) of different ecological components (such as individual species) to potential impacts and 6th of 6 for marine productivity.

Selected Comments. The Governor of Alaska strongly supported a responsible leasing program that makes OCS leases off Alaska available for exploration and development, particularly in the Beaufort Sea, to help augment the depleting flow through the Trans-Alaska Pipeline System

(TAPS). The Governor pointed out the role that Alaska's resources can play in the transition to renewable energy sources and as an integral part of the national economy. The Governor felt that activity can be done in an environmentally responsible way while respecting Alaskan native culture, traditions, and subsistence harvesting. The Alaska congressional delegation and numerous state legislators supported OCS leasing. Most localities supported OCS activity, but some were opposed. The North Slope Borough opposed moving forward without a comprehensive inventory of offshore resources and baseline data. The Northwest Arctic Borough opposed OCS leasing without a comprehensive plan for protecting the Arctic and indigenous peoples, technology to clean up spills, search and rescue capability, and a comprehensive energy plan for the Nation. The DOE encouraged consideration of leasing in Alaska. Numerous national and Alaska-based environmental groups opposed leasing in the Beaufort Sea, particularly citing the need for a more science-based approach to managing the Arctic. Numerous non-energy industry entities at the national level supported the 2009 DPP. Local Alaska businesses stressed the important role of energy to the state's economy. Eight companies expressed interest in leasing in this area.

Proposed Program Options

(1) **One sale in 2015 in the program area depicted in Map 3**

(2) No sale

Discussion

Option 1 (1 Sale)

Valuation. The net benefits of anticipated production in the Proposed Program area are estimated at \$2.90 billion in the low-price case, \$5.06 billion in the mid-price case, and \$14.82 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows. As noted above, the single sale for the Beaufort Sea is proposed late in the program in light of the time needed to review and analyze new information, including ongoing and future scientific studies and the results from any exploration that may occur. Lease-specific decisions, including decisions about additional deferral areas and environmental stipulations, will address new information, as well as feedback from other federal agencies, state government, native communities, and other stakeholders.

Water Quality—Routine operations would result in minor to moderate, short-term, localized impacts such as disturbing sediments and increasing turbidity near construction sites and altering water chemistry from operational discharges. Minor water quality impacts could also occur from fluids entrained in ice roads when they break up in the spring. Compliance with National Pollutant Discharge Elimination System (NPDES) permits and U.S. Coast Guard (USCG) regulations would reduce impacts of routine operations. The effects of accidental oil spills will depend upon material, spill size, location, season, response, and remediation activities. In the presence of cold temperatures and ice, cleanup activities would be extremely difficult. Small

spills would likely result in short-term impacts. Impacts from a large oil spill, including those from a very large spill associated with an unlikely Catastrophic Discharge Event (CDE), defined as a discharge of a volume of oil into the environment that could result in catastrophic effects, could persist for an extended period of time if oil were deposited in wetland and beach sediments or low-energy environments because of potential remobilization. Spills under ice could affect water quality for relatively long periods.

Air Quality—Routine operations are expected to result in minor impacts to air quality. Routine operations would not result in exceeding the National Ambient Air Quality Standards (NAAQS) in public access areas or impact visibility. Smaller oil spills could have localized and temporary impacts. Pollutant levels from very large spills, including accidental spills associated with an unlikely CDE, and associated *in situ* burning if used, could be major during the initial leak and again during cleanup efforts. Plumes from *in situ* burning could temporarily degrade visibility, but eventually, air quality is expected to return to normal or near normal. The long-term air quality effects associated with a spill and cleanup would be minor.

Acoustic Environment—Routine operations could affect ambient noise conditions, but impacts to ambient noise levels are expected to be minor. Noise generating sources associated with routine operations include seismic surveys, drilling and production, infrastructure placement and removal, and vessel traffic. Depending on the source and activity, changes in ambient noise levels could be short-term and localized (e.g., from vessel traffic), long-term and localized (from production), or short-term and less localized (from seismic surveys). Seismic surveys could result in short-term changes in ambient noise levels, but the changes could extend well beyond the survey boundary.

Coastal and Estuarine Habitats—Routine operations would be expected to result in minor to moderate localized impacts primarily due to road and facility construction, and vessel traffic. These operations could have a major effect on the local indigenous residents most proximate to development if it interferes with their subsistence practices for the greater part of a season. The effects of accidental oil spills will depend on habitats affected; the size, location, duration and timing of the spill; and on the effectiveness of spill containment and cleanup activities. Large, including CDE-level, and small spills could result in long-term and short-term impacts, depending on the habitats affected; the duration and size of the spill, and on the effectiveness of spill containment and cleanup activities.

Marine Habitats—Routine operations associated with platform and pipeline placement could result in moderate and long-term impacts to benthic habitats, primarily soft sediments. Accidental releases of oil could be long-term and range from small to medium depending on the habitat affected, cleanup method, and the size, duration, timing, and location of the spill. Routine operations could result in negligible to minor, short-term to long-term impacts to pelagic habitat. The effects of accidental releases of oil, including a CDE, could result in minor, but long-term impacts to pelagic habitat and sea ice habitat, depending on the size, duration, timing, and location of the spill; the habitat affected; and the effectiveness of spill containment and cleanup activities. Severe winter weather and ice cover may be expected to limit containment and cleanup in winter.

Essential Fish Habitat—Routine operations could result in no more than moderate short- and long-term impacts to essential fish habitat (EFH) and managed species. Accidental releases of oil could result in moderate and long-term impacts. Impacts from accidental oil spills, including CDE-level spills, could be long-term depending on the size, duration, timing, and location of the spill; the habitats affected; and the effectiveness of spill containment and cleanup activities, which could be hampered by extreme winter conditions and ice cover.

Marine Mammals—Collisions with OCS-related vessels may injure or kill some individuals, although the incidence of such collisions is expected to be low. Vessels, construction of ice roads, on-ice vehicles, and aircraft have been known to temporarily disturb some individuals. For example, polar bears may abandon dens, but these effects would likely be short-term and mitigation can reduce the disturbance. Negligible to minor impacts to fauna from disturbance or habitat loss from construction and operation of onshore pipeline are expected. Disturbance from noise sources is the most likely impact. A large oil spill, including CDE-level spills, in the Arctic would most likely affect marine mammals by oil-contaminated ice leads, polynyas, rookeries, beaches, and haulouts.

Terrestrial Mammals—Impacts to terrestrial mammals from routine operations would be negligible. A spill, especially from an onshore pipeline, could contaminate habitats used by caribou, grizzly and brown bears, Arctic foxes, and muskoxen. Coastal beaches are particularly critical to species including caribou seeking relief from mosquitoes.

Marine and Coastal Birds—Routine operations may result in negligible to moderate localized short-term impacts; impacts associated primarily with infrastructure construction, and ship and helicopter traffic. Impacts of routine operations to important coastal habitats such as nesting areas and overwintering sites could result in greater, more long-term impacts should normal breeding and nesting activities be disrupted. Small accidental oil spills are expected to have largely local, small effects. Large spills, including CDE-level spills, may result in large, long-term, and possibly population-level effects. The actual magnitude of the effects will depend on the size, duration, and timing of the spill; the species and habitats affected; and the effectiveness of spill containment and cleanup activities. Because of the importance of certain habitat areas for some migrating and breeding birds, spills affecting those birds and habitats could result in long-term population level impacts for some species if the spills affect important nesting colonies, migratory staging areas, or wintering grounds.

Fish Resource—Negligible to minor impacts to fish are expected from routine operations. The impact magnitude of a large oil spill, including a CDE-level spill, would depend on the location, timing, and size of the spill, and the distribution and ecology of affected fish species. Oil contacting shoreline areas could result in large-scale lethal and long-term sublethal effects on early life stages, but no permanent population level effects are expected.

Invertebrates and Lower Trophic Levels—Routine operations could result in negligible to moderate impacts to primarily benthic invertebrates. Recovery could be short- to long-term. Large accidental oil spills, including CDE-level spills, could measurably depress invertebrate populations, especially in intertidal areas. However, no permanent impacts are expected.

Areas of Special Concern—Impacts resulting from routine activities are expected to be negligible to moderate because of the existing protections and use restrictions. Impacts from large accidental oil spills, including CDE-level spills, reaching these areas could negatively affect fauna and habitats, subsistence use, commercial or recreational fisheries, recreation and tourism, and other uses.

Population, Employment, and Income—Direct expenditures associated with routine operations would result in minor impacts from small increases in population, employment and income in arctic communities over the duration of the leasing period, corresponding to less than 5 percent of the baseline. Expenditures associated with spill cleanup activities would create short-term employment and income in some parts of the affected coastal region(s).

Land Use and Existing Infrastructure—Routine operations would result in minimal to moderate impacts to land use, development patterns, and infrastructure. The construction and operation of offshore facilities would expand the area potentially at risk from accidental oil spills, along with the requirement to maintain oil-spill response equipment. An accidental oil spill, including a CDE-level spill, could alter land use temporarily but would not likely result in long-term changes. The magnitude of the impacts would depend on the size and location of the spill.

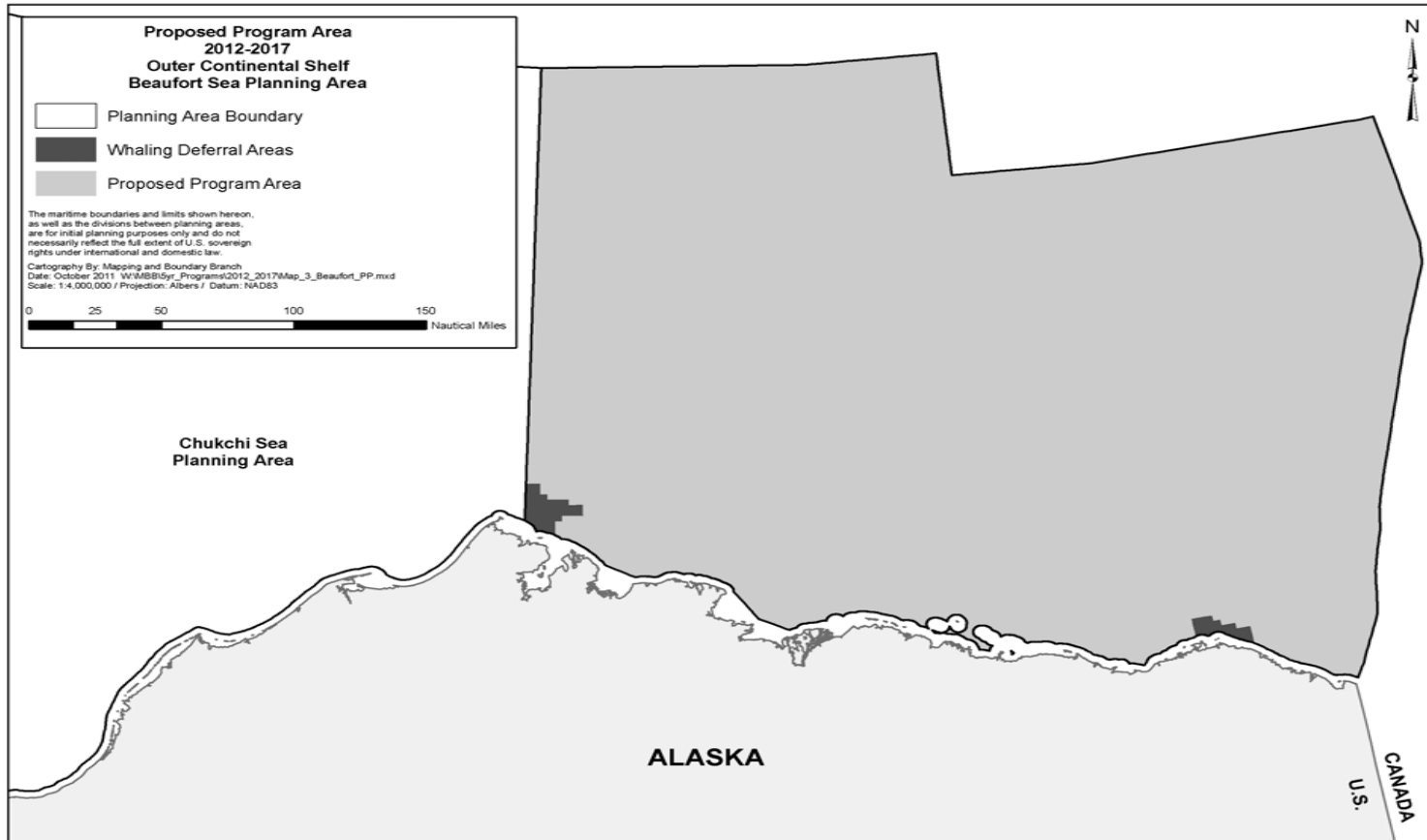
Fisheries—Routine operations would have a minor impact on subsistence fishing over the duration of the leasing period. Large accidental oil spills, including CDE-level spills, may have small to medium, short-term impacts on fisheries resources, including lethal and sublethal toxic effects on exposed eggs, larvae, juveniles, and adults, and small to medium impacts on subsistence fishery and other commercial and recreational fishing activities, such as trawling and charter fishing. The magnitude and duration of effects will depend on the location, size, duration, and timing of the spill; the fisheries affected; and the duration and effectiveness of spill containment and cleanup activities.

Sociocultural Systems and Environmental Justice—Potential impacts of routine operations can range from minor to major on sociocultural systems in the Arctic planning areas, depending on shore base infrastructure and proximity to existing communities. Accidental oil spills, including CDE-level spills; however, may result in serious impacts, especially in the Arctic where impacts to subsistence could result in large impacts to affected communities.

Archaeological Resources—Routine operations could affect significant archaeological and historic resources especially in offshore locations through construction activities such as platform and pipeline construction. Onshore impacts including visual impacts are also possible from pipeline landfall, onshore pipeline, and road construction. Impacts could range from negligible to major, depending on the presence of significant archaeological or historic resources in the area of potential effect. Most resources are expected to be avoided. Accidental oil spills, including CDE-level spills, could impact archaeological and historic resources, depending on the spill location, size, and duration, as well on the effectiveness and nature of spill containment and cleanup activities.

Other Information. The BOEM received several comments, particularly during the scoping process for the Draft EIS, concerning why the two deferral areas in the Beaufort Sea program

area were excluded from leasing consideration and not other areas. Both of these areas were deferred from leasing consideration during the presale process in the three most recent sales, Sales 186, 195 and 202 under the 2002-2007 program. Although no sales were scheduled in the Revised Program for 2007-2012, both these areas were excluded in the Beaufort Sea sales that were on the Proposed Final Program as approved June 2007, and were excluded from leasing consideration in the 2009 DPP. Generally, area deferrals such as these are more appropriately addressed at least initially, at the lease sale stage. Possible deferral of additional areas should be raised for consideration during the pre-sale process for any upcoming Beaufort Sea sales, consistent with a strategy for appropriately tailoring the size and scope of any lease sale in the Arctic in light of evaluation of resource potential and environmental and subsistence considerations.



Map 3 – Beaufort Sea Program Area

Option 2 (No Sale)

Valuation. The net benefits of production would be zero since no activity would occur. However, foregoing the production anticipated to result from a Beaufort Sea sale would result in environmental and social costs incurred to obtain the energy substitutes, including additional imports of oil and increased onshore production of oil and gas, among others.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternatives 5 and 8. A summary of the Draft EIS findings follows.

Under this option the potential direct effects of routine operations in the Beaufort Sea that are described under the analysis of the proposed action would not occur. No oil spills would originate within the Beaufort Sea, although marine and coastal environmental resources there could be affected by a spill that originates in the Chukchi Sea. Energy substitutions for the forgone hydrocarbon production in the Beaufort Sea under this option could increase tanker import spill risks in OCS areas along the Pacific, GOM, and Atlantic coasts that contain tanker ports and terminals.

Chukchi Sea

Key Comparative Results. The net benefits of anticipated production from the proposed Chukchi Sea program area are estimated at \$7.39 billion in the low-price case, \$23.90 billion in the mid-price case, and \$69.27 billion in the high-price case. The area ranks as “Less Sensitive* to Impact” as a component of environmental sensitivity when environmental sensitivity is defined based on the vulnerability (e.g. potential harm to individuals) of different ecological components (such as individual species) to potential impacts, and 5th of 6 for marine productivity. .

Selected Comments. The Governor of Alaska strongly supported a responsible leasing program that makes OCS leases off Alaska available for exploration and development. The Governor pointed out the place that Alaska’s resources can play in the transition to renewable energy sources and as an integral part of the national economy. The Governor felt that activity can be done in an environmentally responsible way while respecting Alaskan native culture, traditions, and subsistence harvesting. The Alaska congressional delegation and numerous state legislators supported OCS leasing. Most localities supported OCS activity, but some were opposed. The North Slope Borough opposed moving forward without a comprehensive inventory of offshore resources and baseline data. The Northwest Arctic Borough opposed OCS leasing without a comprehensive plan for protecting the Arctic and indigenous peoples, technology to clean up spills, search and rescue capability, and a comprehensive energy plan for the Nation. The DOE encouraged consideration of leasing in Alaska. Numerous national and Alaska-based environmental groups opposed leasing in the Chukchi Sea, particularly citing the need for a more science-based approach to managing the Arctic. Numerous non-energy industry entities at the national level supported the 2009 DPP. Local Alaska businesses stressed the important role of energy to the state’s economy. Nine companies expressed interest in leasing in this area.

Proposed Program Options

(1) One sale in 2016 in the program area depicted in Map 4

(2) No sale

Discussion

Option 1 (1 Sale)

Valuation. The net benefits of anticipated production in the Proposed Program area are estimated at \$7.39 billion in the low-price case, \$23.90 billion in the mid-price case, and \$69.27 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows. As noted above, the single sale for the Chukchi Sea is proposed late in the program in light of the time needed to review and analyze new information, including ongoing and future scientific studies and the results from any exploration that may occur. Lease-specific decisions, including decisions about additional deferral areas and environmental stipulations, will address new information, as well as feedback from other federal agencies, state government, native communities, and other stakeholders.

Water Quality—Routine operations would result in minor to moderate, short-term, localized impacts such as disturbing sediments and increasing turbidity near construction sites and altering water chemistry from operational discharges. Minor water quality impacts could also occur from fluids entrained in ice roads when they break up in the spring. Compliance with NPDES permits and USCG regulations would reduce impacts of routine operations. The effects of accidental oil spills will depend upon material, spill size, location, season, response, and remediation activities. In the presence of cold temperatures and ice, cleanup activities would be extremely difficult. Small spills would likely result in short-term impacts. Impacts from a large oil spill, including those from a very large spill associated with an unlikely CDE, defined as a discharge of a volume of oil into the environment that could result in catastrophic effects, could persist for an extended period of time if oil were deposited in wetland and beach sediments or low-energy environments because of potential remobilization. Spills under ice could affect water quality for relatively long periods.

Air Quality—Routine operations are expected to result in minor impacts to air quality. Routine operations would not result in exceeding the NAAQS in public access areas or impact visibility. Smaller oil spills could have localized and temporary impacts. Pollutant levels from very large spills, including accidental spills associated with an unlikely CDE, and associated *in situ* burning, if used, could be major during the initial leak and again during cleanup efforts. Plumes from *in situ* burning could temporarily degrade visibility, but eventually, air quality is expected to return to normal or near normal. The long-term air quality effects associated with a spill and cleanup would be minor.

Acoustic Environment—Routine operations could affect ambient noise conditions, but impacts to ambient noise levels are expected to be minor. Noise generating sources associated with routine operations include seismic surveys, drilling and production, infrastructure placement and removal, and vessel traffic. Depending on the source and activity, changes in ambient noise levels could be short-term and localized (e.g., from vessel traffic), long-term and localized (from production), or short-term and less localized (from seismic surveys). Seismic surveys could result in short-term changes in ambient noise levels, but the changes could extend well beyond the survey boundary.

Coastal and Estuarine Habitats—Routine operations would be expected to result in minor to moderate localized impacts primarily due to road and facility construction, and vessel traffic. These operations could have a major effect on the local indigenous residents most proximate to development if it interferes with their subsistence practices for the greater part of a season. The effects of accidental oil spills will depend on habitats affected; the size, location, duration and timing of the spill; and on the effectiveness of spill containment and cleanup activities. Large, including CDE-level and small spills, could result in long-term and short-term impacts, depending on the habitats affected; the duration and size of the spill, and on the effectiveness of spill containment and cleanup activities.

Marine Habitats—Routine operations associated with platform and pipeline placement could result in moderate and long-term impacts to benthic habitats, primarily soft sediments. Accidental releases of oil could be long-term and range from small to medium depending on the habitat affected, cleanup method, and the size, duration, timing, and location of the spill. Routine operations could result in negligible to minor, short-term to long-term impacts to pelagic habitat. The effects of accidental releases of oil, including a CDE could result in minor, but long-term impacts to pelagic habitat and sea ice habitat, depending on the size, duration, timing, and location of the spill; the habitat affected; and the effectiveness of spill containment and cleanup activities. Severe winter weather and ice cover may be expected to limit containment and cleanup efforts in winter.

Essential Fish Habitat—Routine operations could result in no more than moderate short- and long-term impacts to EFH and managed species. Accidental releases of oil could result in moderate and long-term impacts. Impacts from accidental oil spills, including CDE-level spills could be long-term depending on the size, duration, timing, and location of the spill; the habitats affected; and the effectiveness of spill containment and cleanup activities, which could be hampered by extreme winter conditions and ice cover.

Marine Mammals—Collisions with OCS-related vessels may injure or kill some individuals, although the incidence of such collisions is expected to be low. Vessels, construction of ice roads, on-ice vehicles, and aircraft have been known to temporarily disturb some individuals, for example, polar bears may abandon dens; but these effects would likely be short-term and mitigation can reduce the disturbance. Negligible to minor impacts to fauna from disturbance or habitat loss from construction and operation of onshore pipeline are expected. Disturbance from noise sources is the most likely impact. A large oil spill, including CDE-level spills in the Arctic, would most likely affect marine mammals by oil-contaminated ice leads, polynyas, rookeries, beaches, and haulouts.

Terrestrial Mammals—Impacts to terrestrial mammals from routine operations would be negligible. A spill, especially from an onshore pipeline, could contaminate habitats used by caribou, grizzly and brown bears, Arctic foxes, and muskoxen. Coastal beaches are particularly critical to species, including caribou, seeking relief from mosquitoes.

Marine and Coastal Birds—Routine operations may result in negligible to moderate localized short-term impacts; impacts associated primarily with infrastructure construction, and ship and helicopter traffic. Impacts of routine operations to important coastal habitats such as nesting areas and overwintering sites could result in greater, more long-term impacts should normal breeding and nesting activities be disrupted. Small accidental oil spills are expected to have largely local, small effects. Large spills, including CDE-level spills may result in large, long-term, and possibly population-level effects. The actual magnitude of the effects will depend on the size, duration, and timing of the spill; the species and habitats affected; and the effectiveness of spill containment and cleanup activities. Because of the importance of certain habitat areas for some migrating and breeding birds, spills affecting those birds and habitats could result in long-term population level impacts for some species if the spills affect important nesting colonies, migratory staging areas, or wintering grounds.

Fish Resources—Negligible to minor impacts to fish are expected from routine operations. The impact magnitude of a large oil spill, including a CDE-level spill, would depend on the location, timing, and size of the spill, and the distribution and ecology of affected fish species. Oil contacting shoreline areas could result in large-scale lethal and long-term sublethal effects on early life stages, but no permanent population level effects are expected.

Invertebrates and Lower Trophic Levels—Routine operations could result in negligible to moderate impacts to primarily benthic invertebrates. Recovery could be short- to long-term. Large accidental oil spills, including CDE-level spills, could measurably depress invertebrate populations, especially in intertidal areas. However, no permanent impacts are expected.

Areas of Special Concern—Impacts resulting from routine activities are expected to be negligible to moderate because of the existing protections and use restrictions. Impacts from large accidental oil spills, including CDE-level spills reaching such areas, could negatively affect fauna and habitats, subsistence use, commercial or recreational fisheries, recreation and tourism, and other uses.

Population, Employment, and Income—Direct expenditures associated with routine operations would result in minor impacts from small increases in population, employment and income in arctic communities over the duration of the leasing period, corresponding to less than 5 percent of the baseline. Expenditures associated with spill cleanup activities would create short-term employment and income in some parts of the affected coastal region(s).

Land Use and Existing Infrastructure—Routine operations would result in minimal to moderate impacts to land use, development patterns, and infrastructure. The construction and operation of offshore facilities would expand the area potentially at risk from accidental oil spills, along with the requirement to maintain oil-spill response equipment. An accidental oil spill, including a

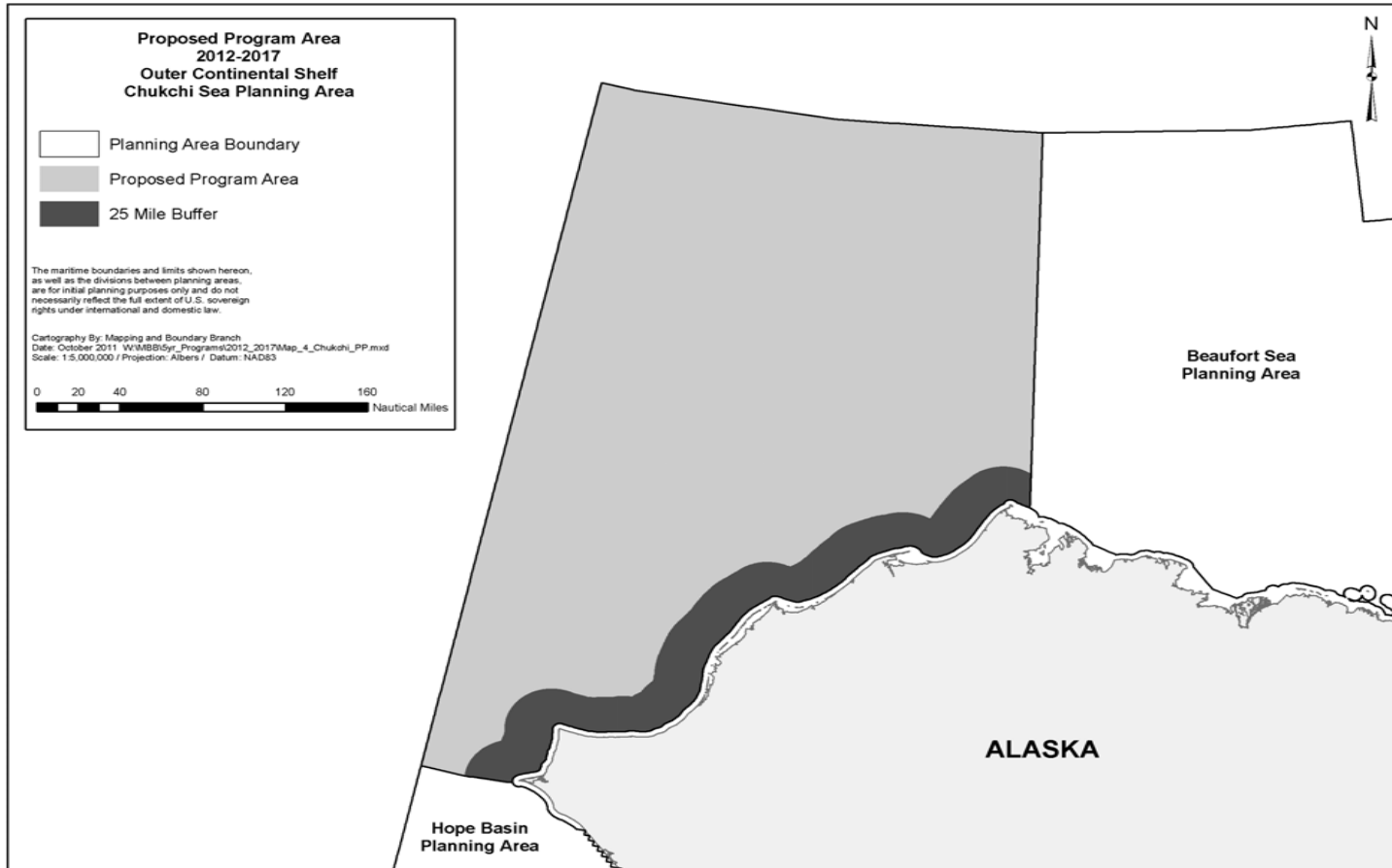
CDE-level spill, could alter land use temporarily but would not likely result in long-term changes. The magnitude of the impacts would depend on the size and location of the spill.

Fisheries—Routine operations would have a minor impact on subsistence fishing over the duration of the leasing period. Large accidental oil spills, including CDE-level spills, may have small to medium, short-term impacts on fisheries resources, including (lethal and sublethal toxic effects on exposed eggs, larvae, juveniles, and adults, and small to medium impacts on commercial, recreational, and subsistence fishery activities, such as trawling and charter fishing. The magnitude and duration of effects will depend on the location, size, duration, and timing of the spill; the fisheries affected; and the duration and effectiveness of spill containment and cleanup activities.

Sociocultural Systems and Environmental Justice—Potential impacts of routine operations can range from minor to major on sociocultural systems in the Arctic planning areas, depending on shore base infrastructure and proximity to existing communities. Accidental oil spills, including CDE-level spills, however, may result in more serious impacts, especially in the Arctic where impacts to subsistence could result in large impacts to affected communities.

Archaeological Resources—Routine operations could affect significant archaeological and historic resources especially in offshore locations through construction activities such as platform and pipeline construction. Onshore impacts including visual impacts are also possible from pipeline landfall, onshore pipeline, and road construction. Impacts could range from negligible to major, depending on the presence of significant archaeological or historic resources in the area of potential effect. Most resources are expected to be avoided. Accidental oil spills, including CDE-level spills, could impact archaeological and historic resources, depending on the spill location, size, and duration, as well on the effectiveness and nature of spill containment and cleanup activities.

Other Information. The BOEM received several comments, particularly during the scoping process for the Draft EIS, concerning why the 25-mile buffer area in the Chukchi Sea program area was excluded from leasing consideration and not other areas. A similarly-sized area was excluded from consideration in Chukchi Sea Sale 193, originally scheduled under the 2002-2007 Program. The 25-mile buffer area was excluded in the Revised Program for 2007-20012, which included Chukchi Sea Sale 193 as a carryover from the 2002-2007 Program, and was excluded from the Chukchi Sea program area in the 2009 DPP. Generally, area deferrals such as these are more appropriately addressed at least initially, at the lease sale stage. Possible deferral of additional areas should be raised for consideration during the pre-sale process for any upcoming Chukchi Sea sales, consistent with a strategy for appropriately tailoring the size and scope of any lease sale in light of evaluation of resource potential and environmental and subsistence considerations.



Map 4 – Chukchi Sea Program Area

Option 2 (No Sale)

Valuation. The net benefits of production would be zero since no activity would occur. However, foregoing the production anticipated to result from a Chukchi Sea sale would result in environmental and social costs incurred to obtain the energy substitutes, including additional imports of oil and increased onshore production of oil and gas, among others.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternatives 6 and 8. A summary of the Draft EIS findings follows.

Under this option the potential direct effects of routine operations in the Chukchi Sea that are described under the analysis of the proposed action would not occur. No oil spills would originate within the Chukchi Sea, although marine and coastal environmental resources there could be affected by a spill that originates on the Beaufort Sea. Energy substitutions for the forgone hydrocarbon production in the Chukchi Sea under this option could increase tanker import spill risks in OCS areas along the Pacific, GOM, and Atlantic coasts that contain tanker ports and terminals.

Cook Inlet

Key Comparative Results. The net benefits for this Proposed Program area are estimated at \$2.08 billion in the low-price case, \$3.35 billion in the mid-price case, and \$9.41 billion in the high-price case. The area ranks as “Less Sensitive* to Impact” as a component of environmental sensitivity when environmental sensitivity is defined based on the vulnerability (e.g. potential harm to individuals) of different ecological components (such as individual species) to potential impacts, and 1st of 6 for marine productivity.

Selected Comments. The Governor of Alaska supported leasing in the Alaska OCS and pointed out the history of environmentally responsible development in Cook Inlet. The DOE encouraged consideration of leasing in the Alaska OCS. Numerous national and Alaska-based environmental groups opposed leasing offshore Alaska. Numerous non-energy industry entities at the national level supported the 2009 DPP. Local Alaska businesses stressed the important role of energy to the state’s economy. Seven companies expressed interest in a Proposed Program that includes potential resource development the area.

Proposed Program Options

- (1) One special interest sale in 2013 in the program area depicted in Map 5
- (2) No sale

Discussion

Option 1 (1 Sale)

Valuation. The net benefits of anticipated production for this Proposed Program area are estimated at \$2.08 billion in the low-price case, \$3.35 billion in the mid-price case, and \$9.41 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows.

Water Quality—Normal operations in the Cook Inlet could adversely impact water quality. However because of dilution, settling, and flushing, these impacts are expected to be localized and temporary. Similarly, spills to coastal waters could adversely impact water quality. The impacts of these spills will be localized and short term, unless chronic spills occur in a localized area. Impacts from a large oil spill including those from a very large spill associated with an unlikely CDE, defined as a discharge of a volume of oil into the environment that could result in catastrophic effects, could persist for an extended period of time if oil were deposited in wetland and beach sediments or low-energy environments because of potential remobilization. The extent and magnitude of the impact would depend on the size, location, and season of the spill. Recovery times could be decreased by oil-spill cleanup activities.

Air Quality—Concentrations of nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and particulate matter of up to 10 micrometers (PM₁₀) from any routine activities associated with the proposed 5-Year Program activities in the Cook Inlet would be within the applicable maximum allowable increases. The concentrations of NO₂, SO₂, PM₁₀, and carbon dioxide (CO₂) would remain well within the NAAQS. Any air quality impacts from oil spills would be localized and of short duration. Pollutant levels from very large spills, including accidental spills associated with an unlikely CDE, and associated *in situ* burning if used, could be major during the initial leak and again during cleanup efforts. For example, plumes from *in situ* burning could temporarily degrade visibility, but eventually, air quality is expected to return to normal or near normal. The long-term effects associated with a spill and cleanup would be minor.

Coastal and Estuarine Habitats—Routine operations would be expected to result in minor to moderate localized impacts primarily due to one potential pipeline landfall and vessel traffic. The effects of accidental oil spills will depend on habitats affected; the size, location, duration and timing of the spill; and on the effectiveness of spill containment and cleanup activities. Large, including CDE-level, and small spills could result in long-term and short-term impacts, depending on the habitats affected; the duration and size of the spill, and on the effectiveness of spill containment and cleanup activities.

Marine Habitats— Routine operations associated with platform and pipeline placement could result in moderate and long-term impacts to benthic habitats, primarily soft sediments. Accidental releases of oil could be long-term and range from small to medium depending on the habitat affected, cleanup method, and the size, duration, timing, and location of the spill.

Routine operations could result in negligible to minor, short-term to long-term impacts to pelagic habitat. The effects of accidental releases of oil, including a CDE, could result in minor, but long-term impacts to pelagic habitats depending on the size, duration, timing, and location of the spill; the habitat affected; and the effectiveness of spill containment and cleanup activities.

Essential Fish Habitat—Routine operations could result in no more than moderate short- and long-term impacts to EFH and managed species. Accidental releases of oil could result in moderate and long-term impacts. Impacts from accidental oil spills, including CDE-level spills, could be long-term depending on the size, duration, timing, and location of the spill; the habitats affected; and the effectiveness of spill containment and cleanup activities.

Marine Mammals—Noise, contaminants, human activity, and ship and helicopter traffic associated with routine OCS operations in the Cook Inlet could affect marine mammals. Noise generated during exploration, construction, and operations may temporarily disturb some individuals, causing them to leave or avoid the area. Such effects would likely be short-term and would not be expected to result in population-level effects. While collisions with OCS-related vessels may injure or kill some individuals, collisions would be relatively unlikely because of the low level of traffic expected from the proposed action. Accidental oil spills may result in the direct and indirect exposure of marine mammals and their habitats to the oil and subsequent weathering products. Animals could be exposed by the inhalation or ingestion of oil or contaminated foods, which may result in a variety of lethal and sublethal effects. Fouling of fur of some species such as sea otters could affect thermoregulation and reduce survival. The magnitude of effects from accidental spills would depend on the location, timing, and volume of the spills; the habitats affected by the spills, such as coastal habitats; and the species exposed. The greatest risk to marine mammals would be associated with large spills, including a CDE, in coastal habitats. Spill cleanup operations could result in short-term disturbance of marine mammals in the vicinity of the cleanup activity, while a collision with a cleanup vessel could injure or kill the affected individual. Disturbance of adults with young during cleanup could reduce survival of the young animals.

Terrestrial Mammals— The construction and normal operations of a potential new onshore pipeline landfall could result in a variety of short-term and long-term impacts to terrestrial mammals. Short-term impacts would be largely behavioral in nature, with affected animals avoiding or vacating the construction areas. Similarly, vehicle and aircraft traffic from the proposed action in the Cook Inlet could temporarily disturb mammals along pipelines or roadways or along flight paths. The disturbance of animals by these activities would be short-term in nature and not expected to result in population-level effects. In the event of an accidental spill, including a CDE, terrestrial mammals may be exposed via ingestion of contaminated food, inhalation of airborne oil droplets, and direct ingestion of oil during grooming, which may result in a variety of lethal and sublethal effects. However, because most spills would be relatively small, less than 50 barrels, relatively few individuals would likely be exposed. While some individual, especially oil-sensitive species, such as the river otter, may incur lethal effects, population-level impacts would not be expected for most species. Cleanup activities could temporarily disturb terrestrial mammals in the vicinity of the cleanup operation, causing those

animals to move from preferred to less optimal habitats, which in turn, could affect the overall condition. Such displacement would be limited to only those relatively few animals in the vicinity of the cleanup activity thus would not be expected to result in population-level effects.

Marine and Coastal Birds—Marine and coastal birds may be affected by the construction of offshore facilities, by boat and aircraft traffic servicing offshore platforms, and by noise and human activities during normal operations and maintenance activities. For most routine operations, the primary effect would be the disturbance of birds in the vicinity of the operation, causing them to temporarily leave the area. Depending on the time of year, construction activities near coastal habitats could disrupt nesting, foraging, and overwintering activities of some species, potentially impacting local populations. Accidental oil spills, including a CDE, pose the greatest threat to marine and coastal birds, affecting both birds and their habitats. Exposed birds may experience a variety of lethal or sublethal effects, and the magnitude and ecological importance of any effects would depend upon the size and location of the spill, the species and life stage of the exposed birds, and the size of the local bird population. Spill cleanup activities may also disturb birds in the vicinity of the cleanup, causing them to leave the vicinity of the cleanup activity.

Fish Resources—Fishes could be disturbed and displaced from the immediate vicinity of drilling discharges for short time periods. Offshore construction also could temporarily disturb and/or displace fishes proximate to the construction activity. Although seismic surveys may kill or injure eggs and fry of some fishes, this injury is limited to within 1 or 2 meters of the airgun-discharge ports. Thus, seismic surveys probably would have no appreciable adverse effects on fish subpopulations. Oiled intertidal areas could lead to considerable mortality of eggs and juvenile stages of some pelagic species in the affected areas. Studies indicate that impacted eggs and juvenile stages could lead to reduced adult survival. Eggs and fry of some benthopelagic and demersal fishes could experience lethal and sublethal effects from oil contact. Although multiple small spills or a single large spill, including a CDE, could cause declines of subpopulations of multiple species inhabiting the Cook Inlet, it is anticipated that there would be no long-term effects on overall fish populations. Accidental oil spills could impact EFH and the species that depend upon them. The nature of the impact would be largely dependent on the size of spill, location, environmental factors, and uniqueness of the affected EFH. Large spills that reach coastal streams and intertidal areas used for spawning by anadromous salmon could have more persistent impacts and require remediation.

Invertebrates and Lower Trophic Levels—Routine operations during exploration, development, and production activities under the proposed action probably would not measurably affect local populations of lower trophic-level organisms. In the event of a large oil spill, populations of lower trophic-level organisms in pelagic waters would not be greatly affected by the spill and associated cleanup activities. However, a large spill could contact some shoreline areas in Cook Inlet and lower trophic-level organisms in sensitive intertidal and shallow subtidal habitats could experience lethal and sublethal effects.

Areas of Special Concern—No development of onshore facilities is anticipated in the Cook Inlet area thereby making impacts from routine OCS operations unlikely in these coastal areas. However, offshore construction of pipelines and platforms could have temporary effects on

wildlife due to noise and activity levels and on scenic values for park visitors. It is anticipated that reviews of individual lease sales would minimize the potential for impacts from routine operations due to development activities. No OCS-related development would occur in the Alaska Peninsula Unit of the Alaska Maritime National Wildlife Refuge (NWR). Effects from oil spills that occur adjacent to national park or NWR boundaries would depend on spill location, spill size, weather conditions at the time of the spill, and the effectiveness of cleanup operations. Large oil spills, including a CDE, in areas adjacent to the Gulf of Alaska or Alaska Peninsula Units of the Alaska Maritime NWR could negatively impact coastal habitats and fauna and could also affect subsistence use, commercial or recreational fisheries, and tourism.

Employment, Population, and Income—Potential effects on population, employment, and regional income from routine operations and oil spills are expected to be limited except for local effects from a large oil spill.

Land Use and Existing Infrastructure—Routine operations from the proposed action would have a low impact on the land use and infrastructure of the affected areas of the Cook Inlet. Accidents from the anticipated low level of activity also are expected to have minimal impact on land use and infrastructure.

Fisheries—Overall populations of biological resources that serve as the basis for commercial fisheries in the Cook Inlet are not expected to be altered by routine exploration, development, or production activities conducted as a result of lease sales under the proposed action. The level of effects from accidental spills would depend on the location, timing, and volume of spills, spill response activities, and other environmental factors. Small spills that may occur under the proposed action are unlikely to have a substantial effect on commercial fishing. A single large spill could affect a small proportion of a given fish population within Cook Inlet, although substantial temporary effects on populations could occur if important habitat areas were contaminated. Large accidental spills, including a CDE-level spill, may have small to medium short term impacts on fisheries. The effects could be as a consequence of reduced catch, loss of gear, or loss of fishing opportunities during cleanup and recovery periods.

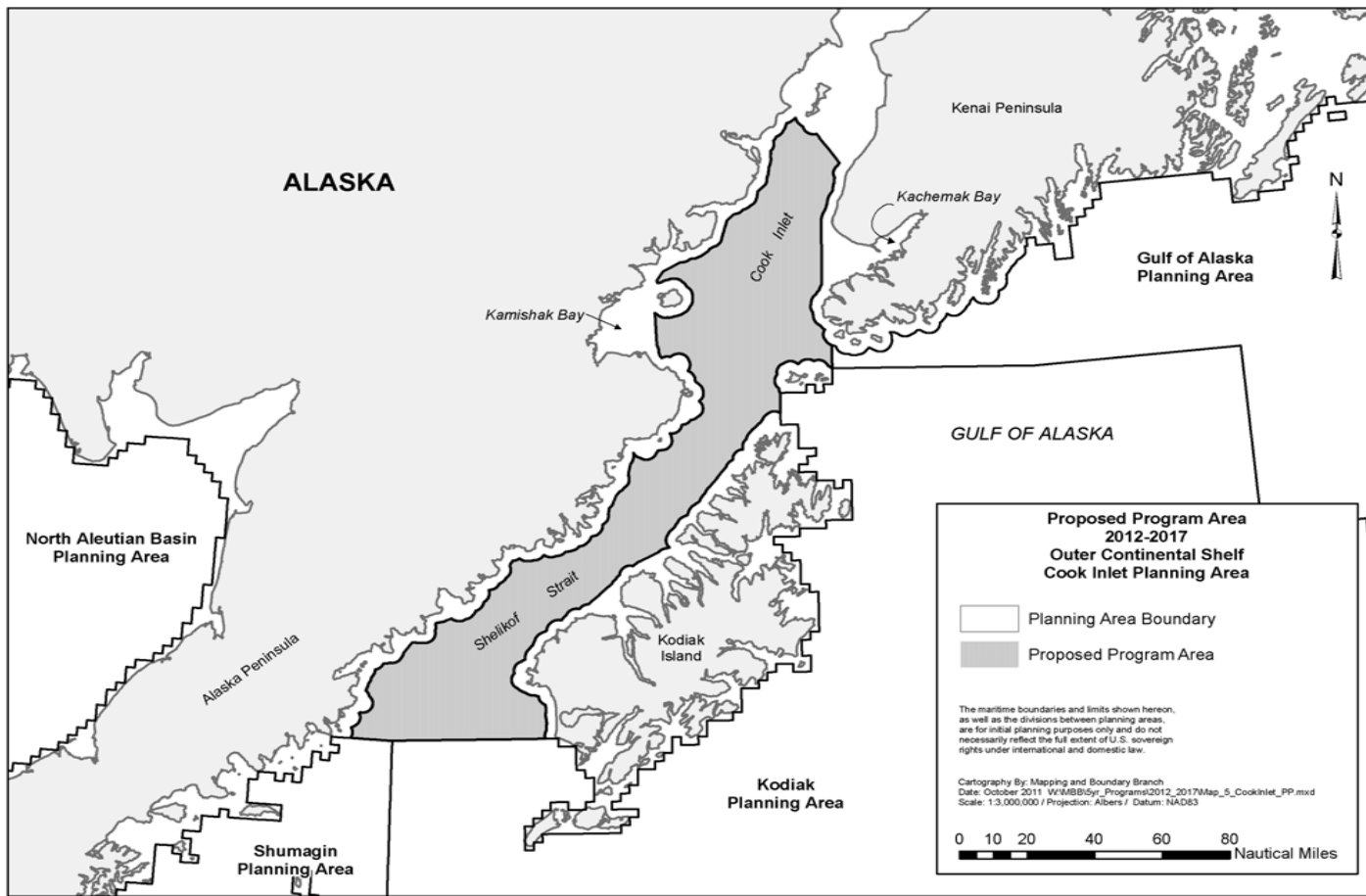
Tourism and Recreation—Routine operations would have limited effects on recreation and tourism, with potential adverse impacts to sightseeing, boating, fishing, and hiking activities. Temporary impacts would occur if a spill reached a recreational-use area. The magnitude of these impacts would depend on factors such as the size and location of the spill, and it would likely be greatest if the spill occurred during the peak recreational season.

Sociocultural Systems and Environmental Justice—Potential direct and indirect impacts on sociocultural systems due to noise, visual, and traffic disturbances, as a result of offshore operations for the proposed action, are expected to be limited. The Cook Inlet already is experiencing oil and gas development on state lands so the addition of a small amount of OCS activity should not disrupt sociocultural systems in the area. Potential impacts on sociocultural systems from accidents under the proposed action could range greatly, depending on the location and timing of a spill.

Archaeological Resources—Assuming compliance with existing federal, state, and local archaeological regulations and policies, most impacts to archaeological resources in the Alaska

region resulting from routine activities under the proposal will be avoided. Some impact may occur to coastal historic and prehistoric archaeological resources from accidental oil spills. Although it is not possible to predict the precise numbers or types of sites that would be affected, contact with archaeological sites would probably be unavoidable, and the resulting loss of information would be irretrievable, if spills should occur. The magnitude of the impact would depend on the significance and uniqueness of the information lost.

Other Information. The Cook Inlet program area is included on the lease sale schedule as a special interest sale area. The sale is proposed for 2013, but before BOEM would proceed, it would issue a request for interest and comments and would move forward only after consideration of the comments received in response to annual requests for information. If the industry interest reflected in comments received did not support consideration of a sale, the sale would be postponed and a request for interest and comments would be issued again the following year, and so on through the 5-year schedule, until a sale is held or the 5-year schedule expires. This process was first utilized for this area in the 2007-2012 program. No sales were held during that time period.



Map 5 – Cook Inlet Program Area

Option 2 (No Sale)

Valuation. The net benefits of production would be zero since no activity would occur. However, foregoing the production anticipated to result from a Cook Inlet sale would result in environmental and social costs incurred to obtain the energy substitutes, including additional imports of oil and increased onshore production of oil and gas, among others.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternatives 7 and 8. A summary of the Draft EIS findings follows.

Under this option the potential direct effects of routine operations in Cook Inlet that are described under the analysis of the proposed action would not occur. No oil spills would originate within the Cook Inlet OCS area. Energy substitutions for the foregone hydrocarbon production in the Cook Inlet would be small given the limited amounts of hydrocarbons that are expected to be developed there.

GULF OF MEXICO REGION

Draft Proposed Program Decision

The 2009 DPP proposed annual areawide lease sales in the Western and Central GOM and three sales in the Eastern GOM, offering all available blocks not covered by leasing restrictions and including a 75-mile no-permanent surface structures buffer for a portion of the Eastern planning area⁶.

Proposed Program Options

Western Gulf of Mexico

Key Comparative Results. The net benefits of anticipated production in this Proposed Program area are estimated at about \$7.28 billion in the low-price case, \$20.52 billion in the mid-price case, and \$33.65 billion in the high-price case. This area ranks as “More Sensitive* to Impact” as a component of environmental sensitivity when environmental sensitivity is defined based on the vulnerability (e.g. potential harm to individuals) of different ecological components (such as individual species) to potential impacts, and 4th of 6 for marine productivity.

Selected Comments. The Governors of Texas and Louisiana supported expanded leasing of the whole of the OCS to reduce the dependence on the GOM and also supported expanded revenue sharing with states. Two senators from Texas and one from Louisiana expressed support along with some of the congressional representatives and a county commissioner from Texas. The

⁶ Much of the 2009 DPP area in the Eastern GOM was and is under leasing restriction pursuant to GOMESA. A restricted area may be included on a 5-Year schedule but may not be offered for leasing consideration as long as the restriction remains in effect. This Proposed Program does not include any area in the Eastern GOM that is currently under leasing restriction.

DOE supported the proposal to continue the annual offering of all the acreage in the Western GOM. Many national environmental organizations opposed OCS leasing and activity in any area, but some supported environmentally sound development in the Western GOM. Numerous non-energy industry entities at the national and local levels endorsed the 2009 DPP and emphasized the need for domestic energy, jobs, and economic growth. Eight companies expressed interest in leasing in this area.

Proposed Program Options

(1) Five areawide sales starting in 2012 of all available, unleased acreage in the area depicted in Map 6

(2) No sale

Discussion

Option 1 (5 Sales)

Valuation. The net benefits of anticipated production in this Proposed Program area are estimated at \$7.28 billion in the low-price case, \$20.52 billion in the mid-price case, and \$33.65 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows.

Water Quality—Routine operations that could result in minor to moderate, localized, short-term impacts include structure placement and construction (pipelines, platforms) and operational discharges (produced water, bilge water, and drill cuttings) and sanitary and domestic wastes. Structure placement and removal could increase suspended sediment loads, while operational discharges, sanitary and domestic wastes, and deck drainage could affect chemical water quality. Compliance with NPDES permits and USCG regulations would reduce most impacts of routine operations. The effects of accidental oil spills will depend upon material, spill size, location, and remediation activities. Small spills would likely result in short-term, localized impacts. Impacts from a large oil spill, including those from a very large spill associated with an unlikely CDE, defined as a discharge of a volume of oil into the environment that could result in catastrophic effects, could persist for an extended period of time if oil were deposited in wetland and beach sediments or low-energy environments because of potential remobilization.

Air Quality—Routine operations are expected to result in only minor impacts to air quality. Sources of air pollutants (NO₂, SO₂, PM₁₀, and CO₂) associated with OCS oil and gas development include diesel and gas engines, turbines, and support vessels. Routine operations would not result in exceeding the NAAQS or impact visibility. Increases of ozone, if they occur, would be less than 1 percent of total concentrations. Small accidental oil spills could have localized and temporary impacts. Pollutant levels from very large spills, including accidental spills associated with an unlikely CDE, and associated *in situ* burning if used, would generally be

small. Plumes from *in situ* burning could temporarily degrade visibility in Prevention of Significant Deterioration (PSD) Class I areas.

Acoustic Environment—Routine operations could affect ambient noise conditions, and impacts to ambient noise levels are expected to be minor. Noise generating sources associated with routine operations include seismic surveys, drilling and production, infrastructure placement and removal, and vessel traffic. Depending on the source and activity, changes in ambient noise levels could be short-term and localized (e.g., from vessel traffic), long-term and localized (from production), or short-term and less localized (from seismic surveys). Seismic surveys could result in short-term changes in ambient noise levels, but the changes could extend well beyond the survey boundary.

Coastal and Estuarine Habitats—Routine operations would result in minor to moderate localized impacts primarily due to facility construction, pipeline trenching and landfalls, channel dredging, and vessel traffic. The effects of accidental oil spills will depend on the specific habitat affected; the size, location, duration, and timing of the spill; and on the effectiveness of spill containment and cleanup activities. Small spills would likely result in short-term impacts while large spills, including CDE-level spills, could cause both short-term and long-term impacts depending on habitat type and location and effectiveness of spill containment and cleanup activities.

Marine Habitats—Routine operations could result in moderate short and long-term impacts to benthic and pelagic habitats. Benthic habitat could be disturbed by platform and pipeline placement, dredging, and operational discharges, including produced water and cuttings. Soft sediment habitats can recover within a few years from most disturbances. Existing mitigation measures should eliminate most direct impacts to sensitive and protected benthic habitats. Marine benthic habitat could be affected by a large oil spill, including CDE-level spills. Impacts could be long-term and range from small to medium, depending on the habitat affected; the size, duration, timing, and location of the spill; and the effectiveness of spill containment and cleanup activities. Impacts to high density deepwater communities from routine operations and accidental spills are unlikely, but may be permanent if they do occur.

Essential Fish Habitat—Routine operations could result in no more than moderate, short- and long-term impacts to EFH and managed species. Existing mitigation measures should eliminate most direct impacts to coral EFH. Impacts from accidental oil spills, including CDE-level spills, could be long-term, depending on the size, duration, timing, and location of the spill; the habitats affected; and the effectiveness of spill containment and cleanup activities.

Marine Mammals—Impacts to marine mammals from routine operations include noise disturbance from seismic surveys, vessels, helicopters, construction and operation of platforms, and removal of platforms with explosives; potential collision with vessels; and exposures to discharges and wastes. Impacts to cetaceans could range from negligible to moderate, with species or stocks inhabiting continental shelf or shelf slope waters most likely to be affected. The West Indian manatee and rare or extralimital whale species, i.e., those from outside the area, are not likely to be affected. A large accidental oil spill, including a CDE-level spill, would have

minor to moderate impacts to marine mammals. Impacts from spill response activities are expected to be minor.

Terrestrial Mammals—In the Western GOM, there are no endangered terrestrial mammals that would be impacted by the proposed action.

Marine and Coastal Birds—Routine operations may result in negligible to moderate localized short-term impacts associated primarily with infrastructure construction, and ship and helicopter traffic. Impacts of routine operations to important coastal habitats such as nesting areas and overwintering sites could result in greater, more long-term impacts should normal breeding and nesting activities be disrupted. Small accidental oil spills are expected to have largely local, small effects. Large spills, including CDE-level spills, may result in large, long-term, and possibly population-level effects. The magnitude of the effects will depend on the size, duration, and timing of the spill; the species and habitats affected; and the effectiveness of spill containment and cleanup activities.

Fish Resources—Negligible to minor impacts to fish, and negligible impacts to threatened or endangered fish species are expected from routine operations. A large accidental oil spill, including a CDE-level spill, is not likely to result in population-level impacts except potentially for spills that significantly affect overfished species and their spawning grounds. Oil contacting shoreline areas could result in large-scale lethal and long-term sublethal effects on early life stages of some species, but no permanent population level effects are expected.

Reptiles—Routine operations would result in minor to moderate localized impacts to marine turtles primarily from seismic exploration, facility construction, pipeline landfalls, channel dredging, and vessel traffic. Accidental oil spills could result in large impacts depending on the size, location, duration and timing of the spill, and on the effectiveness of spill containment and cleanup activities. Small spills would likely result in short-term impacts while large spills, including CDE-level spills, could incur both short-term and long-term potentially population level impacts depending on the species and habitat type affected, and on the size and duration of the spill.

Invertebrates and Lower Trophic Levels—Routine operations could result in negligible to moderate impacts to primarily benthic invertebrates, primarily from habitat disturbance associated with infrastructure placement, and from routine discharges. Recovery could be short-term to long-term. Large accidental oil spills, including CDE-level spills, could measurably depress invertebrate populations especially in intertidal areas, but no permanent impacts are expected.

Areas of Special Concern—Impacts resulting from routine activities are expected to be negligible to moderate because of existing protections and use restrictions. Large accidental oil spills, including CDE-level spills reaching such areas, could negatively affect fauna and habitats, individuals fishing for food, commercial or recreational fisheries, recreation and tourism, and other uses of these areas.

Population, Employment and Income—Direct expenditures associated with routine operations would result in negligible impacts from small increases in population, employment and income in the region over the duration of the leasing period, corresponding to less than 1 percent of the baseline. Given existing levels of leasing activity, impacts on property values would be negligible. In areas where tourism and recreation provide significant employment, accidental oil spills, including CDE-level spills, could result in the short-term loss of employment, income and property values. Expenditures associated with spill cleanup activities would create short-term employment and income in some parts of the affected coastal region(s).

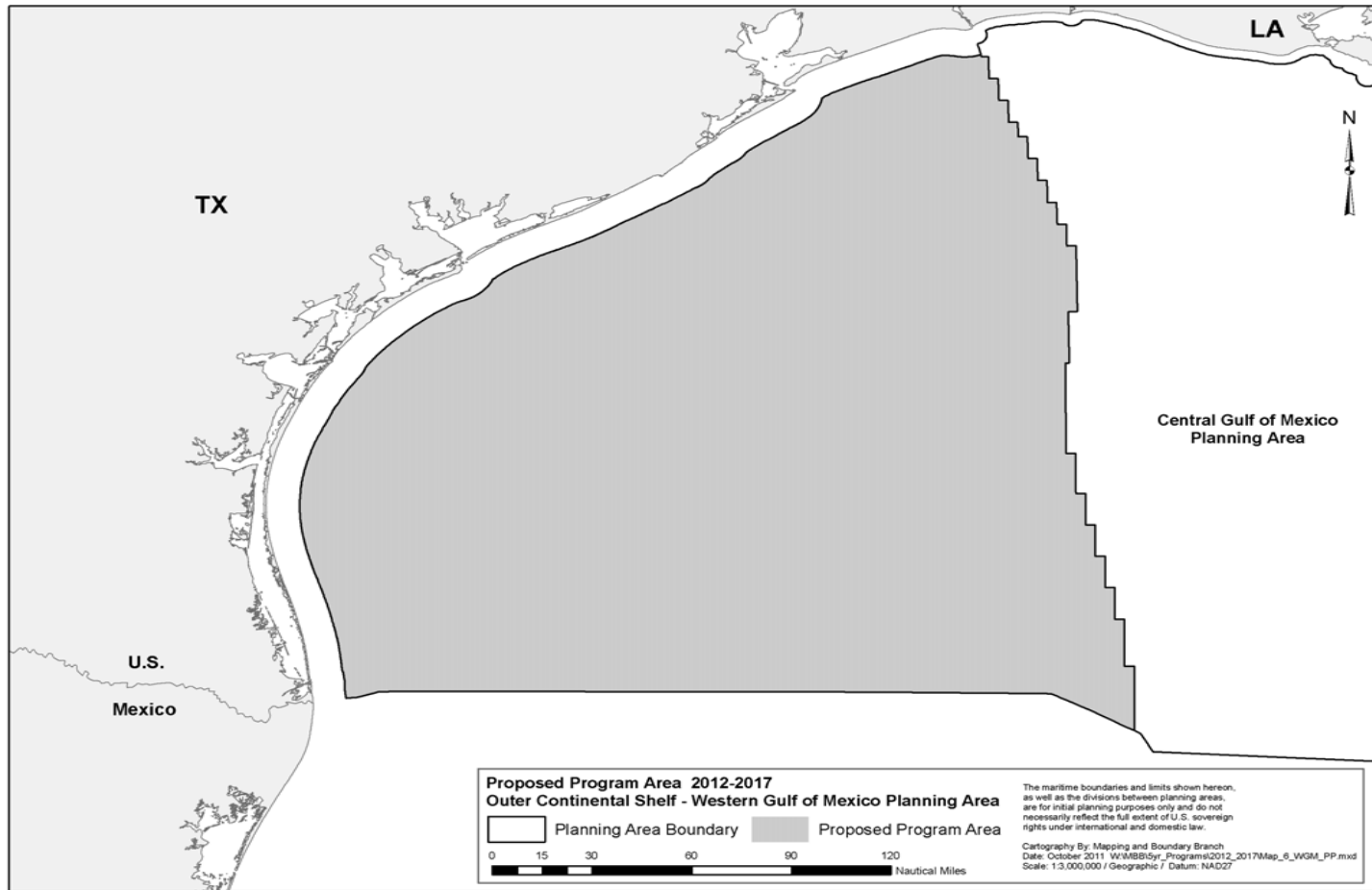
Land Use and Existing Infrastructure—Negligible to minor impacts on land use, development patterns, and infrastructure could result from routine operations. Existing infrastructure generally would be sufficient to handle exploration and development associated with potential new leases. Projected impacts from an accidental oil spill, including a CDE-level spill, would likely include stresses of the spill response on existing infrastructure, and restrictions of access to a particular area while the cleanup is being conducted. Impacts would be expected to be temporary and localized.

Fisheries—Routine operations would have a minor impact on individuals fishing for food, the cost of commercial fishing, or on the number of recreational fishing trips, in the region over the duration of the leasing period. Large accidental oil spills, including CDE-level spills, may have small to medium, short-term impacts on fisheries resources, including lethal and sublethal toxic effects on exposed eggs, larvae, juveniles, and adults, and small to medium impacts on commercial trawling and recreational charter fishery activities and individuals fishing for food. The magnitude and duration of effects will depend on the location, size, duration, and timing of the spill; the fisheries affected; and the duration and effectiveness of spill containment and cleanup activities.

Recreation and Tourism—Routine operations would produce minor impacts to beach recreation, sightseeing, boating, and fishing, while offshore structures would create positive impacts to diving and recreational fishing. The impact of an accidental oil spill, including a CDE-level spill, on tourism and recreation will depend on the size, location, duration, and timing of the spill, as well as on the effectiveness and timeliness of spill containment and cleanup activities.

Sociocultural Systems and Environmental Justice—Because of the well developed and long established oil and gas industry in the GOM, routine operations are expected to have minor impacts on sociocultural systems. Expansion of deepwater development could lead to longer offshore work shifts, which could increase stress to workers, families and communities. Impacts from accidental oil spills would be small, except in the case of very large spills. Very large spills, including CDE-level spills, may temporarily halt and impact economies associated with the oil and gas industry, but also other sectors of the economy. Depending on the duration of such halts and the magnitude of economic impacts, this could result in social and cultural stress, leading to possible social pathologies. Because of the non-coastal location of the majority of low income and minority population groups, routine operations are not expected to add additional environmental justice concerns and impacts would be negligible. Impacts of accidental oil spills, including CDE-level spills, which are not expected, would be minimal.

Archaeological Resources— Assuming compliance with existing federal, state, and local archaeological regulations and policies, most impacts to archaeological resources resulting from routine activities under the proposal will be avoided. Based on the scenario for the proposal, some impact could occur to coastal historic and prehistoric archaeological resources from accidental oil spills. Although it is not possible to predict the precise numbers or types of sites that would be affected, contact with archaeological sites would probably be unavoidable, and the resulting loss of information would be irretrievable.



Map 6 – Western Gulf of Mexico Program Area

Option 2 (No Sale)

Valuation. The net benefits of production would be zero since no activity would occur. However, foregoing the production anticipated to result from any sales in the Western GOM would result in environmental and social costs incurred to obtain the energy substitutes, including additional imports of oil and increased onshore production of oil and gas, among others.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternatives 3 and 8. A summary of the Draft EIS findings follows.

Under this option the potential direct effects of routine operations in the Western GOM that are described under the analysis of the proposed action would not occur. No oil spills would originate within the Western GOM, although marine and coastal resources there would be exposed to effects from spills that might originate elsewhere, including the Central GOM. Energy substitutions for the foregone hydrocarbon production in the Western GOM would be small to moderate and would be accounted for largely by increased import tankering, a considerable proportion of which is expected to be destined for terminals in the Western GOM. This option would create a discontinuity in the regular occurrence of lease sales in the Western GOM that could result in reduced local employment and labor income, as well as potential outmigration and reductions in community services.

Central Gulf of Mexico

Key Comparative Results. The net benefits of anticipated production in the Proposed Program area are estimated at about \$29.97 billion in the low-price case, \$85.73 billion in the mid-price case, and \$141.34 billion in the high-price case. This area ranks as “Most Sensitive* to Impact” as a component of environmental sensitivity when environmental sensitivity is defined based on the vulnerability (e.g. potential harm to individuals) of different ecological components (such as individual species) to potential impacts, and 3rd of 6 for marine productivity.

Selected Comments. The Governors of Mississippi and Louisiana supported expanded leasing of the whole of the OCS to reduce the dependence on the GOM and also supported expanded revenue sharing with states. Both senators from Alabama and Mississippi and one from Louisiana expressed support along with some of the congressional representatives, a state senator, and two local governments in Alabama. The DOE supported the proposal to continue the annual offering of all available acreage in the Central GOM. Many national environmental organizations opposed OCS leasing and activity in any area, but some supported environmentally sound development in the Central GOM, in areas not restricted by GOMESA. Numerous non-energy industry entities at the national and local levels endorsed the 2009 DPP and the need for domestic energy, jobs, and economic growth. Eight companies expressed interest in leasing in this area.

Proposed Program Options

(1) Five areawide sales starting in 2013 of all available, unleased acreage in the area depicted in Map 7.

(2) No sale

Discussion

Option 1 (5 Sales)

Valuation. The net benefits of anticipated production from the Proposed Program area are estimated at \$29.97 billion in the low-price case, \$85.73 billion in the mid-price case, and \$141.34 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows.

Water Quality—Routine operations that could result in minor to moderate, localized, short-term impacts include structure placement and construction (pipelines, platforms) and operational discharges (produced water, bilge water, and drill cuttings) and sanitary and domestic wastes. Structure placement and removal could increase suspended sediment loads, while operational discharges, sanitary and domestic wastes, and deck drainage could affect chemical water quality. Compliance with NPDES permits and USCG regulations would reduce most impacts of routine operations. The effects of accidental oil spills will depend upon material, spill size, location, and remediation activities. Small spills would likely result in short-term, localized impacts. Impacts from a large oil spill, including those from a very large spill associated with an unlikely CDE, defined as a discharge of a volume of oil into the environment that could result in catastrophic effects, could persist for an extended period of time if oil were deposited in wetland and beach sediments or low-energy environments because of potential remobilization.

Air Quality—Routine operations are expected to result in only minor impacts to air quality. Sources of air pollutants (NO₂, SO₂, PM₁₀, and CO₂) associated with OCS oil and gas development include diesel and gas engines, turbines, and support vessels. Routine operations would not result in exceeding the NAAQS or impact visibility. Increases of ozone, if they occur, would be less than 1 percent of total concentrations. Small accidental oil spills could have localized and temporary impacts. Pollutant levels from very large spills, including accidental spills associated with an unlikely CDE, and associated *in situ* burning if used, would generally be small. Plumes from *in situ* burning could temporarily degrade visibility in PSD Class I areas.

Acoustic Environment—Routine operations could affect ambient noise conditions, and impacts to ambient noise levels are expected to be minor. Noise generating sources associated with routine operations include seismic surveys, drilling and production, infrastructure placement and removal, and vessel traffic. Depending on the source and activity, changes in ambient noise levels could be short-term and localized (e.g., from vessel traffic), long-term and localized (from production), or short-term and less localized (from seismic surveys). Seismic surveys could

result in short-term changes in ambient noise levels, but the changes could extend well beyond the survey boundary.

Coastal and Estuarine Habitats—Routine operations would result in minor to moderate localized impacts primarily due to facility construction, pipeline trenching and landfalls, channel dredging, and vessel traffic. The effects of accidental oil spills will depend on the specific habitat affected; the size, location, duration, and timing of the spill; and on the effectiveness of spill containment and cleanup activities. Small spills would likely result in short-term impacts while large spills, including CDE-level spills, could incur both short-term and long-term impacts depending on habitat type and location and effectiveness of spill containment and cleanup activities.

Marine Habitats—Routine operations could result in moderate short and long-term impacts to benthic and pelagic habitats. Benthic habitat could be disturbed by platform and pipeline placement, dredging, and operational discharges (produced water and cuttings). Soft sediment habitats can recover within a few years from most disturbances. Existing mitigation measures should eliminate most direct impacts to sensitive and protected benthic habitats. Marine benthic habitat could be affected by a large oil spill, including CDE-level spills. Impacts could be long-term and range from small to medium, depending on the habitat affected; the size, duration, timing, and location of the spill; and the effectiveness of spill containment and cleanup activities. Impacts to high density deepwater communities from routine operations and accidental spills are unlikely, but may be permanent if they do occur.

Essential Fish Habitat—Routine operations could result in no more than moderate, short- and long-term impacts to EFH and managed species. Existing mitigation measures should eliminate most direct impacts to coral EFH. Impacts from accidental oil spills, including CDE-level spills, could be long-term, depending on the size, duration, timing, and location of the spill; the habitats affected; and the effectiveness of spill containment and cleanup activities.

Marine Mammals—Impacts to marine mammals from routine operations include noise disturbance from seismic surveys, vessels, helicopters, construction and operation of platforms, and removal of platforms with explosives; potential collision with vessels; and exposures to discharges and wastes. Impacts to cetaceans could range from negligible to moderate, with species or stocks inhabiting continental shelf or shelf slope waters most likely to be affected. The West Indian manatee and rare or extralimital whale species, i.e. those from outside the area, are not likely to be affected. Meeting the requirements of the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) would reduce the likelihood and magnitude of adverse impacts from routine operations to most species. A large accidental oil spill, including CDE-level spills, would have minor to moderate impacts to marine mammals; impacts from spill response activities are expected to be minor.

Terrestrial Mammals—The four federally endangered GOM coast beach mice species and the federally endangered Florida salt marsh vole and their habitats would not be significantly affected by normal operations under the proposed action. Impacts are expected to be minimized through appropriate mitigation and the existence of these species' habitats in protected areas. Because of their locations on inner dunes, the habitats of the beach mice are unlikely to be

affected by an accidental offshore oil spill. While the habitat of the Florida salt marsh vole could be affected by an oil spill, this species and its habitat are located far from areas where oil leasing and development may occur under the proposed action. Thus, it is highly unlikely that this habitat would be contacted by an accidental oil spill from OCS oil and gas activities.

Marine and Coastal Birds—Routine operations may result in negligible to moderate localized short-term impacts associated primarily with infrastructure construction, and ship and helicopter traffic. Impacts of routine operations on important coastal habitats such as nesting areas and overwintering sites could result in greater, more long-term impacts should normal breeding and nesting activities be disrupted. Small accidental oil spills are expected to have largely local, small effects. Large spills, including CDE-level spills, may result in large, long-term, and possibly population-level effects. The magnitude of the effects will depend on the size, duration, and timing of the spill; the species and habitats affected; and the effectiveness of spill containment and cleanup activities.

Fish Resources—Negligible to minor impacts to fish and negligible impacts to threatened or endangered fish species are expected from routine operations. A large accidental oil spill, including a CDE-level spill, is not likely to result in population-level impacts except potentially for spills that significantly affect overfished species and their spawning grounds. Oil contacting shoreline areas could result in large-scale lethal and long-term sublethal effects on early life stages of some species, but no permanent population level effects are expected.

Reptiles—Routine operations would result in minor to moderate localized impacts to marine turtles primarily due to seismic exploration, facility construction, pipeline landfalls, channel dredging, and vessel traffic. Accidental oil spills could result in large impacts depending on the size, location, duration and timing of the spill, and on the effectiveness of spill containment and cleanup activities. Small spills would likely result in short-term impacts while large spills, including CDE-level spills, could incur both short-term and long-term potentially population-level impacts depending on the species and habitat type affected, and on the size and duration of the spill.

Invertebrates and Lower Trophic Levels—Routine operations could result in negligible to moderate impacts to primarily benthic invertebrates, primarily from habitat disturbance associated with infrastructure placement and from routine discharges. Recovery could be short term to long term. Large accidental oil spills, including CDE-level spills, could measurably depress invertebrate populations especially in intertidal areas, but no permanent impacts are expected.

Areas of Special Concern—Impacts resulting from routine activities are expected to be negligible to moderate because of existing protections and use restrictions. Large accidental oil spills, including CDE-level spills reaching such areas, could negatively affect fauna and habitats, individuals fishing for food, commercial or recreational fisheries, recreation and tourism, and other uses of these areas.

Population, Employment and Income—Direct expenditures associated with routine operations would result in negligible impacts from small increases in population, employment and income

in the region over the duration of the leasing period, corresponding to less than 1 percent of the baseline. Given existing levels of leasing activity, impacts on property values would be negligible. In areas where tourism and recreation provide significant employment, accidental oil spills, including CDE-level spills, could result in the short-term loss of employment, income and property values. Expenditures associated with spill cleanup activities would create short-term employment and income in some parts of the affected coastal region(s).

Land Use and Existing Infrastructure—Negligible to minor impacts on land use, development patterns, and infrastructure could result from routine operations. Existing infrastructure generally would be sufficient to handle exploration and development associated with potential new leases. Projected impacts from an accidental oil spill, including a CDE-level spill, would likely include stresses of the spill response on existing infrastructure, and restrictions of access to a particular area while the cleanup is being conducted. Impacts would be expected to be temporary and localized.

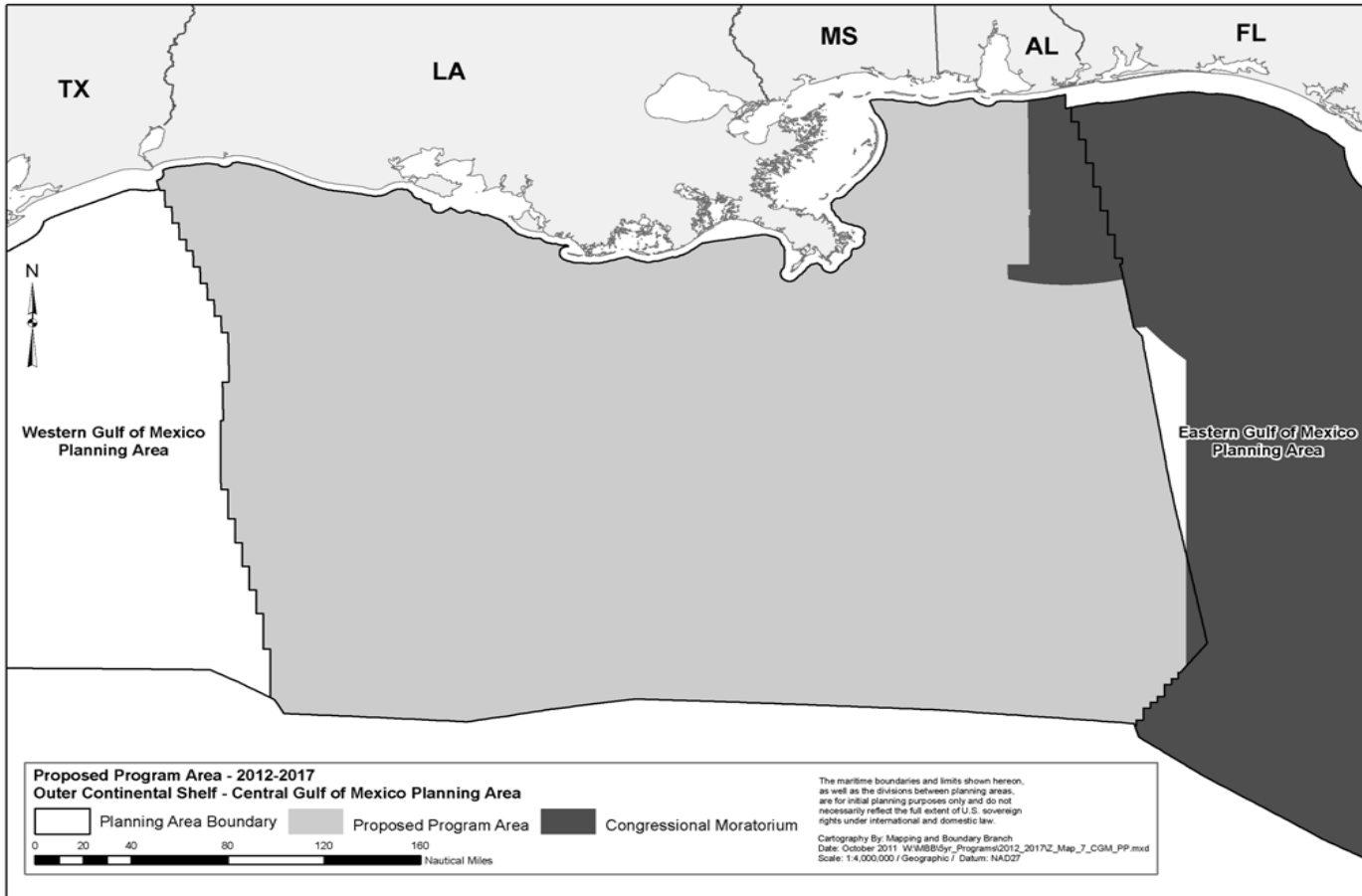
Fisheries—Routine operations would have a minor impact on individuals fishing for food, the cost of commercial fishing, or on the number of recreational fishing trips, in the region over the duration of the leasing period. Large accidental oil spills, including CDE-level spills, may have small to medium, short-term impacts on fisheries resources, including lethal and sublethal toxic effects on exposed eggs, larvae, juveniles, and adults, and small to medium impacts on commercial trawling and recreational charter fishery activities and individuals fishing for food. The magnitude and duration of effects will depend on the location, size, duration, and timing of the spill; the fisheries affected; and the duration and effectiveness of spill containment and cleanup activities.

Recreation and Tourism—Routine operations would produce minor impacts to beach recreation, sightseeing, boating, and fishing, while offshore structures would create positive impacts to diving and recreational fishing. The impact of an accidental oil spill, including a CDE-level spill, on tourism and recreation will depend on the size, location, duration, and timing of the spill, as well as on the effectiveness and timeliness of spill containment and cleanup activities.

Sociocultural Systems and Environmental Justice—Because of the well developed and long established oil and gas industry in the GOM, routine operations are expected to have minor impacts on sociocultural systems. Expansion of deepwater development could lead to longer offshore work shifts, which could increase stress to workers, families and communities. Impacts from accidental oil spills would be small, except in the case of very large spills. Very large spills, including CDE-level spills, may temporarily halt and impact economies associated with the oil and gas industry, but also other sectors of the economy. Depending on the duration of such halts and the magnitude of economic impacts, this could result in social and cultural stress, leading to possible social pathologies. Because of the non-coastal location of the majority of low income and minority population groups, routine operations are not expected to add additional environmental justice concerns and impacts would be negligible. Impacts of accidental oil spills, including CDE-level spills, would be minimal.

Archaeological Resources—Assuming compliance with existing federal, state, and local archaeological regulations and policies, most impacts to archaeological resources resulting from routine activities under the proposal will be avoided. Based on the scenario for the proposal,

some impact could occur to coastal historic and prehistoric archaeological resources from accidental oil spills. Although it is not possible to predict the precise numbers or types of sites that would be affected, contact with archaeological sites would probably be unavoidable, and the resulting loss of information would be irretrievable.



Map 7 – Central Gulf of Mexico Program Area

Option 2 (No Sale)

Valuation. The net benefits of production would be zero since no activity would occur. However, foregoing the production anticipated to result from a sale(s) in the Central GOM would result in environmental and social costs incurred to obtain the energy substitutes, including additional imports of oil and increased onshore production of oil and gas, among others.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternatives 4 and 8. A summary of the Draft EIS findings follows.

Under this option the potential direct effects of routine operations in the Central GOM that are described under the analysis of the proposed action would not occur. No oil spills would originate within the Central GOM, although marine and coastal resources there would be exposed to effects from spills that originated elsewhere including the Western GOM. Energy substitutions for the foregone hydrocarbon production in the Central GOM would be moderate and would be accounted for largely by increased import tankering, a considerable proportion of which is expected to be destined for terminals requiring transit through the Central GOM. This option would create a discontinuity in the regular occurrence of lease sales in the Central GOM that would result in reduced local employment and labor income, as well as potential outmigration and reductions in community services.

Eastern Gulf of Mexico

Key Comparative Results. Given current information, no production is expected from the Eastern GOM program area in the low-price case.⁷ After exploration, however, this assessment may change. Therefore, the net benefits of anticipated production in this Proposed Program area are estimated at about \$1.38 billion in the mid-price case and \$2.96 billion in the high-price case. The area ranks “Most Sensitive* to Impact” as a component of environmental sensitivity when environmental sensitivity is defined based on the vulnerability (e.g. potential harm to individuals) of different ecological components (such as individual species) to potential impacts, and 2nd of 6 for marine productivity.

Selected Comments. One Florida senator and several congressional representatives and state-level legislators supported expansion of OCS leasing into all of the Eastern GOM or only into the area that is not restricted under GOMESA and does not interfere with military areas. The DOE supported the offering of areas previously restricted, such as the Eastern GOM. Many national environmental organizations opposed OCS leasing and activity in any area, but some supported development in the Eastern GOM area not restricted under GOMESA. Numerous non-energy industry entities at the national level and some at the local level endorsed the 2009 DPP and the

⁷ If exploration occurs, whether on nearby blocks leased previously or on blocks leased under this program, the results could change the ultimate net benefits at any price level. However, exploration without eventual production would create negative net benefits (costs only).

need for domestic energy, jobs, and economic growth. Eight companies expressed interest in leasing in this area.

Proposed Program Options

- (1) **Two sales in 2014 and 2016 in the program area depicted on Map 8.**
- (2) One sale in 2014 in the program area depicted on Map 8.
- (3) No sale

Discussion

Option 1 (2 Sales)

Valuation. Given current information, no production is expected from the Eastern GOM program area at the low-price case; therefore net benefits are assumed to be zero. If exploration occurs, net benefits could be either negative if no production results, or positive if successful exploration leads to production. The net benefits of anticipated production from two sales in this Proposed Program area are estimated at about \$1.38 billion in the mid-price case and \$2.96 billion in the high-price case.⁸

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows.

Water Quality—Routine operations are likely to result in small, localized, short-term impacts as a result of structure placement and construction (pipelines, platforms) and operational discharges (produced water, bilge water, and drill cuttings) and sanitary and domestic wastes. Structure placement and removal could increase suspended sediment loads, while operational discharges, sanitary and domestic wastes, and deck drainage could affect chemical water quality. Compliance with NPDES permits and USCG regulations would reduce most impacts of routine operations. The effects of accidental oil spills will depend upon material, spill size, location, and remediation activities. Small spills would likely result in short-term, localized impacts. Impacts from a large oil spill (including those from a very large spill associated with an unlikely CDE, defined as a discharge of a volume of oil into the environment that could result in catastrophic effects, could persist for an extended period of time if oil were deposited in wetland and beach sediments or low-energy environments because of potential remobilization.

Air Quality—Routine operations are expected to result in only minor impacts to air quality. Sources of air pollutants (NO₂, SO₂, PM₁₀, and CO₂) associated with OCS oil and gas development include diesel and gas engines, turbines, and support vessels. Routine operations would not result in exceeding the NAAQS or impact visibility. Small accidental oil spills could have localized and temporary impacts on marine air quality. Pollutant levels from very large

⁸ Current information indicates no difference in anticipated production for the Eastern GOM, whether from one sale or two sales. However, having two sales on the schedule would allow the Secretary the flexibility to adapt to the information available at the time of lease sale decisions.

spills, including accidental spills associated with an unlikely CDE, and associated *in situ* burning if used, would generally be small. Plumes from *in situ* burning could temporarily degrade visibility in PSD Class I areas.

Acoustic Environment—Routine operations could affect ambient noise conditions, and impacts to ambient noise levels are expected to be very small. The small area of the Eastern GOM available for leasing would result in the noise generating sources associated with routine operations include seismic surveys, drilling and production, infrastructure placement and removal, and vessel traffic to be localized and not widespread.

Coastal and Estuarine Habitats—Since all available leases are located 100 or more miles offshore from the Florida coast, and all onshore facilities to service the OCS operations will be located in ports along the Central GOM coast, routine operations are not expected to affect the coastal habitats of the Eastern GOM. The effects of accidental oil spills would likely be confined to marine habitats except for large spills, including CDE-level spills, that could incur both short-term and long-term impacts depending on habitat type and location and effectiveness of spill containment and cleanup activities.

Marine Habitats—Routine operations could result in minor short- and long-term impacts to benthic and pelagic habitats. Benthic habitat could be disturbed by platform and pipeline placement, dredging, and operational discharges (produced water and cuttings). Existing mitigation measures should eliminate most direct impacts to sensitive and protected benthic habitats. Marine benthic habitat could be affected by a large oil spill, including CDE-level spills. Impacts could be long-term and range from small to medium, depending on the habitat affected; the size, duration, timing, and location of the spill; and the effectiveness of spill containment and cleanup activities.

Essential Fish Habitat—Routine operations would result in minor, short- and long-term impacts to EFH and managed species. Existing mitigation measures should eliminate most direct impacts to coral EFH should it occur. Impacts from accidental oil spills, including CDE-level spills, could be long-term, depending on the size, duration, timing, and location of the spill; the habitats affected; and the effectiveness of spill containment and cleanup activities.

Marine Mammals—Impacts to marine mammals from routine operations include noise disturbance from seismic surveys, vessels, helicopters, construction and operation of platforms, and removal of platforms with explosives; potential collision with vessels; and exposures to discharges and wastes. Because of the small area of the Eastern GOM available for leasing, impacts to cetaceans would be small and would affect only a small area. The West Indian manatee and rare or extralimital whale species, i.e. those from outside the area, are not likely to be affected. A large accidental oil spill, including an CDE-level spill, would have minor to moderate impacts to marine mammals. Impacts from spill response activities are expected to be minor.

Terrestrial Mammals—No endangered terrestrial mammals of the Eastern GOM would be impacted by routine activities or small to large oil spills under the proposed action. A large

accidental oil spill, including a CDE-level spill, could contact areas near coastal endangered beach mouse habitats.

Marine and Coastal Birds—Routine operations may result in negligible to moderate localized short-term impacts associated primarily with infrastructure installation and ship and helicopter traffic within a small area of the Eastern GOM. Impacts of routine operations to important coastal habitats such as nesting areas and overwintering sites would be small since existing support bases will be used that are located in areas of the Central GOM. Small accidental oil spills are expected to have largely local, small effects. Large spills, including CDE-level spills, may result in large, long-term, and possibly population-level effects.

Fish Resources—Negligible impacts to fish and threatened or endangered fish species are expected from routine operations. A large accidental oil spill, including a CDE-level spill, is not likely to result in population-level impacts except potentially for spills that significantly affect overfished species and their spawning grounds. Oil contacting shoreline areas could result in lethal and sublethal effects on early life stages of some species, but no permanent population level effects are expected.

Reptiles—Routine operations could result in minor localized impacts to marine turtles primarily due to seismic exploration, facility construction, pipelines and vessel traffic. Accidental oil spills could result in large impacts depending on the size, location, duration and timing of the spill, and on the effectiveness of spill containment and cleanup activities. Small spills would likely result in short-term impacts while large spills, including CDE-level spills, could incur both short-term and long-term potentially population level impacts depending on the species and habitat type affected, and on the size and duration of the spill.

Invertebrates and Lower Trophic Levels—Routine operations could result in negligible to moderate impacts to primarily benthic invertebrates, primarily from habitat disturbance associated with infrastructure placement, and from routine discharges. Recovery could be short term to long term. Large accidental oil spills, including CDE-level spills, could measurably depress invertebrate populations especially in intertidal areas, but no permanent impacts are expected.

Areas of Special Concern—Impacts resulting from routine activities are expected to be negligible to moderate because of existing protections and use restrictions. Large accidental oil spills, including CDE-level spills, reaching such areas could negatively affect fauna and habitats, individuals fishing for food, commercial or recreational fisheries, recreation and tourism, and other uses of these areas.

Population, Employment and Income—Direct expenditures associated with routine operations would result in negligible impacts. Effects are expected to be minimal because of the small amount of activity that is projected to occur in the Eastern GOM, and the fact that onshore support facilities will be located in ports along the Central GOM. In areas where tourism and recreation provide significant employment, accidental oil spills, including CDE-level spills, could result in the short-term loss of employment, income and property values. Expenditures

associated with spill cleanup activities would create short-term employment and income in some parts of the affected coastal region(s).

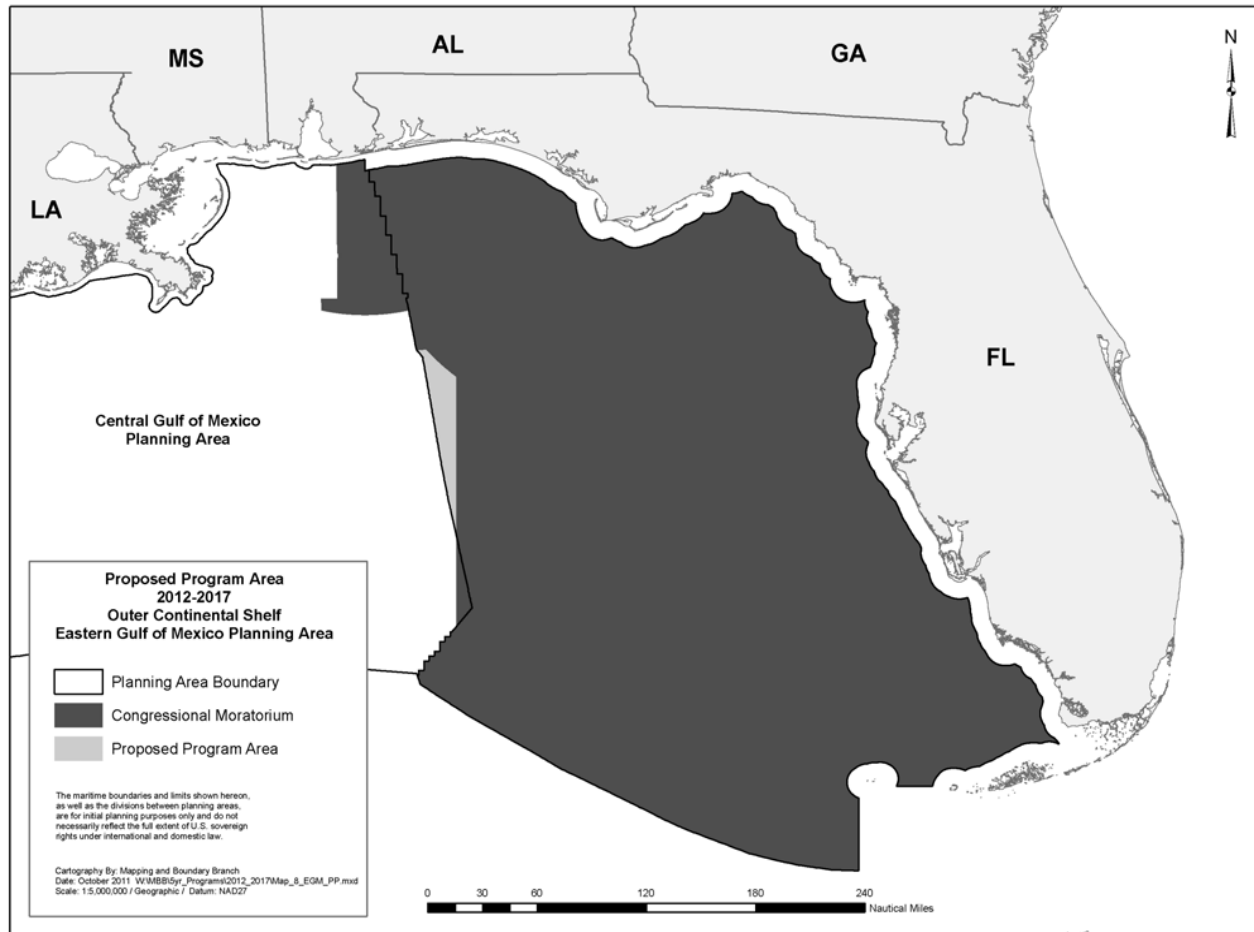
Land Use and Existing Infrastructure—No impacts to land use, development patterns, and infrastructure in the Eastern GOM would occur. Facilities and service bases will be located in ports along the Central GOM coast. Employment needs will likely be small and supplied by the experienced offshore work force located in all GOM coastal states. Projected impacts from an accidental oil spill, including a CDE-level spill, would likely include restrictions of access to a particular area while the cleanup is being conducted. Impacts would be expected to be temporary and localized.

Fisheries—Routine operations would have a minor impact on fishing, the cost of commercial fishing, or on the number of recreational fishing trips, in the region over the duration of the leasing period. Large accidental oil spills, including CDE-level spills, may have small to medium, short-term impacts on fisheries resources, including lethal and sublethal toxic effects on exposed eggs, larvae, juveniles, and adults, and small to medium impacts on commercial trawling and recreational charter fishery activities and individuals fishing for food. The magnitude and duration of effects will depend on the location, size, duration, and timing of the spill; the fisheries affected; and the duration and effectiveness of spill containment and cleanup activities.

Recreation and Tourism—Routine operations would result in minimal impacts to beach recreation, sightseeing, boating, and fishing since OCS structures and facilities will be located at least 100 miles from the Florida shoreline, and onshore support facilities will be located in coastal areas of the Central GOM. Offshore structures would create positive impacts to diving and recreational fishing. The impact of an accidental oil spill, (including a CDE-level spill, on tourism and recreation will depend on the size, location, duration, and timing of the spill, as well as on the effectiveness and timeliness of spill containment and cleanup activities.

Sociocultural Systems and Environmental Justice—Because of the well developed and long established oil and gas industry in the GOM, routine operations are expected to have minor impacts on sociocultural systems. Very large spills, including CDE-level spills, may temporarily halt and impact economies associated with the oil and gas industry, but also other sectors of the economy. Depending on the duration of such halts and the magnitude of economic impacts, this could result in social and cultural stress, leading to possible social pathologies.

Archaeological Resources—Assuming compliance with existing federal, state, and local archaeological regulations and policies, most impacts to archaeological resources resulting from routine activities under the proposal will be avoided. Some impacts could occur to marine historic and prehistoric archaeological resources from accidental oil spills. Although it is not possible to predict the precise numbers or types of sites that would be affected, contact with archaeological sites would probably be unavoidable, and the resulting loss of information would be irretrievable.



Map 8 – Eastern Gulf of Mexico Program Area

Option 2 (1 Sale)

Valuation. The net benefits of anticipated production from one sale in this Proposed Program area are estimated at about \$1.38 billion in the mid-price case and \$2.96 billion in the high-price case.⁹ There is no production anticipated in the low-price case; therefore, net benefits are zero.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternative 1. A summary of the Draft EIS findings follows.

The difference in environmental impacts between one and two sales in the small area available for leasing under Alternative 1 is negligible. The expected amount of activities and hydrocarbon development represents about 1 percent of the totals for the entire GOM area. These amounts are expected to remain essentially the same for the one and two sale program options.

Option 3 (No Sale)

Valuation. The net benefits of production would be zero since no activity would occur. However, foregoing the production anticipated to result from any sales in the Eastern GOM would result in environmental and social costs incurred to obtain the energy substitutes, including additional imports of oil and increased onshore production of oil and gas, among others.

Environmental Impacts. This option is analyzed in the Draft EIS under Alternatives 2 and 8. A summary of the Draft EIS findings follows.

Because of the small area of the OCS that would be removed from leasing under the No Sale Option and the small amount of resource expected to potentially occur within this area, this option would only slightly reduce risks of oil spill occurrence on the OCS or of routine operation effects within the small area.

B. Fair Market Value Options

Introduction

The Act grants the Secretary the authority to issue leases on the OCS. Section 18(a)(4) of the Act states that “[L]easing 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 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.”

The fair market value (FMV) determination, made at the time of lease award, is not based on the value of the oil and natural gas eventually discovered or produced. Instead it is related to the

⁹ Current information indicates no difference in anticipated production for the Eastern GOM, whether from one sale or two sales.

value of the right to explore and, if there is a discovery, to develop and produce hydrocarbons. This value therefore is based on the expected, not actual, activities, and results that are anticipated to occur after the sale. Moreover, this value depends upon the conditions imposed on lessees by BOEM, such as diligence and drilling requirements, which may restrict lessee flexibility in attaining certain timing milestones and hence have a negative effect on expected or actual tract value.

There are several major elements in designing OCS auctions, such as lease sale timing, bidding systems, and sale terms and conditions, for assuring that OCS leases are not awarded prematurely or for less than FMV. This section discusses important considerations used to evaluate options under these elements and includes an overview of the post-sale OCS bid adequacy process.

Draft Proposed Program Decision

The 2009 DPP decision was to set sale terms (called fiscal lease terms in the DPP) using the parameters in place for recent sales, subject to sale-by-sale reconsideration, and continue use of the current, two-phased bid adequacy process, subject to revision as appropriate.

Proposed Program Options

Timing of OCS Lease Sales and Related Activities

(1) Evaluate area specific considerations, including a comparison of market prices with the hurdle prices for oil and for natural gas set in the 5-Year Program document, to determine if the sale should be held as scheduled.

(2) Other.

Discussion: The first decision that must be made in the process of providing a solid foundation for ensuring receipt of FMV is whether to offer the proposed area for sale now or hold it until a later time. In theory, the value of the OCS resources can be optimized by identifying the most favorable time to sell leases. Because OCS leases have fixed lease terms, as long as exploration and development is privately profitable, lessees will explore and develop within that initial period. The BOEM employs a hurdle price screen at the program stage to assure that delaying a sale offering would not provide greater economic value from all anticipated fields in the program area. A hurdle price is simply the oil and gas price level above which immediate development of at least one undiscovered prospect as identified by resource assessment is the most profitable option.

The government's concession to the lessee is a conveyance of offshore oil and natural gas exploration and development rights for a limited lease term, subject to applicable regulatory and statutory requirements. Since future prices, risked resource endowments, required capital and operation costs, time needed to explore and delineate, available technologies, and the prevailing post-sale regulatory and legal environments are in doubt at the time of lease issuance, benefits for decision-making may subsequently be gained when uncertainty is reduced through new

information or events. This information may involve changes in resource prices and expectations, emergence of new technologies, imposition of added regulatory and legal requirements, and additional insights on the resource endowments. In the last instance, this uncertainty can only be fully resolved through the actual leasing and subsequent drilling of OCS acreage, although it also is possible to acquire better knowledge about the resource potential and risk from monitoring activities on nearby leases.

The most significant uncertainty to consider in sale planning analysis is the individual and aggregate volumes of oil and natural gas present, as well as when these undiscovered resources may become producing commercial reserves. These uncertainties are more pronounced in relatively less explored OCS areas. To estimate resource potential, BOEM uses computer models to calculate probability distributions of undiscovered recoverable oil and natural gas. The technically recoverable resource estimates assume that existing or reasonably foreseeable recovery technology will be used and operations are not constrained by the underlying economics of exploration, development and production. A second phase simulates recovery operations with cost estimates and resource price assumptions to calculate the economically recoverable resource volumes. The economically recoverable resource volumes do not include all the undiscovered resources reported as technically recoverable, but rather include those oil and natural gas resources judged to be contained in geologic fields whose sizes and locations make them economic under contemporary circumstances.

The uncertainties about the recoverable resource size and location can only be resolved by lease acquisition and drilling. Private companies must spend billions of dollars to acquire leases and analyze geologic information in their efforts to discover and ultimately produce new oil and natural gas reserves that are undiscovered today.

A good example of how exploration of an OCS province has changed the knowledge of resource potential is the GOM, where estimates of undiscovered oil resources have increased dramatically since the discovery of major deepwater oil and natural gas fields. Even with significant oil and natural gas production since 1975, amounting to nearly 14 billion barrels of oil (BBO) and 150 trillion cubic feet (tcf) of natural gas, the estimated undiscovered technically recoverable GOM oil resources have increased fivefold from that time to today and the estimated natural gas resources have more than doubled. In deepwater, increases in oil and natural gas potential have been facilitated by industry's development of new technology to explore for and extract hydrocarbon 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 a good 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 billion barrels (Bbbl) were much larger than the Chukchi Sea's 0.54 Bbbl. 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 Bbbl in the 2011 assessment. 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 30 times over the 1985 estimate to 15.4 Bbbl of oil and over 25 times to 76.8 tcf of natural gas in this under-explored frontier area. Future exploration in this area will further decrease the uncertainties regarding its oil and natural gas resource potential.

While the value promised by a lease sale is related to the resource endowment, concentration and composition, and the likelihood of drilling a successful well, it is perhaps more closely associated with forecasts of future oil and natural gas prices. A drilled and discovered field of a given anticipated size may be profitable to drill over a wide range of resource prices, but the best time to drill is closely related to how aggressively future resource prices are expected to rise. In short, the smaller the geologic field and the faster resource prices are anticipated to rise, the more optimal it becomes to lease and drill in the future rather than now.

Given the significant uncertainty of program area hydrocarbon resources as well as the inherent difficulty of accurately forecasting future oil and natural gas prices, calculating timing and composition of lease offerings is very difficult, however, managing this uncertainty becomes more feasible as resource potential is resolved through actual exploration. Moreover, the decisions needed at the 5-Year Program stage focus on whether and when a particular area should be included in the sale schedule rather than the specific composition of the sale areas and the terms attached to the blocks to be included. The composition issue, along with the most effective way to achieve the desired economic results, is best left to be more fully resolved at the lease sale design stage, in part to incorporate the latest and most current information into the analysis.

Accordingly, at the program stage BOEM's approach to determining whether an area is ripe for development is not based solely on a program area's aggregate resource estimates. Instead, it focuses more broadly on evaluation of a hurdle price below which immediate exploration and development of any one of a program area's potential undiscovered field sizes, as suggested by available resource assessments, would not provide the best value for society. Above the hurdle price, the program area may be considered available for leasing, in conjunction with modification in sale configuration consistent with other program goals. This approach reflects the insight that only as resource knowledge increases through exploration will BOEM learn more about the available resources in order to make sound decisions about which areas to include in subsequent 5-Year Programs as well as the potential composition of the scheduled sales during the sale design stage.

The second stage, lease sale design, includes deciding whether to hold or delay a sale included in the 5-Year Program, which blocks to offer, setting the sale terms, and issuing leases that meet FMV requirements. Deferring these issues to the lease sale stage provides more flexibility and allows decisions to be made closer to the time when economic conditions that influence sale decisions are better known and somewhat easier to forecast. Once leases are issued, BOEM is limited in its authority to mandate delays in activities for purely economic reasons as companies have contractual rights related to potential development and production within the regulatory framework during their initial lease term.

To formally assess the timeliness of offering program areas at the 5-Year Program stage, BOEM analyzed the expected undiscovered fields in each program area to determine an area “hurdle” weighted average (i.e., barrels of oil equivalent or BOE) price. The basic approach determined the BOE price below which delaying development of the largest potential undiscovered field in the sale area would expect to yield greater future net economic value than through its immediate development. This screen indicates whether the expected value from waiting might exceed the expected value from offering the area in this 5-Year Program. These hurdle prices will provide the decisionmaker information on whether there are any undiscovered field sizes which are likely to exist within the program area that are favorable to being leased now. This approach has the advantage of including areas in the 5-Year Program which show economic promise, while deferring certain timing, composition and sale design decisions to the lease sale stage. This approach is a consistent methodology for conducting program area evaluations during the 5-Year Program stage and avoids having to prematurely forecast future prices, cost levels, resource endowments and the state of technology.

For this analysis, BOEM calculated the hurdle prices for two sample water depths in the Central GOM and for the Chukchi and Beaufort Seas. The largest geologic field size identified in rigorous resource assessments of the different areas was selected for use in conjunction with cost estimates consistent with those water depths and field sizes employed in both national resource assessments and post-sale tract evaluations. These factors were inputted in an in-house dynamic programming model called WEB2 (When Exploration Begins, version 2) to obtain a hurdle market price below which waiting to drill and develop the prospective discovery is calculated to make the undiscovered resources of the area’s largest potential field, and hence all smaller fields as well, more valuable in the future than now. Conversely, if expected weighted market prices for oil and natural gas exceed this hurdle price level, then it would be more economically valuable to lease the area now and allow lessees to explore for and develop any anticipated, but as yet undiscovered, fields acquired in the lease sale. Note that the hurdle price is interpreted to represent a starting price growing at an annual rate of 2 percent, which defines an expected future vector of oil prices, including random percentage changes in future prices that are independent of the absolute price of oil at the time of a potential sale.

Table 1 below shows the hurdle prices for the largest anticipated field expected to be discovered in approximately 200 meters water depth in the Central GOM (approximately 740 million barrels of oil equivalent (MMBOE)), an ultra-deep natural gas prospect, in 1200 meters water depth in the Central GOM (approximately 670 MMBOE), in the Chukchi Sea (approximately 1,385 MMBOE), and in the Beaufort Sea (approximately 710 MMBOE). At prices above the hurdle oil price the opportunity to find and develop that biggest field now becomes more valuable than waiting.

The BOE prices used in the model are weighted by the approximate gas-to-oil ratios in each of the respective water depths in determining a hurdle oil-equivalent price. In the shallow water of the Central GOM, natural gas is approximately 72 percent of a BOE, whereas a BOE in the deep water is only 28 percent natural gas. In Alaska, natural gas is approximately 47 percent of a BOE in the Chukchi Sea and 37 percent in the Beaufort Sea. Table 1 shows the gas-oil ratio for each of the representative areas. The resource estimates in each area are divided based on the

gas-oil ratio and valued at \$110 a barrel (bbl) of oil and \$7.38 per million cubic feet (mcf) of natural gas, the mid-case scenario evaluated in this Proposed Program. The weighted scenario BOE price in Table 1 is the mid-case scenario prices weighted for each area by the gas-oil ratio. For example, in the deep water Central GOM, the weighted scenario BOE price is the value of the oil portion ($\$110 \times 0.72$) plus the value of a BOE of natural gas ($\$7.38 \times 0.28 \times 5.62$ mcf to BOE conversion factor).¹⁰ The total value per BOE was then used to scale the hurdle BOE price into a hurdle oil price and a hurdle gas price. As oil is more valuable than natural gas on a British thermal unit (Btu) basis, the hurdle oil price is lower in the deep water Central GOM than in the shallow water even though the costs are greater and the largest field size is smaller in this example. Because of the high gas-oil ratio in the shallow water Central GOM, this sample field would likely be classified as a gas field, so the oil price is not relevant.

Table 1: Hurdle Prices

	Gas-Oil Ratio (mcf/bbl)	Weighted Scenario BOE Price	Hurdle Price		
			BOE	Oil	Natural Gas
Shallow Water Central GOM (200 meters)	13.98	\$61.12	\$9.00	\$16.20	\$1.09
Deep Water Central GOM (1200 meters)	2.16	\$90.98	\$13.00	\$15.72	\$1.05
Chukchi Sea	4.99	\$77.77	\$27.00	\$38.19	\$2.56
Beaufort Sea	3.36	\$84.36	\$22.00	\$28.69	\$1.92

This analysis indicates that in the Central GOM, current and projected oil and natural gas prices are five to six times the amount needed to justify holding a sale purely on the basis of valuation alone. In this case, as long as oil prices remain above \$16 per barrel, there is expected to be at least one field at those water depths that is more valuable to lease now. Due mostly to the higher costs in the Chukchi and Beaufort Seas, oil prices need to be in the \$30 to \$40 per barrel or higher range to justify leasing at least some of the resources now. Because the hurdle price for these two water depth sizes in the Central GOM as well as the Beaufort and Chukchi Seas are so far below current market price, BOEM considers these results to be representative of the other GOM and Alaska program areas.

The significant uncertainty surrounding the OCS exploration and development economics must be considered in the formulation of decision criteria for determining timing for lease issuance. At the lease sale stage, BOEM will compare current prices to these hurdle prices. If prices have dropped to below these levels, BOEM will conduct additional analyses to determine whether or not to hold a sale and the specific parameters of that sale. Once the timing screen criteria are met at the 5-Year Program stage, additional decisions on selected portions of these areas, along with appropriate lease terms and conditions, are included in the lease sale stage, allowing the more specific decisions to be made when uncertainty is reduced. The analysis is an important element to help ensure the OCS is being managed to generate the public's FMV for OCS resources.

¹⁰ There may be small discrepancies due to rounding.

Size of Lease Sale

(1) Assess the effect of recently raised minimum bid-levels within the areawide leasing framework before each lease sale to encourage timely leasing of the offered blocks

(2) Other.

Discussion: After an affirmative decision to hold a lease sale, the next decision is selection of the leasing framework to be used for the sale. Since 1983, GOM lease sales have been conducted under the areawide leasing (AWL) format with, for the most part, relatively low minimum bid requirements. The State of Louisiana requested on several occasions the use of schemes other than AWL that were in place prior to 1983, such as industry nomination/agency tract selection (N/TS), which would tend to sell fewer tracts and allow more focused environmental analysis. BOEM contracted for a study (AWL Study) evaluating alternative leasing schemes and received the final report in 2010.¹¹

The AWL Study simulates OCS activity on leases sold over the next 50 years under the status quo leasing system of areawide sales, initially offering 8,000 GOM blocks per year, declining thereafter as accumulating information weeds out the barren blocks. The status quo is compared to, among other options, two restricted sale sizes: one-half the AWL scale (AWL half or AWLH) and an N/TS-scale offering of 400 blocks per year similar to sales before AWL.

Results in Table 2¹² indicate that N/TS would sacrifice substantial activity for increased high bids but would appear to provide little overall fiscal gain, because the loss and delay of royalty, rental, and tax¹³ revenues would offset the higher bonus promised by N/TS relative to AWL.

Table 2: Long-term Assessment of Criteria under Alternative Lease Sale Scenarios

Performance Measure (Change from baseline offer of 8,000 tracts/year)	Cut Offerings in Half (offer 4,000 tracts/year)	Pre-1983 Scale (offer 400 tracts/year)
Average Annual Tracts Sold	-31%	-80%
Exploration Wells Drilled	-16%	-52%
Number of Fields Discovered	-7%	-28%
Discounted High Bids	+9%	+39%
Total Production	-2%	-10%
Expedited (discounted) Production	-4%	-17%
Discounted Federal Leasing Revenues	-1%	+5%
Discounted Leasing + Tax Receipts	-1%	0%
Coastal State Economic Benefits	-9%	-34%

¹¹ *Policies to Affect the Pace of Leasing and Revenues in the Gulf of Mexico*, December 2010, BOEMRE 2011-014, available at boem.gov.

¹² This table is extracted from the more extensive table in *Ibid*, pages 159-164.

¹³ The tax rate in this study is assumed to be one-half the nominal rate.

State Revenue Sharing (uncapped)	2%	+10%
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This long-term comparison presumes the same leasing framework will continue to be used over each of 10 future 5-Year Programs thereby incorporating enough time for significant evolution in technology, resource estimates and oil prices. Long term trends in those fundamental variables dominate the results reported. The model used for the AWL Study suggests somewhat smaller activity losses and larger bonus gain over just the next 5-Year Program from reduced sale sizes. A near-term comparison of AWL and N/TS was extracted from one of the study's sub-models, the Area Model.

The results of this analysis suggest that the near-term reductions in leases sold, wells drilled, and discoveries made under the reduced sale sizes are less severe than the AWL Study reports in the long-term. Under N/TS, near term leases sold would be 75 percent less versus 80 percent less long term, wells drilled would be 23 percent less near term versus 52 percent less long term, and discoveries 10 percent less near term versus 28 percent less long term. Under AWLH, near term leases sold would be 22 percent less versus 31 percent less long term, wells drilled 4 percent less versus 16 percent less long term, and discoveries 3 percent less versus 7 percent less long term. This disparity is consistent with the notion that in the near term, restricted sale sizes have a better chance of including the richer set of undiscovered prospects. In the out years when the remaining prospects are less numerous and obvious, the AWL scheme increases the chances that someone will acquire an overlooked opportunity not recognized by a nomination process driven by consensus expectations.

The increased bonus amounts near term for the AWLH are roughly in line with the long term comparison (10 percent more versus 9 percent more long term), but the near term gain of bonus under the N/TS framework (115 percent more) is 3 times the proportion shown in the long term results (39 percent). This disparity suggests that less aggressive bidding competition will be induced by N/TS relative to AWL in the out years after earlier activities have reduced the uncertainty about the value of still available tracts. However, the long term analysis in the fuller AWL Study finds that offsetting reductions in rentals, royalties, and taxes eliminate the net fiscal gain promised by higher cash bonus bids under N/TS leasing. There is no obvious reason that a similar proportional offset would not occur for the lease subset sold under the next 5-Year Program alone.

In summary, the Area Model suggests the N/TS framework reduces leasing from the AWL framework in about the same proportion near term as long term, drilling and discovery by less than half as much near term as long term, and increases aggregate bonuses about three times as much near term as long term. However, the AWL Study does not justify accepting even the less severe losses associated with a switch to N/TS leasing framework for the upcoming 5-Year Program in anticipation of generating increased fiscal revenue. This is the case because the increase in cash bonus bids per block leased under N/TS 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.

Administratively withholding areas for sale that are not deemed favorable for leasing on economic grounds has long been considered less desirable by BOEM than utilizing the AWL

framework. The government cannot expect to identify with any degree of accuracy before a sale which blocks have the lowest value based on the sparse and highly uncertain data available to evaluators in the relatively brief periods between sales. However, setting a meaningful minimum bid level allows the auction market to determine which blocks are perceived to have the lowest values, while the leasing program could make these blocks available in future sales. Higher future oil prices and improved technology would lower exploration and production costs and perhaps reduce drilling risks on these blocks. Their value would increase and they could be reoffered for sale at a more favorable time to society and the government. Rather than adjusting the size of the sale arbitrarily, BOEM will use the minimum bid as a way to limit the sale size by allowing the market to choose which tracts to lease. BOEM will continue to evaluate the minimum bid level to ensure that it helps to maintain competition and to encourage timely leasing of offered blocks. The minimum bid is one of several fiscal policy elements of the sale terms decision discussed next.

The BOEM can set relatively high minimum bid levels to limit leasing to those blocks which appear favorably valued. Such blocks characteristically have an anticipated rate of growth in value less than the equivalently measured opportunity cost of holding them unsold. If a block has a perceived economic value less than the minimum bid, such will be revealed in the competitive auction market and the block will not be leased. So, the minimum bid can be structured specifically to ensure that certain blocks whose current value is either unknown or positive, but less than the level needed to justify selling at the present time, are in fact retained in the government's inventory. This is one way of ensuring that the blocks which have already matured economically are sold first, while those with the highest potential for economic growth are retained for a later sale. This strategy is consistent with the goal of maximizing the economic value of OCS resources.

Rather than adjusting the size of the sale arbitrarily, BOEM will use the minimum bid as a way to limit the sale size by allowing the market to choose which tracts to lease. The BOEM will continue to evaluate the minimum bid level to ensure that it helps to maintain competition and to encourage timely leasing of offered blocks. The minimum bid is one of several fiscal policy elements of the sale terms decision discussed next.

As discussed above, BOEM is exploring options for a more focused approach to leasing than AWL in certain instances. In particular, the Alaskan Beaufort and Chukchi Seas program areas are less explored than GOM areas and require extensive environmental analysis and coordination with other federal agencies, Alaskan natives, the scientific community, industry, and state and local governments before leasing decisions can be made. The BOEM is considering an alternative leasing approach that would be better tailored to the specific conditions of these Arctic areas, including resource potential and environmental and subsistence considerations, in addition to being designed to ensure FMV for leased acreage.

Sale Terms

(1) Leave current minimum bid levels, rental rates, fixed royalty rates, and lease terms as the baseline, subject to sale-by-sale reconsideration.

(2) Other.

Discussion: After deciding to hold a sale and the framework to be used, the next set of decisions relates to 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 minimum bid level, annual rental payments, royalties, and a limited initial period of the lease. All of the financial obligations (bonus payments, rentals and royalties) reflect the value of the lessor's (i.e., the federal government) property interest in the leased minerals and are fiscal components of FMV. When determining the appropriate lease terms for a sale, BOEM must balance the need to receive FMV with the other policy goals in the Act, such as expeditious and orderly development of OCS resources. BOEM evaluates sale terms on a sale-by-sale basis and has adjusted them in recent sales in response to emerging market conditions, competition, and the prospective nature of available OCS acreage.

In addition, BOEM, jointly with the Bureau of Land Management, currently has a contract with IHS-CERA for a study entitled "Comparative Assessment of the Federal Oil and Gas Fiscal Systems." The study compares other countries' petroleum extraction fiscal systems and terms to the U.S. federal system. That study may help inform further decisions about whether to revise applicable fiscal terms that would be expected to help balance the objectives of the offshore program.

Minimum Bid

The minimum bid serves 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 proposed increasing the minimum bid in the GOM for water depths 400 meters or deeper was recently proposed increasing the minimum bid from \$37.50 to \$100 per acre starting with the WGOM Sale 218 scheduled to be held in December 2011. The GOM minimum bid remains at \$25 per acre in water depths less than 400 meters. The most recent minimum bids in Alaska were \$25 per hectare (about \$10 per acre) in the Chukchi Sea, Cook Inlet and in Zone B (deeper water areas) of the Beaufort Sea; and \$37.50 per hectare (about \$15 per acre) in Zone A (near shore areas) of the Beaufort Sea.

As explained above, the minimum bid also can be used to help control the pace of leasing, especially under an AWL framework, in which many marginally valued blocks are offered for sale and, when bid on, tend to receive low winning bids. In such large sales, increasing the minimum bid level can have a significant effect on the number of blocks leased, but may impact aggregate cash bonuses very little or even cause them to increase, since raising the minimum bid level can push low bids to higher levels.

Rentals

During the initial term of a lease and before the commencement of royalty-bearing production, the lessee pays annual rentals which generally are either fixed or escalating. 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 term is extended following the spudding of a well, which in some cases must be targeted to be drilled to a depth of at least 25,000 feet subsea in the GOM.

The prevailing GOM rental rates are shown in Table 3. Rental rates were last adjusted in Central GOM Sale 208, March 2009. Alaska rental rates range from \$2.50 to \$30.00 a hectare (about \$1.00 to \$12.00 per acre), with escalating rentals used in the four sales since 2003 (Beaufort Sea Sales 186, 195 and 202 and Chukchi Sea Sale 193).

Table 3: GOM Rental Rates per Acre or Fraction Thereof

Water Depth in meters	Years 1-5	Years 6, 7, and 8+
0 to <200	\$7.00	\$14.00, \$21.00, \$28.00
200 to <400	\$11.00	\$22.00, \$33.00, \$44.00
400 to <800	\$11.00	\$16.00
800+	\$11.00	\$16.00

Rental payments also 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 earlier; thereby giving other market participants an opportunity to acquire these blocks.

Royalties

The government also reserves a royalty interest, which is a share of the value of production at the lease if the lease is determined to hold economically recoverable hydrocarbons and goes into production. Royalty rates can have a significant impact on bidder interest and are a key parameter in the calculation of the underlying economic value for a block. Considered in combination with increased resource prices, perceived improvements in discovery and extraction technology, especially in deepwater, and the competitive market for OCS acreage, BOEM raised GOM deepwater royalty rates for new leases from 12.5 percent to 16.67 percent in 2007 and to 18.75 percent in 2008. The GOM shallow water royalties for new leases increased from 16.67 percent to 18.75 percent in 2008. Alaska sales have utilized a 12.5 percent royalty rate.

The BOEM is presently analyzing and evaluating application of different royalty rates, as well as different royalty structures. The ad valorem royalty on OCS production captures a share of the economic rent for the public on producing leases but increases the break-even resource price and minimum potential field size necessary to economically support exploration drilling and development activities. To hedge against the risk that hydrocarbon prices may climb significantly following lease issuance, newly issued leases could be offered using a price or value based sliding royalty system, in which royalty rates, not simply royalty amounts, rise with resource prices or the gross value of production. As long as production costs do not rise in parallel with hydrocarbon prices, such a system could also capture a greater share of the OCS economic rent without jeopardizing exploration and development. With a sliding royalty rate, if

hydrocarbon prices realize sustained increases after the leases are awarded, the government stands to collect an increasing portion of the economic rent through the royalty share. On the other hand, if prices fall, a sliding royalty would reduce the fiscal burden on lessees and reduce the probability of postponed exploration and development and/or early abandonment of production. This sort of flexibility in turn could reduce the wasted resources associated with premature abandonment of a particular block. The Act allows the Secretary flexibility to implement appropriate royalty terms for each lease sale.

Initial Period of the Lease

Once a high bid meets the FMV requirements, the lease rights are issued to the lessee for a limited term called the initial period. The 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 time for development.

The BOEM recently changed the lease terms in the deepwater GOM to account for improvements in deep water technology and the decreased time necessary for exploration and infrastructure development. The current GOM lease terms are shown in Table 4.

Table 4: GOM Initial Periods

Water Depth in meters	Initial Periods
0 to <400	5 years extended to 8 years if a well is spudded during the initial 5-year period targeting hydrocarbons below 25,000 feet TVD SS*
400 to <800	5 years extended to 8 years if a well is spudded during the initial 5-year period
800 to <1,600	7 years extended to 10 years if a well is spudded during the initial 7- year period
1,600+	10 years

*Total Vertical Depth Subsea

Lease terms on the Alaska OCS vary by area from 8 to 10 years because of the historically longer lead times needed for exploration due to seasonal factors such as sea ice, remoteness and availability of suitable drilling platforms. Using shorter lease terms for shallower waters helps to encourage timely development by providing a built-in incentive for development.

Bidding Systems

- (1) **Continue use of a single round sealed bid auction format with a cash-bonus competitive bidding system, subject to periodic review.**
- (2) Other.

Discussion: The next step in ensuring FMV is to identify the auction format and determine which competitive bidding system to use. The Act requires the use of a sealed bid auction format with a single bid variable on tracts no larger than 5,760 acres. The Act does allow for

different competitive bidding variables including royalty rates, bonus bids, work commitments, or profit sharing rates. The specific competitive bidding systems available under the Act and in the regulations at 30 CFR 560.110 mostly provide for variations of the cash bonus/royalty rate approaches.

In evaluating which competitive bidding terms to use, BOEM considers the goals of the 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 efficiency of the selected approach. Some of the alternative approaches, such as profit sharing and work commitments, could have beneficial aspects, but they are difficult to apply. Profit sharing systems applied to production values could result in operators producing closer to the socially optimal output and rates than with royalty systems, but any gains will likely be cancelled by excessive bid amounts that typically cannot be honored and the need for extensive administrative resources to audit and verifying the measure of profits. Similarly, work commitment bids could be beneficial in identifying who has the most optimistic view of geologic prospects. However, this system also encourages overbidding and wasted expenditures, especially in new areas where there is little resource knowledge, as well as difficulty in identifying, measuring and tracking qualified expenditures.

When Congress amended the Act in 1978, it instructed DOI 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. DOI used four alternative bidding systems from 1978 through 1982. These systems were found to be unsatisfactory. 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, BOEM has chosen to use the cash-bonus bidding system subject to a fixed royalty rate since 1983.

Bid Adequacy Review

(1) Continue use of the current, two-phased bid adequacy process, subject to revision as appropriate.

(2) Other.

Discussion: Once the lease sale, with modifications, is held, all accepted bids must satisfy FMV requirements. The bid adequacy process in use since 1983, evaluates high bids in two phases. The first phase assesses bid adequacy and relative block value by applying long-standing rules and procedures such as the number of bids received on the block, the distribution of those bids as well as the ranking of high bids across blocks, and an independent BOEM assessment of the block's geologic and economic viability. If not accepted during this first phase, the high bid is evaluated using detailed analytical assessment procedures to generate an independent evaluation of block value. The outputs of these procedures, in conjunction with the distribution of bids on blocks receiving multiple bids, are a set of block-specific values that are used to determine that block's ultimate reservation price. This price cannot be lower than the minimum bid level used for all blocks within a comparable water depth range. 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 either block-specific bidding factors or detailed block-specific analytical factors to ensure that FMV is received for each OCS lease issued. The FMV and the bid adequacy process also are discussed in part IV.F of this document.

IV. PROGRAM ANALYSIS

A. Analysis of Energy Needs

Introduction

Energy plays a central role in the U.S. economy and energy spending is commensurately significant. In recent years, American consumers have spent well over a trillion dollars a year on energy, more than 8 percent of the gross domestic product (GDP). As noted in its report “Key World Energy Statistics 2010”, the International Energy Agency recognizes the United States as a world leader in total energy consumption in the global energy system, importing almost 30 quadrillion Btu of energy each year to satisfy energy requirements of almost 100 quadrillion Btu of total consumption in transportation, industrial, commercial, and residential sectors. Although the United States also is a leading producer of coal, natural gas, and oil, growing demand for energy in other countries, especially China and India, means competition for limited energy sources may become more intense and costs for imported energy will likely increase in real terms over the coming decades. To address these issues, there is a greater importance and need to efficiently and practically promote investments in renewable energies and existing domestic production throughout the United States, both onshore and the OCS.

Section 18 of the Act requires the Secretary to formulate an OCS leasing program to “best meet national energy needs for the five-year period following its approval or re-approval.” In formulating the program, the Secretary must consider “the location of such [OCS oil- and gas-bearing] regions with respect to, and the relative needs of, regional and national energy markets.” The long lead times required for OCS oil and gas leasing and permitting of exploration, development, and production activities, along with the extended life of oil and gas projects, dictate that the analysis of energy needs look at projections for a period that extends far beyond the end of the 5-year schedule of sales in the Proposed Program. The energy needs analysis in this Proposed Program relies heavily on U.S. Energy Information Administration (EIA) energy forecasts. These forecasts are carried to 2035, so this analysis uses this shorter period rather than the 40 to 50 years used for most analyses in this document.

Expected high and volatile energy prices, especially for crude oil, and continued dependence on foreign energy, raise important energy policy issues about energy supply options and their effects on the economy and the environment. The following sections discuss national and regional energy needs, considering a large, continuing gap between domestic production and consumption; increased concern over the amount of U.S. dollars sent overseas; and expected supply contributions of OCS production and other sources of energy.

Forecast of National Energy Needs

Domestic energy security and independence are key topics relating to the national energy policy due to the challenging international political climate, increased competition for resources, energy supply instability, and price volatility. The EIA's *Annual Energy Outlook (AEO) 2011* forecasts changes in domestic energy production, energy imports, and energy consumption over the next 23 years. While there are many factors that simultaneously affect such forecasts, the primary engine behind the projected changes in production-consumption gaps and import requirements are assumptions about economic growth. The average annual growth rate for the U.S. economy projected in *AEO 2011* is 2.7 percent of GDP. Although the general falling ratio of energy expenditures to GDP over time from 7.4 percent in 2009 to 4.4 percent in 2035 reflects economic growth and declines in energy intensity, volatile prices and uncertain supplies could contribute to tight petroleum and natural gas supplies which could lead to the ratio creeping back up.

In 2009, the United States accounted for approximately 22 percent of the world's oil consumption and 21 percent of the world's natural gas consumption. World energy demand is projected to increase as a result of strong international demand in developing economies relative to supply. The average price of imported crude oil per barrel is projected to increase from \$61.66 in 2009 to \$124.94 (in 2009 dollars per bbl) in 2035 while world crude oil price estimates for 2035 range from \$50.07 to nearly \$200 per barrel depending on economic access to non-Oil Petroleum Exporting Countries (OPEC) resources and resulting OPEC price behavior. If price levels remain at, or exceed, the high levels of recent years, economic growth may be depressed, which would slow the growth of energy consumption. Continued dependence on foreign energy, especially for crude oil, raises important energy policy issues about energy supply options and their effects on the economy and the environment.

Oil and Natural Gas Production Estimates

Petroleum and natural gas currently supply nearly 63 percent of the Nation's energy needs. Furthermore, EIA forecasts that the Nation is poised to become even more dependent on oil and natural gas over the next two decades. The EIA projections, shown in Table 5 below, indicate that while the *share* of energy obtained from other sources is likely to increase slightly, the actual *amount* of oil and natural gas needed to meet the Nation's energy needs is expected to grow almost 15 percent by 2035.

Table 5: U.S. Energy Consumption (quadrillion British thermal units (Btu))

	2009	2015	2020	2025	2030	2035
Liquid Fuels and Other Petroleum	36.62 (38.6%)	39.10 (38.3%)	39.38 (37.5%)	39.84 (36.9%)	40.55 (36.5%)	41.70 (36.5%)
Natural Gas	23.31 (24.6%)	25.77 (25.3%)	26.00 (24.8%)	25.73 (23.8%)	26.58 (23.9%)	27.24 (23.9%)
Other	34.86 (36.8%)	37.15 (36.4%)	39.54 (37.7%)	42.38 (39.3%)	43.90 (39.5%)	45.25 (39.6%)
Total	94.79	102.02	104.92	107.95	111.03	114.19

Source: EIA Annual Energy Outlook 2011 (Reference Case) p.115

Note: Numbers in parentheses are percentages of total. Totals may not sum to column totals due to independent rounding.

Table 6 summarizes EIA's forecast for U.S. crude oil production from 2009 to 2035.¹⁴ It shows projected offshore crude oil production in the GOM increasing from 1.71 MMbbl per day in 2009 to 1.94 MMbbl in 2020, or a little over 1 percent annually. From 2020 to 2025, production decreases to 1.55 MMbbl but returns to 1.91 MMbbl by 2035. Over this period, GOM production is expected to continue to account for approximately 30 percent of U.S. domestic oil production.

Overall, total U.S. crude oil production is projected to increase from 5.36 MMbbl per day in 2009 to 5.95 MMbbl per day in 2035. Projected production is higher in the later years of the forecast when forecasted real prices are higher. Even with the increased production, imported oil would continue to account for a very large share of domestic consumption. Projected increases in domestic production, refinery gains, ethanol and biodiesel, and liquids from gas, coal, and biodiesel all contribute to the overall gain in liquid fuels production by 2035.

¹⁴ The EIA projections assume that all laws and regulations remain intact, i.e., EIA does not make assumptions as to which legal and regulatory proposals will eventually be adopted.

Table 6: U.S. Crude Oil Production (MMbbl of oil per day)

	2009	2015	2020	2025	2030	2035
Gulf of Mexico	1.71	1.81	1.94	1.55	1.71	1.91
OCS	(31.9%)	(31.2%)	(31.9%)	(26.4%)	(29.4%)	(32.1%)
Other	3.65	4.00	41.4	4.33	4.11	4.04
	(68.1%)	(68.8%)	(68.1%)	(73.6%)	(70.6%)	(67.9%)
Total	5.36	5.81	6.08	5.88	5.82	5.95

Source: EIA Annual Energy Outlook 2011 (Reference Case) p.143

Note: Numbers in parentheses are percentages of total. Totals may not sum to column totals due to independent rounding. The EIA does not publish Alaska OCS numbers separately.

Table 7 summarizes EIA's forecast of U.S. natural gas production from 2009 to 2035. U.S. natural gas production is projected to increase from 20.96 tcf in 2009 to 26.32 tcf in 2035. These estimates include Alaska natural gas, assumed to begin flowing through a new pipeline some time after its completion in 2020.

The large increases in domestic natural gas production come from the abundance of discovered and undiscovered shale gas reserves in the United States and increased exploration and development of these areas. The combination of two technologies, horizontal drilling and hydraulic fracturing, has made it economic to produce shale gas at today's prices. This has made a substantial contribution to domestic supplies, reducing natural gas prices even as oil prices have risen. Shale production in the United States grew from 1.0 tcf in 2006 to 4.8 tcf, or 23 percent of total U.S. dry natural gas production, in 2010. Expectations are for another threefold increase by 2035.

On an energy-equivalent basis, natural gas and oil production from the OCS are similar. However, the proportion of hydrocarbon production represented by natural gas is declining relative to that of oil. Only a few years ago, OCS natural gas production exceeded oil production on an energy-equivalent basis. On an energy-equivalent basis, OCS natural gas production in 2010 was 2.32 quadrillion Btu. This is lower than that generated from oil production, which equaled 3.28 quadrillion Btu in 2010.

The *AEO 2011* shows projected offshore natural gas production for the GOM increasing to 3.05 tcf over the period studied, representing an increase in natural gas production of about a half a percent annually. Unlike onshore production, GOM natural gas production is expected to decrease in the intermediate term since many undiscovered offshore fields are uneconomic at the gas prices projected over the next few years. While GOM natural gas production is expected to contribute a smaller percentage toward the Nation's natural gas requirements over the next two decades due to the technological advances in shale gas production, it remains an important and stable source of domestic natural gas.

Table 7: U.S. Natural Gas Production (Trillions of Cubic Feet/Year)

	2009	2015	2020	2025	2030	2035
Gulf of Mexico	2.7 (12.9%)	2.15 (9.6%)	2.96 (12.6%)	2.42 (10.1%)	2.86 (11.4%)	3.05 (11.6%)
Other	18.26 (87.1%)	20.28 (90.4%)	20.24 (87.4 %)	21.56 (89.9%)	22.24 (88.6%)	23.27 (88.4 %)
Total	20.96	22.43	23.43	23.98	25.1	26.32

Source: EIA Annual Energy Outlook 2011 (Reference Case) p.143

Note: Numbers in parentheses are percentages of total. Totals may not sum to column totals due to independent rounding. The EIA does not publish Alaska OCS numbers separately.

Net pipeline imports of natural gas, primarily from Canada and Mexico, are projected to decline about 14 percent annually from 2.23 tcf in 2009 to about 0.04 tcf in 2035. This decline is due to reserve depletion and growing domestic demand in those countries, along with abundant supply and accompanying lower prices in the United States. Net imports of liquefied natural gas are expected to decrease from 0.41 tcf in 2009 to 0.14 tcf by 2035. Some have speculated that the United States could even export liquefied natural gas during peak world demand periods, especially in light of the much higher natural gas prices prevailing in other markets.

Meeting Energy Needs

Contribution of OCS Oil

From a national energy and economic security standpoint¹⁵, OCS production takes on even greater importance as the United States tries to maintain domestic oil supplies as a means to help reduce dependence on foreign oil. Petroleum demand is projected to grow from 18.81 MMbbl per day in 2009 to 21.93 MMbbl per day in 2035, an average of about 0.6 percent per year. Demand growth is led by the transportation sector, which is projected to increase from about 71 percent of U.S. petroleum consumption in 2009 to about 73 percent of consumption in 2035, with liquid fuels comprising 97 percent of transportation consumption. While EIA projections show a decrease in oil imports of approximately 0.5 percent per year between 2009 and 2035, imports would still supply more than 40 percent of the oil consumed in the United States by 2035.

Offshore oil accounts for more than 38 percent or 1.54 MMbbl per day of 2010 domestic oil production. The GOM is one of the largest suppliers of crude oil for the U.S. market, along with Canada, Saudi Arabia, Mexico, Venezuela, Nigeria, and other countries. From 2000 to 2010, deepwater production of oil from the GOM increased by over 70 percent. Without this increase, declining domestic production in recent years would have been more severe. The trend of increasing deepwater GOM production is attributable to the recent contribution of very large

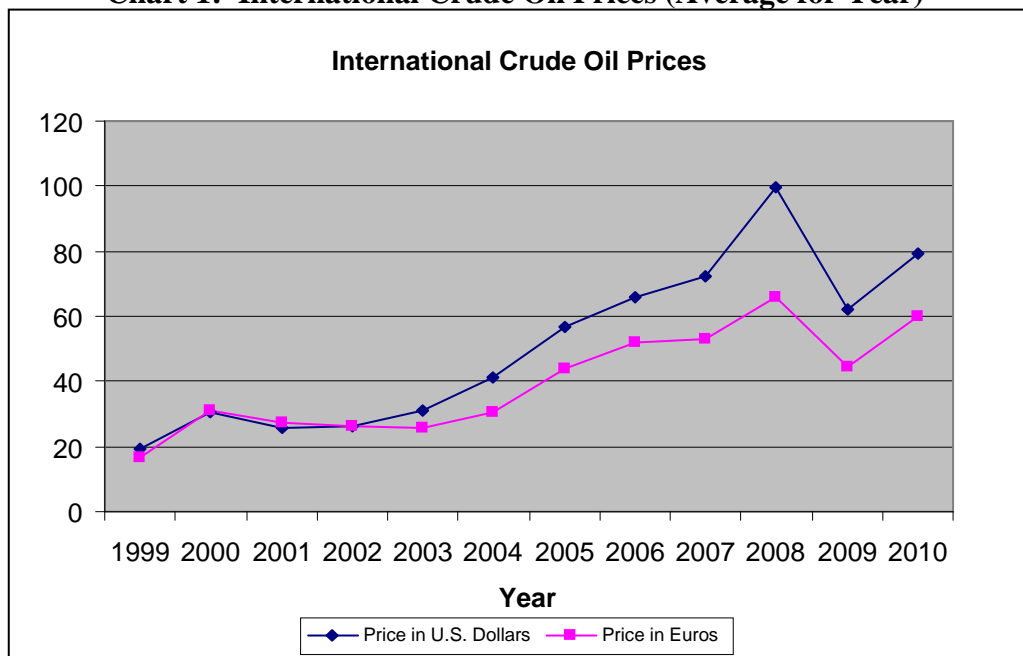
¹⁵While oil prices are set on the world market, making it difficult to insulate the Nation's economy from price changes, maintaining secure supplies of petroleum can help avoid temporary supply disruptions or threats thereof, and consuming domestic supplies limits the amount of dollars sent overseas, reducing the balance of payments deficit.

fields with high flow rates located in over 1,000 feet of water that have been discovered and developed using new technology. This trend is expected to continue, due to record-setting levels of leasing activity in deep water.

According to EIA, crude oil and petroleum imports accounted for 49 percent of oil demand in 2010 but are expected to decline to 41 percent of demand in 2035. Even without major year-to-year increases in petroleum imports, the contribution of these imports to the U.S. balance of payments deficit has increased substantially. Applying the EIA estimates of daily petroleum imports to its high price scenario would yield an estimated net export of nearly one-half trillion dollars per year from the United States to other countries.

Although the decline in the U.S. balance of trade was largely due to increased world oil prices, the contribution of the trade deficit to a weakening dollar was also a factor, given that oil prices are denominated in dollars.¹⁶ As the following chart indicates, oil prices have risen more rapidly in U.S. dollars than in euros.

Chart 1: International Crude Oil Prices (Average for Year)



Source: EIA data at http://www.eia.gov/dnav/pet/pet_pri_spt_s1_a.htm and http://www.econstats.com/fx/fx_aa1.htm for exchange rates.

Not only did world oil prices increase rapidly through the summer of 2008, but the declining value of the dollar exerted additional upward pressure on U.S. import costs. The dollar amount spent on oil imports by August 2008, when oil prices were at their peak, surpassed the amount spent in all of 2007. Production of oil and natural gas from the OCS directly reduces the amount of oil that must be imported from abroad, much of it from politically unstable regions, thereby lessening the threat to the U.S. economy posed by supply disruptions and higher prices.

¹⁶ As the dollar weakened, oil became relatively more expensive to U.S. consumers than to those with stronger currencies, resulting in less pressure to reduce demand abroad and greater pressure on available world supply than there otherwise would have been. This was another factor contributing to increased overall world prices.

Contribution of OCS Natural Gas

Natural gas demand has risen significantly over the last decade as new gas-fired generation plants have been built and put into service. This increase in demand, as well as growing residential demand, has raised concerns about the volumes of natural gas available from traditional sources. Both domestic production and imports from Canada and Mexico will have to increase dramatically to maintain adequate supplies in the future. However, since 2000, both the production and the net exports of Canadian natural gas to the United States essentially have been flat. In 2035, U.S. imports of Canadian natural gas are projected to fall to 2.8 tcf, while U.S. natural gas exports to both Canada and Mexico are expected to increase. Canada's imports of U.S. natural gas are projected to rise from 0.7 tcf in 2009 to 1.0 tcf in 2035 and Mexico's imports to rise from 0.3 tcf in 2009 to 1.6 tcf in 2035.

According to the *AEO 2011*, natural gas production in the United States from shale gas resources has increased considerably to meet growing demand. The OCS currently supplies about 13 percent or 2.70 tcf of annual domestic natural gas production and there are an estimated 12 tcf in proven reserves of natural gas in the GOM. By 2035, OCS production is expected to account for roughly 11 percent of total domestic natural gas production. The improving prospects for domestic U.S. natural gas production mean fewer natural gas imports. While the OCS has large volumes of proven and undiscovered natural gas resources, most of the increased domestic natural gas production in the next decade will come from onshore areas.

The Nation is expected to rely on more oil and natural gas to meet its energy needs, even as alternative sources of energy supply an increasing share of energy. This reliance on oil and natural gas will necessitate that the Nation continue to access federal lands to supply the needed energy resources. Estimates by the USGS of remaining domestic technically recoverable oil and natural gas resources onshore and state waters offshore and by BOEM for the OCS indicate that the majority of the Nation's remaining resources lie on federal OCS and onshore public lands. Therefore, there is a clear need for continued oil and gas leasing activity in the GOM, the primary OCS region currently available for energy production and development activities. Outside the GOM, the Alaska OCS holds promise and lease sales are proposed in the Chukchi Sea, Beaufort Sea, and Cook Inlet program areas. Depending on their resource potential, production from other OCS areas could help meet the country's energy needs. In light of the aftermath of the *Deepwater Horizon* event and the need to develop information about the resource potential in areas where there has not been active leasing, the Secretary has decided that it is appropriate for this 5-Year Program to focus on leasing in the GOM and in areas of the Alaska OCS in which there are active leases.

Alternatives to the Contribution of OCS Oil and Natural Gas

In the Draft EIS, the term No Action Alternative (NAA)¹⁷ is used to refer to the selection of the No Sale Option for all program areas. In the NAA, no new leasing would take place for at least five years and domestic oil and natural gas supplies would be reduced by the amount of foregone production until such time as those resources become available from future leasing programs. If

¹⁷ See additional discussion in Net Economic Value section, below.

no OCS oil and gas lease sales were held during the period covered by the new 5-Year Program, energy markets would find substitutes to satisfy the demand that would have been met by production resulting from the oil and natural gas resources anticipated to be discovered and produced as a result of the additional lease sales to be held under that program. In an environment of increasing world demand for oil and natural gas, a supply cut equivalent to the production anticipated to result from a new 5-Year Program would contribute to rising prices in the absence of additional production somewhere else. This would lead to a small reduction in oil and natural gas consumed in the United States, but most of the foregone production would be replaced by other sources.

The BOEM uses its *Market Simulation Model* to estimate the amount and percentage of substitutes the economy would adopt in the case that a particular 5-Year Program were not approved and implemented. The *Market Simulation Model* is based on estimates of price elasticities of demand and substitution effects. In this case, elasticity of demand is the extent to which consumers purchase less of a product when the price increases by a certain amount.

Based on the research supporting the model, Table 8 shows that under the mid-price scenario of \$110 per barrel and \$7.38 per thousand cubic feet (mcf), oil and natural gas production foregone from this Proposed Program would be replaced by 67 percent greater imports, 17 percent increased onshore production, a 6 percent switch to coal, 3 percent increased electricity from other sources, a 2 percent switch to other energy sources, and 6 percent reduction in consumption.¹⁸ Without the expected production from the 5-Year Program, 10 billion BOE (BBOE) over 40 years would be lost. In terms of quantities involved, expectations would be for supplies of other energy sources to increase as follows over 40 years: imports by 6.7 BBOE, onshore production 1.7 BBOE and other energy sources by 1.1 BBOE. Consumption would be expected to decline by 0.6 BBOE.

¹⁸ Total does not sum to 100 percent due to independent rounding and conversion to equivalent units of energy (e.g., Btu to BOE)

Table 8: Results of the No Action Alternative (No New Program)

Energy Sector	Quantity (BBOE) over 40 years	Percent of OCS Production Replaced
Onshore Production	1.7	17%
Onshore Oil	0.2	2%
Onshore Gas	1.5	15%
Imports	6.7	67%
Oil Imports	5.8	58%
Gas Imports	0.9	9%
Coal	0.6	6%
Electricity from sources other than Coal, Oil, and Natural Gas	0.3	3%
Other Energy Sources	0.2	2%
Reduced Demand	0.6	6%

Given relative ease of transport, oil prices are set on the world market. Natural gas is not as easily transported, thus its prices are influenced much more heavily by regional supply. Therefore, in the absence of production from a new program, U.S. natural gas prices would rise much more than would oil prices. This would result in substitution away from natural gas and toward what would then be relatively cheaper oil and other energy sources. The net effect is that U.S. oil consumption would rise under the NAA, even after accounting for the effects of a very slight increase in the price of oil.

The estimated energy alternatives would substitute for the approximately 10 BBOE lost over 40 years from the absence of oil and gas lease sales that would be held during the period covered by the Proposed Program. The distribution of reduced consumption and switching to alternative sources by sector depends on the amount of consumption and relative price elasticities of demand across the sectors. Transportation accounted for 72 percent and industrial consumption accounted for almost 23 percent of oil consumption in 2010. Residential and commercial consumption accounted for approximately 6 percent. Other forms of energy cannot readily substitute for most of the oil and natural gas consumed in these sectors in the near term. In the U.S. transportation sector, a consumption decline would probably involve a reduction in miles traveled, the purchase of more fuel efficient cars, or both. In addition to the modest price increase associated with these scenarios, the cost of replacing the present transportation fuel infrastructure hinders efforts to extend the use of alternative transportation fuels, although automobile companies have unveiled and/or announced plans for new gasoline-electric and all electric hybrid vehicles.

A detailed discussion of the model and alternative sources of energy in the context of the Proposed Program for 2012-2017 is given in *Energy Alternatives and the Environment, 2012-2017* (BOEM 2011-051), which can be found with other 5-Year Program documents at www.boem.gov. The model and the related publication will be updated for analyses conducted for the Proposed Final Program.

Alternative Energy

Many alternative energy sources will contribute to the future U.S. energy landscape with an increasing emphasis on renewable technologies and CO₂ emission-reducing sources. The President is committed to a broad effort to secure America's energy future and protect consumers by producing more conventional resources at home while also working to reduce dependence on oil over the longer term by using cleaner, alternative fuels and improving energy efficiency. In February 2009, with the passage of the American Recovery and Reinvestment Act (ARRA), the United States invested over \$90 billion in clean energy which has supported a wide range of programs. For example, ARRA included \$2.4 billion for battery and electric drive component manufacturing, and for electric drive demonstration and infrastructure, investments that are spurring the advanced vehicle batteries industry in the United States. Investments in the grid included \$4.5 billion for the Smart Grid, demonstrations projects, and capacity building. The Section 1603 renewable energy grant program, another example of an ARRA investment, has been an essential tool in deploying renewable energy resources in the United States over the past two years, successfully increasing U.S. manufacturing and supporting tens of thousands of new jobs for Americans. These and other investments are helping to ensure that electricity generation from non-hydro renewable sources is on track to double by 2012 from 2008 levels. Moreover, ARRA built on significant federal investment in solar, geothermal, and marine and hydrokinetic renewable energy technologies under the Energy Independence and Security Act of 2007.

In 2010, DOI approved a dozen renewable energy projects on public lands, including nine commercial-scale solar energy initiatives. On a national scale, renewable sources supplied about 8 percent of all the energy consumed domestically in 2010. On the OCS, DOI and BOEM have responsibilities for renewable energy projects and other alternative uses of federal lands under the Energy Policy Act of 2005. The BOEM has the authority to (1) grant leases, easements or right-of-ways for renewable energy-related uses on the OCS, (2) act as a lead agency for coordinating the permitting process with other federal agencies, and (3) monitor and regulate those facilities used for renewable energy production and energy support services. The first OCS renewable energy commercial lease was issued in October 2010 for the Cape Wind project, offshore Massachusetts. The construction and operation plan to develop the 468-megawatt project was approved in April 2011 and marks a milestone in the development of OCS renewable energy resources.

The alternative energy technologies expected to be deployed on the OCS will continue to mature over the next decade and beyond. Environmental and meteorological data collection has begun in the Mid-Atlantic OCS for potential wind energy production zones and BOEM has been actively working with coastal states to share information on potential wind energy leasing sites. Federal or state governments might use taxes, subsidies, or specific measures, such as requiring non-gasoline powered vehicles, to encourage or mandate a different mix of energy alternatives than the market would choose. Such government actions would most likely be directed at vehicle or electric generating plant fuels and renewable energy portfolio standards. Even with increased contributions from alternative and renewable energy sources, as discussed above, natural gas and oil will remain important contributors to the energy mix throughout the foreseeable future.

Regional Energy Considerations

For 2009, Table 9 shows proportional petroleum and natural gas production and consumption by region in the United States. It also shows total energy consumption as a percentage of total U.S. energy consumption for each region.

Table 9: Proportional Petroleum and Natural Gas Production and Consumption by Region in 2009

Petroleum Admin for Defense District (PADD) or OCS Region*	Production (MMbbl:MMcf)		Consumption		Total Energy Consumption (MMBtu) % of U.S. Total
	Crude Oil % of U.S. Total	Natural Gas % of U.S. Total	Crude Oil % of U.S. Total	Natural Gas % of U.S. Total	
East Coast	0.44%	3.35%	29.89%	26.43%	31.26%
Midwest	11.03%	12.24%	25.48%	25.97%	29.32%
Gulf Coast	28.72%	49.78%	26.05%	25.64%	20.57%
Federal OCS, GOM	29.08%	11.24%	0.00%	0.46% **	0.00%
Rocky Mountain	6.66%	20.26%	3.43%	4.54%	3.86%
Pacific***	22.65%	2.98%	15.16%	16.97%	16.82%
Federal OCS, Pacific	0.98%	0.15%	0.00%	0.00%	0.00%
Federal OCS, Alaska	0.07%	0.00%	0.00%	0.00%	0.00%

East Coast (PADD I): Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Florida, Georgia, North Carolina, South Carolina, Virginia, and West Virginia

Midwest (PADD II): Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee, Wisconsin

Gulf Coast (PADD III): Alabama, Arkansas, Louisiana, Mississippi, New Mexico, and Texas

Rocky Mountain (PADD IV): Colorado, Idaho, Montana, Utah, and Wyoming

Pacific (PADD V): Alaska, Arizona, California, Hawaii, Nevada, Oregon, and Washington

*Offshore production in state waters is included with onshore production for each PADD. Federal OCS production is not included in the PADDs.

** Natural gas is often used as a fuel in offshore production.

*** Without Alaska, the Pacific PADD produces less than it consumes.

Sources:

Oil Production - http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mtbl_a.htm

Gas Production - http://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_VGM_mmcf_a.htm

Oil Consumption - http://www.eia.gov/dnav/pet/pet_cons_psup_dc_r50_mtbl_a.htm

Gas Consumption - http://www.eia.gov/dnav/ng/ng_cons_sum_dc_u_nus_m.htm

Total Energy Consumption - http://www.eia.gov/state/seds/sep_use/notes/use_print2009.pdf

OCS crude oil and natural gas production -

http://www.eoearth.org/files/156001_156100/156002/ocsproduction2010_doi.xls

Petroleum conversion factors - http://www.eia.gov/kids/energy.cfm?page=about_energy_conversion_calculator-basics#oilcalc

2009, million Btu per barrel (5.8)

Natural gas conversion factors: http://www.eia.gov/kids/energy.cfm?page=about_energy_conversion_calculator-basics#oilcalc

2009, Btu per cubic foot (1,027)

One noticeable theme is that, when production from Alaska is included, the GOM and the western part of the United States produce a greater share of the Nation's hydrocarbons than they consume while the opposite is true for the eastern part.

Conclusion

Despite promising new sources of energy that may appear on the horizon, America's reliance on oil and natural gas is likely to change only gradually in the near future. Additional reductions in oil dependence may also come from increases in efficiency. Achieving the goal of ample, secure, clean, and affordable energy will require diligent, concerted efforts on both the supply and demand sides of the energy equation. National energy policy will need to focus on increasing conservation and efficiency to help reduce demand for fossil fuels, i.e., oil, natural gas, and coal, and thus help lessen dependence on foreign oil imports. Oil and natural gas production and renewable energy from the OCS are key components of a national energy strategy to diversify energy sources. Renewable energy sources are attractive for environmental reasons and worldwide government policies and incentives will increase the use of renewable energy sources.

In the interim, to help bridge the existing energy gap as the Nation moves towards a more sustainable energy future, obtaining sufficient supplies of traditional fuels at reasonable prices and continued responsible oil and natural gas development is crucial to the economy and energy security. The OCS leasing program helps supply a share of the Nation's energy requirements while reducing the dependence on imported energy by identifying key offshore federal oil and gas bearing regions that best meet the nation's energy needs. Over the next 25 years, offshore production is expected to account for roughly 32 percent of total domestic crude oil production and 11 percent of total domestic natural gas production. Without the program, significant increases in imported oil and natural gas and onshore production would be needed to sustain the Nation's growing energy requirements.

The size, timing, and location of lease sales in the Proposed Program have been selected to help meet the needs described above in an efficient and practical manner in light of existing legal constraints, local conditions, and other uses of particular parts of the OCS. In the short term, the Proposed Program is designed to maximize the potential of the Central and Western GOM, which have both the highest economically recoverable resource potential of available areas as well as the most developed infrastructure. In the intermediate term, the Proposed Program sets in motion further exploration and potential development of undiscovered resources offshore Alaska.

B. Analysis of Environmental Concerns

Introduction

The Act, as amended requires consideration of environmental protection in managing the Nation's offshore oil and natural gas resources. The Act's amendments point to the importance of applying safeguards to help limit the risks of environmental damage and to protecting the human, marine, and coastal environments. Section 18 of the Act mandates that decisions on managing the mineral resources of the OCS strike a proper balance between the potential for environmental damage, the potential for discovery of oil and natural gas, and the potential for adverse impact on the coastal zone. It is therefore important in developing a 5-Year Program to solicit comments relating to environmental concerns, to consider and analyze carefully the comments received, and to make use of that information in the development of the EIS prepared for the program, and, ultimately in the development of the program itself.

Environmental Analyses

The Draft EIS for the 5-Year Program for 2012-2017 has been prepared to accompany this document for the Secretary's consideration. Preparation of the EIS began with publication of a Notice of Intent to Prepare an EIS published in the *Federal Register* (74 FR 3631) on January 21, 2009. That notice was intended to start the formal scoping process by calling for comments and information to be used to determine the scope of the planned EIS for the 12 areas in the 2009 DPP. However, scoping was postponed when the comment period for the 2009 DPP was extended by 180 days. A second notice was published in the *Federal Register* on April 2, 2010, (75 FR 1628) announcing scoping in eight areas as part of the OCS Strategy announced by the President and the Secretary on March 31, 2010. In the aftermath of the *Deepwater Horizon* event on April 20, 2010, scoping meetings again were postponed. Following the December 1, 2010, announcement of a revised OCS Strategy, a third notice was published in the *Federal Register* on January 4, 2011, (76 FR 376) setting out the schedule for scoping meetings and another comment period on six areas. The Draft EIS analyzes the six areas proposed for leasing along with seven alternatives (see part III of this decision document and chapter 2 of the EIS for descriptions of the proposed action and alternatives). The potential environmental impacts that correspond to proposed and alternative lease sale options are summarized following each set of options presented in part III of this document.

There is additional information relating to environmental concerns in the analyses of social costs, environmental sensitivity and marine productivity, and other uses of the OCS presented in part IV.C below. Also, much pertinent information is available in other documents cited and incorporated by reference.

C. Comparative Analysis of OCS Planning Areas

This section presents the required comparative analyses of section 18 factors and considerations for the Proposed Program decision. The analyses address the section 18 criteria that lend themselves to quantification as well as those that do not. To facilitate valuation of OCS program areas, the social benefits and costs of proposed OCS activities, as well as the costs of energy substitutes avoided by implementing the program, and environmental sensitivity and marine productivity of the areas proposed for leasing consideration are quantified. The other factors are addressed more qualitatively. The comparative analysis also takes into account comments received, other considerations pursuant to the Act and NEPA, and applicable judicial opinions. An extensive description of potential environmental impacts is addressed in the Draft EIS, published concurrently with this document.

1. Net Benefits Analysis

At the Proposed Program stage in the 5-Year Program, BOEM conducts a benefit-cost analysis by program area of the social value from anticipated production of economically recoverable oil and natural gas resources expected to be leased and discovered in each program area as a result of the program. The analysis examines the benefits to society from the production of oil and natural gas as well as the environmental and social costs associated with the anticipated exploration, development, and production. The analysis also includes estimates of the environmental and social costs associated with those activities that would be necessary to obtain other sources of energy that would be needed should any of the No Sale Options be selected. While society continues to receive the benefits from previously leased OCS resources that are not subject to this Proposed Program decision, only the net benefits from proposed new leasing are considered in this Proposed Program analysis.

The 2009 DPP decision document provided a comparative analysis of all unleased, undiscovered oil and natural gas resources in all 26 OCS planning areas, resulting in the “relative ranking” of those planning areas. Consideration of this analysis and of the various other factors outlined in part II of this document led to the decision on the location and timing of OCS lease sales in this Proposed Program.

For the Proposed Program, BOEM proceeds from the relative ranking of all unleased, undiscovered economically recoverable resources in the 26 planning areas to evaluating the value of anticipated production from each program area for the program proposal and for each of the broad program alternatives described in the Draft EIS (see Valuation of Program Alternatives, below). This valuation provides the Secretary with estimated net benefits by planning area from anticipated production under each of the three price cases listed in Table 10. In addition, the Proposed Program adds to the 2009 DPP analysis by including the net domestic consumer surplus¹⁹ or demand-side benefits that come from new leasing. Summing the supply

¹⁹ As footnoted in part II of this document, consumer surplus (a standard term in economics) represents the difference between the price actually charged for a service or product and the higher price consumers would be willing to pay for a service or product if they had to. In this context, an action or event that lowers the price of a

and demand-side net benefits in each program area and for each program alternative provides the net benefits shown in Table 16. This analysis is one of the many factors the Secretary considers in his decision on the size, timing, and location of future lease sales.

Figure 1 summarizes the components of BOEM net benefits analysis. Additional information on the methodology and economic assumptions can be found in the *Economic Analysis Methodology for the 5-Year OCS Oil and Gas Leasing Program for 2012-2017*, (BOEM 2011-050).

Figure 1: Components of Net Benefits Analysis

Anticipated Production of the Program Area	x	Assumed Price Level	=	Gross Revenue
Gross Revenue	-	Private Costs	=	Net Economic Value (NEV)
NEV	-	Environmental and Social Costs of Program Proposal - Environmental and Social Costs of Energy Alternatives (Resulting from the No Sale Option)	=	Net Social Value (NSV) (Net Supply-Side Benefits)
NSV	+	Consumer Surplus Benefits - Lost Domestic Producer Surplus Benefits	=	Net Benefits

The various components of the net benefits analysis include evaluation of impacts from economic activities as well as impacts associated with economic value. As described later in this section, the NEV analysis looks at changes in economic activity as it measures commercial revenues, tax receipts, and other government revenues. Economic value is measured as consumers' willingness to pay, both for natural resources and for goods they want to consume. The environmental and social costs as well as the consumer surplus calculations measure economic value.

Another way to look at social value is to compare the benefits of incremental employment, labor income, and other such factors with the potential range of costs imposed by each EIS alternative. That approach is more easily used when considering impacts from the local or regional perspective and is used in the equitable sharing of developmental benefits and environmental risks analysis below. This net benefits analysis is approached from the national perspective, which provides the Secretary with a clearer picture of the overall balance of benefits and costs tied to the program-area-by-program-area decision as to whether to offer the area for leasing.

good or service will increase consumer surplus by the change in price times the quantity purchased at that lower price.

Gross Revenue

In the first stage of the net benefits analysis, BOEM calculates the gross revenue from the production of OCS oil and natural gas anticipated as a result of the 5-Year Program. Gross revenue is the anticipated production of each resource multiplied by the assumed price level.

Price Level Assumptions

Leasing from the 2012-2017 program is expected to stimulate exploration, development, and production activity for approximately 40 years²⁰, over which time oil prices could fluctuate dramatically. Recent oil price volatility has shown that unanticipated events, weather, geopolitical unrest, or economic changes can cause oil price paths to deviate considerably from even the most respected forecasts. In addition, the widespread application of technology to extract abundant tight natural gas has impacted domestic natural gas prices, causing the decoupling of oil and natural gas prices. Because oil and natural gas prices can be very volatile, as shown by the fluctuations over the last few decades, BOEM uses level-price scenarios where the inflation-adjusted, or “real,” prices for oil and natural gas are assumed to remain constant. Use of a forecast or of variable prices in the analysis would make it difficult for the decision-makers to separate out the impacts of price changes from the differences in program areas. For this reason, the Proposed Program analysis includes resource and net benefit estimates for each of the three level price scenarios shown in Table 10. The BOEM’s use of three level-price paths allows decisionmakers to more easily understand net benefits at a mid-range price as well as changes in benefits that may result from major swings in price, either upward or downward. A real discount rate of 7 percent is used in the Proposed Program analysis.

Table 10: Price Scenarios

	Oil (per bbl)	Natural Gas (per mcf)
Low	\$60	\$4.27
Mid	\$110	\$7.38
High	\$160	\$11.39

Estimates of Hydrocarbon Resources and Anticipated Production

Resource estimates from the 2011 National Assessment of Undiscovered Technically and Economically Recoverable Oil and Gas Resources on the OCS provide the foundation for BOEM’s evaluation of program areas. This assessment considers recent geophysical, geological, technological, and economic information and utilizes a probabilistic, geologic, play-based approach to estimate the undiscovered technically recoverable resources of oil and natural gas for individual plays. This methodology is suitable for both conceptual plays where there is little

²⁰ Some Alaska exploration and development (E&D) scenarios extend to about 50 years because the pace of development historically has been slow. However, most of the activity takes place within 40 years of the start of activity.

or no specific information available, and for developed plays where there are discovered oil and natural gas fields and considerable information is available.

The 2011 assessment incorporates significant updates to the economic assumptions used to assess the Undiscovered Economically Recoverable Resource (UERR) for developing the anticipated production expected from the program areas. The most influential change involved incorporating a relationship between oil price and development costs in the modeling methodology. Capturing observed variations in oil and natural gas exploration and development costs across a wide range of oil prices improved BOEM's confidence in estimating the UERRs from which the anticipated production volumes in Table 11 were derived. This fundamental relationship was not modeled in previous economic assessments. A cost-price "elasticity factor" 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. Another important factor affecting the anticipated production reported in this analysis was a revised estimate of the natural gas heat content (Btu) equivalency factor. That factor, which was 0.90 in 2005, has decreased to less than 0.40 in 2011, thus lowering the economic value of natural gas relative to oil. For example, an oil price of \$60 per bbl in the 2006 assessment was associated with a gas price of \$9.07 per mcf of natural gas, while the same oil price is associated with a natural gas price of \$4.27 per mcf in the 2011 assessment. Furthermore, estimates of UERR expected to be available for lease as of October 2012 were revised to incorporate recent leasing activity in those planning areas with OCS lease sales scheduled in the interim. A description of the methodology and results of the 2011 assessment is available in the national assessment fact sheet at www.boem.gov.

Estimates of anticipated production are a subset of the total resource potential and provide a more realistic basis for valuation in the Proposed Program and Draft EIS analyses. Anticipated production differs from undiscovered technically and economically recoverable resource estimates in that anticipated production only includes oil and natural gas resources that are expected to be leased, discovered, developed, and produced, as a result of a series of lease offerings in a new 5-Year Program, or for the cumulative case in the Draft EIS, from the cumulative effect of all past, present, and future 5-Year Programs.

In the GOM, the anticipated production expected to result from sales in this Proposed Program is based on historical sale-specific field discovery volumes, production and drilling activity, leasing trends and BOEM's most recent 10-year GOM production forecast. The UERR estimates from BOEM's 2011 assessment provide the upper limit constraint of the volume estimates for the cumulative case. Assessment data is also used to segregate anticipated production into water-depth categories using geologic play-specific resource estimates as well as a distribution of available acreage. For example, a significant decline in leasing and drilling activity in the shallow water of the Western GOM since 2007 resulted in a significant reduction of the anticipated production volumes in this area. The anticipated production estimates for the Eastern GOM also incorporated area-specific subsurface geological and geophysical data interpretation.

In Alaska, many factors influence the development of exploration, development and anticipated production scenarios related to the program. In the Alaska Arctic, oil is the priority commodity

of interest due to its higher market value and the existing Trans Alaska Oil Pipeline System (TAPS). Accordingly, the scenarios in the Beaufort and Chukchi Seas assume that large oil fields will be developed first. Natural gas is of secondary interest and is assumed to be commercially viable if a new large-volume transportation system pipeline is built and oil production provides funding for much of the infrastructure. Natural gas production is likely to be delayed until oil pools are depleted. Natural gas is assumed to be utilized as both fuel for facilities and for reservoir pressure maintenance through injection to extract more oil. Cook Inlet has established infrastructure and a nearby market for oil and natural gas production. With access to existing infrastructure and a local market, smaller oil or natural gas pools could become commercial projects, and natural gas could be produced more quickly.

In part due to the differences between mature areas and frontier areas, the high-price estimates for the GOM areas are not strictly comparable to those for the Alaska OCS areas, especially for the Arctic areas. The estimates for the GOM are based on years of experience, while those for the Beaufort and Chukchi Seas must necessarily rely on key exploration and development assumptions. This is true even more for the high-price estimates than for the low-price and mid-price estimates.

Table 15 presents a summary of anticipated production and other estimates shown in Tables 11 through 14.

Table 11: Production Estimates*

	Oil (billion barrels)			Natural Gas (trillion cubic feet)			BBOE (billion barrels of oil equivalent)		
	Low	Mid	High	Low	Mid	High	Low	Mid	High
Central GOM	2.24	3.77	4.34	9.47	16.41	19.07	3.92	6.69	7.73
Western GOM	0.56	0.86	0.97	2.63	4.07	4.59	1.03	1.58	1.79
Eastern GOM**	0.00	0.05	0.07	0.00	0.11	0.16	0.00	0.07	0.10
Chukchi Sea	0.50	1.00	2.15	0.00	2.50	8.00	0.50	1.44	3.57
Beaufort Sea	0.20	0.20	0.40	0.00	0.50	2.20	0.20	0.29	0.79
Cook Inlet	0.10	0.10	0.20	0.00	0.04	0.68	0.10	0.11	0.32

* After publication of the January 2009 DPP decision document, BOEM completed a subsequent resource assessment (2011 assessment) resulting in revised estimates of unleased, undiscovered economically recoverable resources. The new estimates are reflected in the anticipated production numbers in this table. The low-price case represents a scenario under which inflation-adjusted prices are \$60 per barrel for oil and \$4.27 per mcf for natural gas throughout the life of the program. Prices for the mid-price case are \$110 per barrel and \$7.38 per mcf. Prices for the high-price case are \$160 per barrel and \$11.39 per mcf.

** Current information does not indicate that the number of sales would affect anticipated production for the Eastern GOM. The two-sale option allows the Secretary to consider any new information that might arise from exploration on existing leases subsequent to his decision on the program, when deciding whether to hold a second sale.

Net Economic Value

Once the gross value of the resources is calculated, the second stage in the net benefits analysis is to calculate the NEV from resources expected to be leased and produced from sales in the 2012-2017 program. The NEV is the discounted gross revenue from the produced oil and natural gas less the discounted costs of exploring, developing, producing, and transporting the oil and natural gas to the market, or the costs required to realize the economic value of the resources. The NEV estimates are calculated for each program area using the same schedules of exploration, development, and production activities that are used in the environmental and social cost analysis and in the Draft EIS. The federal government, as lessor, collects a portion of the NEV as transfer payments in the form of cash bonuses, rentals, 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 or reinvested in exploration and development projects. The NEV can be equated to the sum of the present values of royalties, rents, bonuses, taxes, and after-tax profits.

The NEV estimates are given in Table 12 below. The NEV for the GOM program areas is lower than in previous programs by about 60 percent in the Western GOM and 30 percent in the Central GOM despite higher prices. The principal reason for the lower NEV is that the anticipated production from this 5-Year Program is lower than that of previous programs.

As discussed above, the exploration and development scenario for the Eastern GOM low case includes the drilling of some exploration wells, but these wells are not expected to produce at the low scenario prices. If there were exploration but no production, the NEV for the Eastern GOM in the low case would be negative. Without production, companies do not make profit and the government only receives the bonus bid and rental revenue, assuming a sale is held and companies bid. In both the mid- and high price scenarios, production and positive NEV are anticipated. Because no sales can be added to an approved 5-Year Program, the two-sale option for the Eastern GOM provides some insurance in case prices remain at current levels or rise even higher. If prices were to drastically fall toward the level of the low price case, the Secretary could reconsider holding both Eastern GOM sales.

Table 12: Net Economic Value

	Net Economic Value* (\$ billions)		
	Low	Mid	High
Central GOM	11.54	54.77	104.81
Western GOM	3.22	14.33	26.48
Eastern GOM (2 Sales)	**	1.06	2.49
Chukchi Sea	5.19	19.60	58.96
Beaufort Sea	2.06	4.20	12.53
Cook Inlet	1.43	2.75	8.17

*The low-price case represents a scenario under which inflation-adjusted prices are \$60 per barrel for oil and \$4.27 per mcf for natural gas throughout the life of the program. Prices for the mid-price case are \$110 per barrel and \$7.38 per mcf. Prices for the high-price case are \$160 per barrel and \$11.39 per mcf.

** Given current information, no production is expected from the Eastern GOM Program Area at the low-price case, whether from one or two sales; therefore NEV is assumed to be zero. If exploration occurs, NEV could be either negative if no production results or positive if successful exploration leads to production. The estimated

value of Eastern GOM resources is highly sensitive to changes in information, so placing a second sale on the schedule would provide flexibility to adapt to such changes.

Net Social Value

The third stage in the net benefits analysis is the calculation of net social value (NSV). The NSV is the NEV less the present value of net environmental and social costs anticipated from the Proposed Program, presented by program area. The program environmental and social costs arise from actual and potential environmental and social damage during the exploration, development, production, and transportation of OCS oil and natural gas resources. In order to calculate the net environmental and social costs, the costs that would be incurred if leasing did not occur in one or all of the program areas by selection of the No Sale Option must be subtracted from the program costs. Table 13 presents the estimates for the environmental and social costs associated with the development of the economically recoverable resources in the OCS program areas and with the environmental and social costs avoided by selecting the program proposal.

Selection of the No Sale Option in all of the program areas is equivalent to the NAA that is analyzed in the Draft EIS. If the No Sale Option is chosen in any or all of the program areas, no new leasing would take place in those areas for at least 5 years and domestic oil and natural gas supply would be reduced by the amount of foregone production. This reduction in production would cause only a small change in the quantity demanded of oil and natural gas due to slightly higher hydrocarbon prices. Instead, increases in imports and domestic onshore production as well as fuel switching would be necessary to meet continuing domestic demand for oil and natural gas resources.

The BOEM uses its *Market Simulation Model* to estimate the substitutions for offshore oil and natural gas development if one or more program areas are excluded from the program. The model indicates that if the No Sale Option was selected in each program area, there would be a 23 percent reduction in OCS production of oil and natural gas. Of this, 58 percent would be replaced by increased oil imports, 9 percent by increased gas imports; 2 percent by increased onshore oil production; 15 percent by increased onshore gas production; 6 percent by increased domestic coal production; 3 percent by increases in electricity from sources other than oil, coal, and natural gas; 2 percent by increases in other energy sources; and 6 percent by a reduction in domestic quantity demanded.²¹ These proportions of replacements to OCS oil and gas would roughly hold regardless of which program areas are or are not included in the program, but may vary slightly depending on the relative amount of oil and gas in those areas.

The BOEM is updating its *Offshore Environmental Cost Model* (OECM) which is used to estimate both the environmental and social costs that would result from OCS activities and the costs that would result from selecting the No Sale Option for one or more program areas. The OECM uses the levels of OCS activity from the exploration and development scenarios employed in NEV and the Draft EIS as well as the energy market substitutions from the *Market Simulation Model* to calculate environmental and social costs. The OECM is organized into the

²¹ Total does not sum to 100 due to independent rounding and conversion to equivalent units of energy, e.g. Btu to BOE.

following categories²²—Recreation, Air Quality, Property Values, Subsistence Harvests, Fiscal Impacts, Commercial Fishing, and Ecology. The OECM is designed to model the social and environmental impact of activities associated with OCS exploration, development, production, and transportation as well as typical oil spills that might occur on the OCS. Currently, the revised model is not designed to represent impacts from catastrophic events or impacts on unique resources such as endangered species.²³ Appendix B of this document illustrates BOEM’s proposed methodology to identify information on the range of factors that could influence the severity of impacts from a catastrophic event and the unique resources that could be affected. The proposed methodology is presented only for the Central GOM in order to solicit public review and comment on the planned approach. The BOEM will continue to refine and revise the model for the Proposed Final Program, and the methodology used in Appendix B, or a revision thereof, will be applied to all program areas. In addition to Appendix B, a detailed paper outlining the specifics of the model and its assumptions is being posted on boem.gov for public comment.

The results of the OECM used in the net benefits analysis are the net environmental and social costs which take into consideration the costs of energy substitutes that would occur as a result of the selection of a No Sale Option. Using the energy market substitutions of additional imports, onshore production, and fuel switching, the OECM calculates the environmental and social costs that would be incurred in the absence of each of the program areas in the program. In order to get an accurate value of the net environmental and social costs of the 5-Year Program, the No Sale Option costs are subtracted from the program environmental and social costs for each program area. Costs from the No Sale Option come from the added risk of oil spills and additional air emissions from increased tanker imports as well as from additional air emissions resulting from increased onshore production of oil, natural gas, and other energy sources such as coal.

As shown in Table 13, for every program area, the costs of relying on the substitute sources of energy under the No Sale option are equal to or greater than the environmental and social costs from producing program area resources under the proposal. The difference between the costs of the energy market substitutes under the No Sale Option and the costs of the proposed option is

²² The OECM also provides a general estimate of greenhouse gas (GHG) emissions from OCS program activities and the activities necessary to provide the energy substitutes. Because any effects of GHG emissions on climate change would not be affected by location, BOEM hopes eventually to estimate emissions not only from domestic production but also from overseas production and from supertankers carrying oil from the exporting countries overseas to U.S. shores, as well as from tanker emissions in port. No monetary values are attached to these emissions, except where there is sufficient data on the health effects within U.S. borders.

²³ As demonstrated by the *Deepwater Horizon* event in 2010, major or catastrophic events can have substantial economic and environmental effects on the social and environmental costs of offshore oil and gas exploration and development activity. In light of the economic, social, and environmental risks posed by offshore oil and gas activity, DOI has developed and implemented heightened safety and environmental protection standards and other reforms to reduce the risk of a major or catastrophic event. The OECM is designed to provide decisionmakers with information about the relative environmental and social costs associated with having or not having an offshore leasing program absent a low probability, high impact event. This is relevant to weighing the costs and benefits of the Proposed Program.

almost entirely due to the air emissions impacts.²⁴ The OECM calculations show that the replacement of OCS natural gas with onshore production in No Sale Option would yield higher environmental and social costs than other energy substitutes due mostly to the higher costs associated with air emissions onshore near domestic population centers. When OCS oil is replaced, it is mostly replaced with increased imports which increase air emissions and increase the risk of tanker spills along U.S. coastal areas receiving the imported oil. Both for increased onshore natural gas production and increased oil imports, air emissions have a greater impact on health per unit of production than do air emissions miles offshore. Environmental and social costs resulting from foreign oil production for export to the United States and from transportation of that oil to U.S. waters or borders are excluded from the model because the Net Benefits analysis is from a national perspective.

For the Proposed Program analysis, the costs that would have occurred without new leasing in a particular program area are attributed to that program area.²⁵ In practice, the resulting costs would actually be felt in areas that would have increased imports, tanker traffic, or domestic oil and natural gas production in the vicinity. In order to attribute these costs to the program areas and to present the benefits and costs likely to result from approving individual program area options, the costs of the energy alternatives or substitutions are proportionally spread among the different program areas based on the amount of production expected from each area in the exploration and development scenarios. However, since natural gas, which would be replaced primarily by increased onshore production, is more costly to replace than oil, which would be replaced primarily by increased imports, natural gas-prone program areas would have higher No Sale Option costs than would more oil-prone areas. For example, in the mid-price case for the Western GOM, production is estimated to be about 46 percent natural gas, whereas the Chukchi Sea is expected to only be 21 percent natural gas. As a result, No Sale Option costs in the Western GOM are nearly double those in the Chukchi Sea even though the Chukchi Sea has almost the same amount of BOE production.

The program environmental and social costs, costs of the energy alternatives supplied as a result of No Sale Option selections, and net costs for new OCS leasing and production are given in Table 13 below. A more detailed explanation of BOEM's OECM and Market Simulation Model methodology can be found in the *Economic Analysis Methodology for the 5-year OCS Oil and Gas Leasing Program for 2012-2017*, cited above.

²⁴ The current version of the OECM also weights the social costs of air emissions from nearshore platforms, because it assigns air emissions to caissons or other minor facilities that are more typical of larger, standard platforms. Because these facilities would be installed in shallow water, near shore, their emissions are weighted more heavily than those of more distant facilities.

²⁵ The primary purpose of this analysis is to help the Secretary select decision options for each program area. Tying benefits and costs to the source program area is a relatively simple way to present the benefits and costs likely to result from approving each individual program area options rather than indivisible packages of options. For example, foregoing all proposed sales in all program areas would lead to increased additional environmental and social costs from increased tanker traffic along the Mid-Atlantic; however, in a simple table showing costs by locality it would be impossible to show how a size, timing, and location decision for each program area would contribute to the reduction of costs that would otherwise accrue to the Mid-Atlantic coast. There would be no clear link between cause and effect.

Table 13: Environmental and Social Costs*

Environmental and Social Costs									
	Program			No Sale Option**			Net		
	(\$ billions)								
	Low	Mid	High	Low	Mid	High	Low	Mid	High
Central GOM	2.52	4.25	4.96	5.48	9.43	10.94	-2.97	-5.18	-5.98
Western GOM	1.44	2.14	2.42	1.44	2.23	2.53	0.00	-0.09	-0.11
Eastern GOM (2 Sale)	***	0.05	0.07	***	0.10	0.14	***	-0.05	-0.08
Chukchi Sea	0.01	0.02	0.04	0.10	1.26	3.76	-0.09	-1.23	-3.72
Beaufort Sea	0.01	0.01	0.01	0.04	0.25	0.83	-0.03	-0.25	-0.82
Cook Inlet	0.00	0.00	0.01	0.01	0.04	0.01	-0.01	-0.03	-0.01

* The low-price case represents a scenario under which inflation-adjusted prices are \$60 per barrel for oil and \$4.27 per mcf for natural gas throughout the life of the program. Prices for the mid-price case are \$110 per barrel and \$7.38 per mcf. Prices for the high-price case are \$160 per barrel and \$11.39 per mcf.

** Selection of the No Sale option for any program area would result in greater reliance on other sources of energy (“energy alternatives”) to meet the demand that would have been satisfied with OCS oil and gas production anticipated from the proposed sale(s) for that area. These energy alternatives would also impose significant costs on society. See discussion above.

*** Given current information, no production is expected from the Eastern GOM Program Area at the low-price case; therefore environmental and social costs, whether from one or two sales, are assumed to be zero, as are the costs of replacing foregone OCS production with substitute sources of energy. If exploration occurs without subsequent production, the costs attributed to the sale(s) would be positive.

Net Benefits

In calculating the total net benefits, BOEM adds the NSV supply-side benefits (NEV minus net environmental and social costs) to the demand-side benefits (net domestic consumer surplus). In theory, consumer surplus is the difference between the price actually charged for a service or product and the higher price consumers would be willing to pay for a service or product if they had to²⁶. Similarly, producer surplus is the difference between the actual price that producers receive and the minimum price they would be willing to accept. New OCS oil and natural gas production increases the supply of oil and natural gas which lowers the price consumers pay and the price producers receive. For the net benefits analysis, BOEM considers the change in consumer surplus occurring with the increase in OCS oil and natural gas production from this Proposed Program, but also takes into account the loss in producer surplus faced by domestic producers. The change in consumer surplus is estimated as the pecuniary gain calculated by taking the difference between the price that consumers would have to pay without new OCS production and the price they actually pay because of new OCS production. Because every unit

²⁶ For example, when gasoline prices increase and even double, people do not stop buying gasoline, although they pay the higher price only grudgingly. At higher and higher prices, consumers would buy less, up to a theoretical maximum.

of oil and natural gas consumed domestically will have this new, lower price, even though the per-unit price reduction is small, generation of OCS production leads to a large gross societal consumer surplus benefit. BOEM uses the *Market Simulation Model* to calculate the price changes in the international oil market and the domestic natural gas market as a result of new OCS production to estimate the change in consumer surplus.

Conceptually, most of the consumer surplus is offset by reductions in producer surplus. As OCS production increases, consumers pay a slightly lower price on each unit of consumption, which means that producers also receive a slightly lower price. This is the case for natural gas, because most of the gas sold in the United States is produced domestically. As a result, for domestic production, the net consumer surplus gain is only the relatively small difference between consumer and producer surplus. However, for OCS oil, the resulting lower world oil price leads to a lower annual cost of imported oil, resulting in a gain for the domestic consumer that far exceeds the losses to domestic producers. Additional information on consumer surplus can be found in the *Economic Analysis Methodology for the 5-Year OCS Oil and Gas Leasing Program for 2012-2017*, cited above.

The sum of the supply or NSV and demand or net domestic consumer surplus benefits constitutes the total net benefits associated with the program area resources. The estimated total net benefits of resources in the Proposed Program areas form one of the bases for developing program options. Table 14 shows the estimates for the components of the net benefit analysis for each of the program areas at each of the three price cases.

Table 14: Net Benefits*

	Net Social Value			Net Domestic Consumer Surplus			Net Benefits		
	(\$ billions)								
	Low	Mid	High	Low	Mid	High	Low	Mid	High
Central GOM	14.50	59.95	110.79	15.47	25.79	30.55	29.97	85.73	141.34
Western GOM	3.22	14.41	26.59	4.06	6.11	7.05	7.28	20.52	33.65
Eastern GOM (2 Sale)	***	1.11	2.56	***	0.27	0.40	***	1.38	2.69
Chukchi Sea	5.27	20.83	62.67	2.12	3.06	6.60	7.39	23.90	69.27
Beaufort Sea	2.09	4.45	13.36	0.82	0.61	1.46	2.90	5.06	14.82
Cook Inlet	1.44	2.79	8.18	0.64	0.57	1.23	2.08	3.35	9.41

* The low-price case represents a scenario under which inflation-adjusted prices are \$60 per barrel for oil and \$4.27 per mcf for natural gas throughout the life of the program. Prices for the mid-price case are \$110 per barrel and \$7.38 per mcf. Prices for the high-price case are \$160 per barrel and \$11.39 per mcf.

** Given current information, no production is expected from the Eastern GOM Program Area at the low-price case, whether from one or two sales; therefore net benefits are assumed to be zero. If exploration occurs, net benefits could be either negative—if no production results—or positive—if successful exploration leads to production. The

estimated value of Eastern GOM resources is highly sensitive to changes in information, so placing a second sale on the schedule would provide flexibility to adapt to such changes.

Summary Valuation of Program Options Benefits and Costs

Table 15 provides in one table a summary by program area of anticipated production and the various estimates comprising the components of the net benefits analysis. Considering those benefits and costs amenable to monetization, leasing any of the program areas is expected to result in net economic and societal benefits, with the exception of the Eastern GOM in the low-price case. An important component of the benefits is the environmental and social costs avoided by producing from the OCS, rather than from the energy substitutes, as explained above. These societal costs of *not* approving one or more proposed lease sales are largely due to the environmental and social costs of the most likely substitutes including increased oil imports and onshore oil and gas production, which result in additional air emissions in port or onshore (often in Clean Air Act non-attainment areas), and the risk of oil spills from tankers.

With respect to the option of having either one or two sales in the Eastern GOM, anticipated production is the same between the two alternatives, but there is slightly more activity and exploration in the two-sale option. The two-sale option provides some insurance in case prices remain at current levels or rise higher or there is new technology or new discoveries in the area. Since there is less activity in the one-sale case, the environmental and social costs of the program are slightly lower, but the other sections of the net benefits analysis remain the same.

Table 15: Summary of Net Benefits Analysis*

		Oil (BBO)	Gas (Tcf)	BBOE	NEV	Environmental and Social Costs			NSV	Net Domestic Consumer Surplus	Net Benefits
						Program	Energy Alternatives	Net			
						\$ billions					
Central GOM	Low	2.24	9.47	3.92	11.54	2.52	5.48	-2.97	14.50	15.47	29.97
	Mid	3.77	16.41	6.69	54.77	4.25	9.43	-5.18	59.95	25.79	85.73
	High	4.34	19.07	7.73	104.81	4.96	10.94	-5.98	110.79	30.55	141.34
Western GOM	Low	0.56	2.63	1.03	3.22	1.44	1.44	0.00	3.22	4.06	7.28
	Mid	0.86	4.07	1.58	14.33	2.14	2.23	-0.09	14.41	6.11	20.52
	High	0.97	4.59	1.79	26.48	2.42	2.53	-0.11	26.59	7.05	33.65
Eastern GOM	Low	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mid	0.05	0.11	0.07	1.06	0.05	0.10	-0.05	1.11	0.27	1.38
	High	0.07	0.16	0.10	2.49	0.07	0.14	-0.08	2.56	0.40	2.96
Chukchi Sea	Low	0.50	0.00	0.50	5.19	0.01	0.10	-0.09	5.27	2.12	7.39
	Mid	1.00	2.50	1.44	19.60	0.02	1.26	-1.23	20.83	3.06	23.90
	High	2.15	8.00	3.57	58.96	0.04	3.76	-3.72	62.67	6.60	69.27
Beaufort Sea	Low	0.20	0.00	0.20	2.06	0.01	0.04	-0.03	2.09	0.82	2.90
	Mid	0.20	0.50	0.29	4.20	0.01	0.25	-0.25	4.45	0.61	5.06
	High	0.40	2.20	0.79	12.53	0.01	0.83	-0.82	13.36	1.46	14.82
Cook Inlet	Low	0.10	0.00	0.10	1.43	0.00	0.01	-0.01	1.44	0.64	2.08
	Mid	0.10	0.04	0.11	2.75	0.00	0.04	-0.03	2.79	0.57	3.35
	High	0.20	0.68	0.32	8.17	0.01	0.01	-0.01	8.18	1.23	9.41

* Note: The low-price case represents a scenario under which inflation-adjusted prices are \$60 per barrel for oil and \$4.27 per mcf for natural gas throughout the life of the program. Prices for the mid-price case are \$110 per barrel and \$7.38 per mcf. Prices for the high-price case are \$160 per barrel and \$11.39 per mcf.

Valuation of Program Alternatives

Valuation of the Proposed Program. While Table 15 shows the estimates of the components of the net benefit analysis for each program area in the Proposed Program, Table 16 compares the total estimated net benefits for groups of options, using the same groupings of options as those that comprise the alternatives analyzed in the Draft EIS. The net benefits of the NAA in the Draft EIS are the negative of those for the program proposal and are not displayed here. See “Relationship of Proposed Program Options to the Draft EIS Alternatives” in part III for a listing of which program options, by number, are included in each alternative.

Table 16: Valuation (Net Benefits) of Program Alternatives*

[All figures in the table are in discounted billions of 2012 dollars]

Alternative	Price Case	Net Economic Value	Environmental and Social Costs			Net Social Value	Net Consumer Surplus	Net Benefits
			Program Proposal	Energy Alternatives	Net			
1: Proposed Action	Low	23.43	3.99	7.08	-3.09	26.52	23.10	49.62
	Mid	96.71	6.48	13.31	-6.83	103.54	36.41	139.95
	High	213.43	7.50	18.21	-10.71	224.14	47.30	271.44
2: Exclude Eastern GOM	Low	23.43	3.98	7.08	-3.09	26.52	23.10	49.62
	Mid	95.65	6.43	13.21	-6.78	102.43	36.13	138.56
	High	210.95	7.44	18.07	-10.63	221.58	46.90	268.48
3: Exclude Western GOM	Low	20.21	2.55	5.64	-3.09	23.30	19.04	42.34
	Mid	82.38	4.34	11.08	-6.74	89.12	30.30	119.42
	High	186.95	5.09	15.69	-10.60	197.55	40.24	237.79
4: Exclude Central GOM	Low	11.89	1.47	1.59	-0.12	12.01	7.63	19.65
	Mid	41.94	2.23	3.88	-1.65	43.59	10.62	54.21
	High	108.63	2.54	7.27	-4.73	113.36	16.74	130.10
5: Exclude Beaufort Sea	Low	21.37	3.98	7.04	-3.06	24.43	22.29	46.72
	Mid	92.51	6.47	13.06	-6.58	99.09	35.80	134.89
	High	200.90	7.49	17.38	-9.89	210.79	45.83	256.62
6: Exclude Chukchi Sea	Low	18.24	3.97	6.98	-3.01	21.24	20.99	42.23
	Mid	77.11	6.46	12.05	-5.60	82.70	33.35	116.05
	High	154.48	7.46	14.45	-6.99	161.47	40.70	202.17
7: Exclude Cook Inlet	Low	22.00	3.98	7.06	-3.08	25.08	22.46	47.54
	Mid	93.96	6.48	13.27	-6.80	100.75	35.84	136.59
	High	205.26	7.50	18.20	-10.70	215.97	46.06	262.03

* The low-price case represents a scenario under which inflation-adjusted prices are \$60 per barrel for oil and \$4.27 per mcf for natural gas throughout the life of the program. Prices for the mid-price case are \$110 per barrel and \$7.38 per mcf. Prices for the high-price case are \$160 per barrel and \$11.39 per mcf.

Environmental Sensitivity and Marine Productivity

a. Relative Environmental Sensitivity

1. Introduction

An assessment of “relative environmental sensitivity” is required by section 18 (a)(2)(A) of the Act. However, “sensitivity” is not a well-defined term in ecology or environmental science. Sensitivity can be considered from at least two perspectives: 1) the vulnerability of ecological components (such as species) to potential impacts (such as harm to individual animals) and 2) the resilience of an ecosystem or an ecosystem’s ability to resist fundamental change and recover from an impact. The former vulnerability approach is a component response approach and provides a relatively straightforward and quantifiable measure of potential impacts. This approach could be augmented with consideration of the impacts on an ecosystem’s ability to resist fundamental, or “state,” change, a characteristic known as “resilience”, which is a “system response.”

Historically, BOEM has focused on the vulnerability or component response approach. However, in connection with this Proposed Program, BOEM is evaluating adding a resilience component to the relative sensitivity analysis. While either of these approaches would provide valid information on relative environmental sensitivity, developing and implementing an analysis of relative environmental sensitivity that combines both of these components could provide an improved assessment of the relative sensitivity of areas considered for leasing. The BOEM is supporting ongoing research to consider options and potential new approaches to defining and measuring environmental sensitivity and will look for ways to incorporate these different types of analyses in an effort to continually improve the science used for OCS decision-making. This may include components of ecosystem resilience, biodiversity, marine productivity and other potential considerations. The results of this study will be made available to the DOI and public stakeholders as soon as it is available. Findings from new research may lead to changes in the model in advance of the Proposed Final Program. Incorporating additional factors may lead to different rankings of program areas based on these additional factors and considerations.

Therefore, as used in this Proposed Program, the term “sensitivity” refers to “sensitivity, as measured by indicators of vulnerability to impact.” Accordingly, “sensitivity, as measured by indicators of vulnerability to impact” will be indicated by use of the term “sensitivity*.”

The analysis in this document largely mirrors that found in the 2007-2012 Revised Program (December 2010) and considers vulnerability of the various components of biological marine environment to multiple impact-producing factors, such as oil spills, sound and physical disturbance, and increased vulnerability due to climate change and ocean acidification. The results are summarized in Table 17 below. Because relatively small differences in total scores are not meaningful, this table presents the OCS program areas grouped into three categories of relative vulnerability ranging from “most” to “less” vulnerable to OCS oil and natural gas activities. Categorization of an OCS program area as “less” vulnerable does not mean that environmental resources of that OCS program area are not sensitive, but as a collection are found to be relatively less sensitive than other OCS program areas to the types of impacts anticipated

from OCS oil and natural gas activities. See section 5 below for a detailed explanation of how these vulnerability groups were determined. This analysis only considers the Proposed Program areas which are being considered for leasing.

Table 17: Grouping of OCS Program Areas by Relative Environmental Sensitivity* to Impact as a Measure of Environmental Sensitivity**

<p>Most Sensitive* to Impact Central GOM Eastern GOM</p>
<p>More Sensitive* to Impact Beaufort Sea Western GOM</p>
<p>Less Sensitive* to Impact Chukchi Sea Cook Inlet</p>

** OCS program areas are listed in alphabetical order within each grouping.

2. Methodology

Definitions

The Act and court opinions do not define relative environmental sensitivity, but defer to the Secretary’s methodology “so long as it is not irrational.”²⁷ For the purposes of this analysis, relative environmental sensitivity* is defined as the vulnerability of an OCS area’s ecological components (i.e., coastal habitats, marine habitats, marine fauna, and marine productivity) to the potential impacts of OCS oil and natural gas activities in comparison to the same ecological components in other OCS program areas. This analysis also provides a discussion of the increased vulnerability of certain areas due to anticipated affects of global climate change.

Coastal and marine environmental resources in and adjacent to the six OCS program areas were evaluated in this analysis. “Coastal” is defined as the coastline and boundaries of estuarine waters. “Marine” is defined as seaward of the shoreline, and includes both state and federal waters.

OCS Impact Factors Analyzed for Sensitivity*

This environmental analysis is based, in large part, on an evaluation of the sensitivity* of various coastal and marine habitats and biota to accidentally spilled crude oil. Other relevant factors, such as sound generated by and physical disturbance from routine OCS oil and natural gas activities, were analyzed where appropriate or applicable. This analysis assumes these routine activities would be mitigated, to the extent possible, by measures in the form of lease

²⁷ 43 U.S.C. §1344(a)(2)(G); *Watt I*, 668 F2d 1290 (D.C. Cir. 1981); *Watt II*, 712 F2d 584 (D.C. Cir. 1983); *Center for Biological Diversity v. U.S. Department of the Interior*, 563 F3d 466 (D.C. Cir. 2009).

stipulations, regulations, and laws to minimize impacts and protect marine resources. Monitoring and mitigation measures would be developed through consultation and coordination with the National Marine Fisheries Service (NMFS) and the USFWS as required by the ESA, Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), and MMPA. Biological opinions such as this identify Reasonable and Prudent Measures, Terms and Conditions, and/or Conservation Recommendations that can then be applied as lease stipulations.²⁸

Oil Spills

One measure of relative environmental sensitivity is the sensitivity*of the various ecological components to spilled crude oil. Unlike some assessments in the programmatic and sale-specific EIS's designed to estimate potential risks from proposed oil and gas leasing activities, this relative environmental sensitivity analysis does not consider risk, nor do the rankings for environmental sensitivity reflect potential risk. Analysis of the effects of oil and natural gas activities is left to programmatic, sale-specific, and site-specific reviews conducted pursuant to NEPA. The Draft EIS accompanying this decision document describes the biological environments of the OCS regions in Chapter III and discusses the potential environmental consequences of OCS program activities in Chapter IV.

Sound

Another measure of relative environmental sensitivity is the sensitivity* of marine fauna to sound. Seismic surveys, drilling and production activities at OCS facilities, and support vessel traffic generate sound that could affect marine resources. This analysis assumes that monitoring and mitigation measures, such as the use of independently contracted protected species observers to monitor exclusion zones around the source vessels and shut down procedures when protected species are within the exclusion zone, would continue to be included as lease stipulations to minimize impacts from sound on marine resources. Such monitoring and mitigation measures would be developed through consultation and coordination with NMFS and USFWS as required by ESA, MSFCMA, and MMPA.

Physical Disturbance

Another measure of relative environmental sensitivity is the sensitivity*of various ecological components to physical disturbance. Physical disturbance includes bottom disturbances from OCS platform and pipeline emplacements, as well as from anchors. This analysis assumes that BOEM will continue to require site-specific surveys to assist in avoiding direct contact with marine habitats. However, unavoidable or accidental disturbances could result in physical destruction and burial of organisms and habitat.

²⁸ In *Center for Biological Diversity v. U.S. Department of the Interior*, 563 F3d 466 (D.C. Cir. 2009), the U.S. Court of Appeals for the District of Columbia Circuit upheld “graduated compliance with environmental and endangered life standards, [thereby making] ESA requirements more likely to be satisfied both in an ultimate and a proximate sense.”

Habitats and Biota Analyzed

Distribution, abundance, and environmental sensitivities of four ecological components within and on the adjacent coast of each OCS program area are first evaluated based on their present condition. Thereafter, climate change effects projected to occur over the life of the program are considered in order to adjust for increased sensitivity to oil and natural gas activities. While this analysis continues to use NOAA's Environmental Sensitivity Index (ESI) data to analyze the sensitivity of shoreline or coastal habitats, it does not use those data as a proxy for overall marine sensitivity, but separately considers the sensitivity of offshore marine resources. The BOEM has identified three relevant components of the various areas of the OCS, biological marine environment that may be affected by oil and natural gas activities: marine habitats, marine productivity, and marine fauna (i.e., birds, fish, marine mammals and sea turtles).

This analysis is directed at the environmental sensitivity requirement under section 18)(2)(a)(D) of the Act rather than considering the social value of these habitats and biota. The social value, such as subsistence or cultural use, is the analysis under section 18(2)(a)(D), which is in part IV.C of this document. As an affecting factor, subsistence harvests include birds, fish and marine mammals in all coastal areas of Alaska. However, marine mammal harvests are managed by NMFS and USFWS within the potential biological removal of each stock and U.S. law prohibits any harvesting of sea turtles. Commercial fishing and recreational or subsistence harvests of fish and birds are managed within sustainable limits under existing laws and are reflected in the abundance levels of these resources in each OCS program area. Subsistence harvests, in particular, represent a very small amount of the total annual harvest. Therefore, subsistence harvest and other uses of the OCS are properly addressed as social values under section 18(a)(2)(D).

Reports, Studies and Data Used

Section 18 (a)(2)(A) of the Act specifies that required analyses, including the relative environmental sensitivity analysis, shall be based on a consideration of existing information. Earlier relative environmental sensitivity and marine productivity analysis relied on only two studies (CSA, 1990 and 1991) and one dataset (<http://response.restoration.noaa.gov>). In contrast, this analysis relies on almost 50 reports, studies, and datasets (see section 6).

Qualifications

To facilitate the evaluation of scheduling and preparing for sales in a 5-Year Program, the OCS is divided into 26 administrative geographical units called planning areas. See Maps 1 and 2 in part III of this document. The program areas analyzed in this document encompass all or parts of the six relevant planning areas. These are areas, rather than ecoregions, for which decisions on the size, timing and location of lease sales will be made. They do not necessarily correspond to ecosystem boundaries, and sometimes do not correspond to geographic areas with which the public is familiar. The BOEM expects that its future analyses of the relative environmental sensitivity on the OCS, including the ongoing analysis noted in the introduction to this section, will most likely take ecosystem boundaries into consideration.

In this analysis, relative environmental sensitivity is defined as the vulnerability of an OCS area's ecological components, i.e., coastal habitats, marine habitats, marine fauna, and marine

productivity, to the potential impacts of OCS oil and natural gas activities in comparison to the same ecological components in other OCS program areas. Risk, likelihood of adverse impact, and amount or size of disturbance is considered in the Draft EIS.

3. Ecological Components

The relative environmental sensitivity ranking of OCS program areas by various ecological component is presented in Table 18 from most sensitive* to less sensitive* to impact from OCS oil and natural gas activities. The rankings below are based on scoring of the OCS program areas as described later in this section.

This analysis continues to use NOAA’s ESI data to analyze the sensitivity of coastal habitats, thus indirectly including coastal fauna and productivity (see section 3.1). This analysis also separately considers marine resources. However, there is not an equivalent dataset available for the biological marine environment, so this analysis has identified three components to the biological marine environment that may be affected by OCS oil and natural gas activities: marine habitats, marine productivity, and marine fauna (i.e., birds, fish, marine mammals and sea turtles).

The potential response of these four ecological components were considered and scored separately from the potential effects of oil and natural gas development. This analysis does not try to account for the interaction of these components in relation to each other, as this would involve a complex, ecosystem-level study, which is beyond the scope of this review.

Table 18: Ranking of OCS Program Areas by Relative Environmental Sensitivity* from Most to Less Sensitive* to Impact¹

Coastal Habitats	Marine Habitats	Marine Fauna	Marine Productivity
Eastern GOM	Eastern GOM	Central GOM	Cook Inlet
Central GOM	Beaufort Sea	Eastern GOM	Eastern GOM
Western GOM	Central GOM	Western GOM	Central GOM
Beaufort Sea	Western GOM	Cook Inlet	Western GOM
Cook Inlet	Chukchi Sea	Chukchi Sea	Chukchi Sea
Chukchi Sea	Cook Inlet	Beaufort Sea	Beaufort Sea

¹In the case of ties, OCS program areas were listed in alphabetical order.

3.1 Coastal Habitats

Spilled oil is a major environmental risk from OCS oil and natural gas activities. Coastal environmental resources face the most significant environmental consequences from contact with spilled oil. Although the occurrence of an OCS oil spill that contacts the shoreline would be a rare event, its unlikely occurrence could result in widespread effects on biological resources over a large area. Direct contact to coastal biota and habitats could result in mortality, weakened populations and habitat degradation. Cleanup and restoration activities could result in further

disruptions to fauna. Oil that persists in the environment after cleanup operations would continue to be re-released into the environment, causing effects over an extended period of time. Examples of the potential magnitude and duration of these effects have been documented in studies of major marine spills, such as EXXON Valdez (Peterson et al., 2003), and are being re-evaluated in the wake of the 2010 *Deepwater Horizon* event.

Concerns about oil spill impacts are reflected in the scoping information and public comments collected by BOEM during the preparation of EISs. Because oil spill effects are the major environmental concern when addressing coastal environments, this analysis uses the ESI database developed by NOAA to measure coastal relative environmental sensitivity. The ESI shoreline database provides a systematic method for compiling standardized data to map shoreline sensitivity to spilled oil. Coastal states and federal agencies, including BOEM, assisted in ESI development efforts and use ESI products. The ESI scoring approach has a strong scientific basis, and has been used for oil spill response planning for over three decades in the United States and overseas. The ESI shoreline database is complete for all coastal states with the exception of Washington, Oregon, and Maine; however, not all of this data is needed for this analysis.

The ESI shoreline type classification uses standardized definitions of shoreline characteristics to assign the sensitivity rankings. The shoreline type classification is based on factors that include:

- Relative exposure to waves and tidal energy;
- Biological productivity and sensitivity of shoreline material;
- Substrate type (grain size, permeability, trafficability, and mobility);
- Shoreline slope;
- Ease of cleanup; and,
- Ease of restoration.

These factors determine how long the oil will persist in the shoreline environment and continue to cause potential environmental damage, how much damage may occur to the biologic properties of the shoreline substrate, and how much environmental damage may result from cleanup and restoration efforts. The sensitivity* of many coastal biologic and socioeconomic resources to oil spills is determined to a large degree by these factors. Each shoreline segment is assigned an ESI score between 1 and 10 in order of increasing sensitivity* to oil spill. Table 19 provides descriptive information about the types of shorelines associated with each score. Comparison of the standardized data over large areas reveals patterns in the distribution of the relative environmental sensitivity of coastal areas to oil spills. More information on the ESI shoreline can be found at <http://response.restoration.noaa.gov>.

Table 19: ESI Scoring and Respective Descriptions

ESI Score	Description
1	Exposed rocky shores; Exposed, solid man-made structures
2	Exposed wave-cut platforms in bedrock, mud, or clay; Exposed scarps and steep slopes in clay
3	Fine to medium-grained sand beaches; Scarps and steep slopes in sand
4	Coarse-grained sand beaches
5	Mixed sand and gravel beaches
6	Gravel beaches; Riprap
7	Exposed tidal flats
8	Sheltered rocky shores and sheltered scarps in bedrock, mud, or clay
9	Sheltered tidal flats; Vegetated low banks
10	Salt/brackish-water marshes; Freshwater marshes/swamps; Scrub-shrub wetlands; Inundated tundra

The shoreline analysis that follows is based on all the available digital ESI shoreline data from NOAA for the six program areas. These ESI line data sets were aggregated or disaggregated as appropriate to represent respective program areas. Each ESI value was weighted by the length of its line segment. An average rating for the OCS program area was calculated based on the weighted average of the ESI for the coastal areas adjacent to the OCS program area.

The results of this analysis are shown in Table 20, which lists the average ESI shoreline scoring by OCS program area in order of decreasing average ESI shoreline sensitivity rank. The table ranks OCS program areas with the greatest amounts of sensitive shorelines, as reflected in high average ESI shoreline sensitivity* rank, as being the most sensitive*.²⁹

High scores at or near a score of 9.0 occur adjacent to the full Eastern and Central GOM OCS planning areas, where extensive coastal lowlands made up of wetlands, swamps and other sensitive shorelines occur. The program areas considered in this analysis in the Eastern GOM and Chukchi Sea are not adjacent to the shoreline. However their planning area ESI values are included in the analysis below. The variation in ESI shoreline sensitivity* rank used as a measure of coastal environmental sensitivity* is the result of geographic variations in coastal geologic, biologic, and oceanographic characteristics that affect the degree to which oil accumulates and persists in coastal areas. The actual presence or occurrence of specific biologic environmental resources is indirectly considered in the calculations, because accumulation and persistence of spilled oil would be the primary factors for determining impacts to these resources. A program area bordered by a rocky coastline would have a lower sensitivity* to oil spills because less oil would typically accumulate and the oil's presence in the environment

²⁹ This method does not give extra weight to areas with smaller amounts of sensitive shoreline based upon a sensitive shoreline's rarity. While that kind of comparative analysis would be possible, it would require much more subjectivity and could undermine the agency's best efforts to create as objective an analysis as possible in comparing these greatly disparate areas. In addition, because persistence of oil, its penetration into shoreline substrate and the difficulty of cleanup are by far the most important factors in determining effects to shorelines and their inhabitants, the average sensitivity of an area's shoreline is the best comparative tool for conducting the difficult analysis required.

would be relatively short-term. As a result the impacts on the affected environmental resources would be less severe than in a more sensitive* area.

Table 20: Relative Environmental Sensitivity* to Impact of the OCS Program Areas for Coastal Habitats

OCS Program Area	Average ESI Score ¹
Eastern GOM	9.1
Central GOM	8.9
Western GOM	7.6
Beaufort Sea	7.4
Cook Inlet	5.9
Chukchi Sea	4.9

¹ Higher scores indicate greater sensitivity*, to spilled oil.

3.2 Marine Habitats

Marine habitats are the arrangements of geologic, oceanographic, and biologic features of the ocean that combine in characteristic ways to create environments favorable for the establishment, flourishing, and continued survival of the flora and fauna of marine and ecologically connected coastal areas.

Marine habitats, seaward of the shoreline, are divided into benthic or pelagic categories as shown in Table 21. Benthic marine habitats are attached to the seafloor. Some benthic features, such as kelp forest, can extend vertically from the seafloor upward to near the ocean surface, and downward, in the case of submarine canyons, over a thousand meters deep. Pelagic habitats occur within or at the surface of the ocean independent of the seafloor. Examples include drifting surface Sargassum vegetation that provides habitat for fish and marine reptiles, areas where dynamic ocean circulation processes result in high biological productivity, and sea ice. The analysis also includes the presence of officially designated federal marine critical habitats (USDOC, NOAA Fisheries, Office of Protected Resources, 2009a; and USFWS, 2009b) and marine sanctuaries (USDOC, NOAA, 2009) as a factor in marine habitat scores.

Table 21: Examples of Marine Habitat Components*

Benthic		
Marine Habitat Type	Example	OCS Area
Vegetated	Big Bend seagrass	Eastern GOM
Bottom Relief Features	Pinnacle trend	Central GOM
Coral Reef	Florida Keys	Straits of Florida
Deep/Cold Water Coral	Aleutian Islands Coral Gardens	Aleutian Arc
Seeps	Chemosynthetic communities	Western GOM
Canyons	Baltimore Canyon	Mid-Atlantic
Pelagic		
Marine Habitat Type	Example	OCS Area
Ice	Polynyas	Chukchi Sea
Vegetated	Floating Sargassum	South Atlantic
Oceanic Process	Ocean upwelling	Central California
Designated Habitat/Sanctuary		
Marine Habitat Type	Example	OCS Area
Critical Habitat	Polar Bear	Beaufort and Chukchi Seas
Marine Sanctuary	Cordell Bank	Central California

*Some of component examples are areas that are not included in this Proposed Program, but are included as illustrative of the breadth of the analysis only.

The analysis identified the relative abundance of benthic habitats, pelagic habitats, and designated habitat/sanctuary areas in each of the six OCS program areas. A relative abundance value (i.e., high = 3, moderate = 2, and low = 1) was determined for each habitat type by the amount and kind of habitat that occurs within each OCS program area. See Table 22. No abundance value was applied if the habitat was absent from the OCS program area. Information sources used to estimate abundance values include published reports and publications (for example, Navy 2005, 2006, 2007a, 2007b, 2008a, 2008b and 2008c; GeoHab, 2008; McGee et al., 2006; Lumsden et al., 2007; and SEAMAP, 2001), and internal agency information from environmental documents and data.

Table 22: Marine Habitat Abundance Values

Marine Habitat Type	Abundance Value Criteria		
	High (3)	Moderate (2)	Low (1)
Benthic			
Vegetated	Widespread occurrence of seagrasses extending beyond the coastal fringe	Some occurrence of seagrasses beyond coastal fringe	Scattered occurrences limited to coastal fringes
Relief Features	Abundant features with relief of 100 m or more	Some high relief features	Low relief features only or scattered occurrence of features
Chemosynthetic Communities	Likely abundant occurrence of features	Likely occurrence of features	Unlikely occurrence of features
Cold/Deep Coral	Extensive occurrence of coral and communities with reef building coral	Abundant coral organisms but no reef building	Occurrence of coral organisms
Tropical Coral	Extensive development of coral communities and reefs	Coral communities occur	Coral organisms occur
Canyons	Abundant canyon habitat with high relief	Common occurrence of canyon habitat, some with high relief	Some canyon habitat
Pelagic			
Ice	Substantial sea and landfast ice existing for > 6 months/yr	Substantial sea and landfast ice for < 6 months/yr	Discontinuous or scattered ice for < 4 months/yr
Vegetated	Widespread occurrence of coalesced vegetative mats	Some occurrence of floating mats	Scattered occurrences
High Productivity Resulting from Oceanic Processes	Widespread occurrence in area for much of the year	Some occurrence for much of the year; or widespread for part of the year	Scattered and short-term occurrences

Benthic habitats are considered predominantly sensitive to bottom disturbances associated with anchoring, structure installation and removal, and pipeline installation activities. While marine oil spills are unlikely to contact benthic habitats, spills of synthetic drilling muds from a platform could settle on benthic habitats (Boland et al., 2004). Physical disruption, destruction, and smothering of benthic habitat from these activities could result in long term or permanent impacts because of slow recovery rates from physical disturbances.

Pelagic habitats are assumed to be most sensitive to oil spills, as these habitats would be exposed at or near the sea surface to open contact from marine spills. Pelagic habitats are typically seasonal as their occurrences are related to seasonal properties of the global ocean circulation and temperature of the atmosphere. As a result, while the habitat could be degraded to the extent

of being unavailable or dangerous to the habitat users for the remainder of the season, the habitat could return in the next cycle of its occurrence with no remnant evidence of the spill. Pelagic habitats could also be sensitive to disturbance from nearby normal OCS operations, such as service vessel and helicopter traffic, regulated discharges, and sound.

Impact coefficients were developed based on the expected sensitivity* of marine habitats to oil and natural gas activities. The analysis applies the same degree of sensitivity* to both the short-term but potentially dramatic impacts to pelagic habitats from oil spills and the potentially long-term impacts from bottom disturbances. The highest impact coefficient of 4 was used in habitats that span both pelagic and benthic environments, such as seagrasses and coral reefs that occur in relatively shallow water and that could be exposed to impacts from both oil spills and bottom disturbances. The highest impact coefficient of 4 also was applied to sea ice habitat, which, by its physical presence during much of the year, would keep the oil more confined and concentrated than what would occur in an open ocean habitat. A slightly lower impact coefficient of 3 was applied to floating vegetation, whose habitat value could become degraded through absorption of oil, but not bottom disturbance. The lowest coefficient of 2 was applied to the remaining habitats.

The presence of marine sanctuaries, critical habitat, and other officially designated and protected marine habitat areas in an OCS program area is used as an additional indicator of marine habitat sensitivity*. Each federally designated area was given a value of 1. Examples include designation of critical habitat for the spectacled eider in the Chukchi Sea program area (USFWS, 2009a), and designation of polar bear critical habitat in Alaska in 2010 (USFWS, 2010).

The relative sensitivity* scores and rankings of each of the six OCS program areas are presented in Table 23 below. The scores were calculated by summing the product of each benthic and pelagic marine habitat type’s abundance value by each habitat’s sensitivity* coefficient. An additional value was added to this sum based on the number of federally designated areas present in an OCS program area.

Table 23: Relative Environmental Sensitivity* to Impact, of the OCS Program Areas for Marine Habitats

OCS Program Area	Score ¹
Eastern GOM	43
Beaufort Sea	32
Central GOM	32
Western GOM	32
Chukchi Sea	25
Cook Inlet	17

¹ Higher scores indicate greater sensitivity* to OCS oil and natural gas activities.

3.3 Marine Fauna

The ESI shoreline data provide a systematic method for compiling standardized data to map shoreline sensitivity* to spilled oil. However, there is not an equivalent dataset available for the

biological marine environment, so this analysis identifies three components of the biological marine environment that may be affected by OCS oil and natural gas activities: marine habitats, marine productivity, and marine fauna (i.e., birds, fish, marine mammals and sea turtles) to create a comparative analysis and to more fully account for the biological aspects of the marine environment.

3.3.1 Birds

This analysis considers the sensitivity* of birds to OCS oil and natural gas activities, because bird species comprise important and often prominent elements of most coastal onshore, nearshore, and offshore biological communities, especially in Alaska (USDOJ, MMS, 2007). The greatest source of potential harm to coastal and marine birds from OCS oil and natural gas activities is from a large oil spill. The relative sensitivity* of marine and coastal birds within each OCS program area is dependent upon the number of birds that could be exposed to a large oil spill. Birds listed as threatened or endangered under the ESA are considered more sensitive to a large oil spill. According to the ESA, a species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. Marine and coastal birds were considered to primarily consist of three species groups--seabirds, waterfowl, and shorebirds.

The evaluation of the sensitivity* of marine and coastal birds was limited to spilled crude oil because (1) the different program areas could be evaluated against a common factor, in this case, spilled oil, and (2) oil spills, although rare, are anticipated to cause the largest, most visible and measurable effects of OCS activities on birds. Adverse effects to marine and coastal birds, such as collisions with structures, displacement/disturbance from sound and other human activities, and habitat loss from installation of facilities, etc., are individually and collectively much smaller than the potential effects from a large crude oil spill.

Methodology

The following assumptions were included in the analysis.

- (1) *Spilled oil has not weathered substantially when it contacts bird populations.* The impacts of spilled oil are substantially reduced by the effects of weathering. By eliminating the mitigating effects of weathering in the analysis of environmental sensitivity, the adverse effects of spilled oil, both toxicity and coating, are maximized. This assumption is conservative and provides an assessment of the most severe effects of spilled oil.
- (2) *All of the bird populations within a program area are vulnerable to being contacted by spilled oil.* Migratory species, which may inhabit the OCS program area for only a short period, are assumed to be present and contacted by spilled oil.
- (3) *Program areas that have little or no shoreline would have a correspondingly small coastal bird population.*

- (4) *In the absence of site-specific information, marine and coastal bird abundance and distribution does not change abruptly from one program area to the next.* As a consequence, the final assessment required interpolation and extrapolation of population numbers based on gradients and trends in the best available information. There are legitimate reasons why there can be abrupt differences between program areas; i.e., where an island group in one OCS program area may host millions of breeding seabirds and the adjacent program area, without nesting islands, does not support breeding birds.
- (5) *The best available datasets reflect the current distribution and abundance of marine and coastal bird resources*

Best available information on marine and coastal birds was reviewed and used to compile total numbers of birds according to the OCS program areas. Much of this information came from regional waterbird plans that were specific to seabirds, waterfowl, or shorebirds. These plans were often step-down plans from larger continental plans that focused on bird resources of a particular bio-conservation unit or country. For example, the North American Waterbird Conservation Plan (Kushlan et al., 2002) steps down from the Waterbird Conservation for the Americas Plan. Similarly, USFWS has completed a Seabird Conservation Plan for the Pacific Region (USFWS, 2005) and a draft plan is completed for Alaska (USFWS, 2009c). Information from the scientific literature and books also were used as sources of population information for seabirds, waterfowl, and shorebirds using the OCS program areas and adjacent coastal areas. Information from these data sources was combined to enumerate birds according to coastal or marine habitats. Breeding birds and migratory waterfowl and shorebirds were considered associated with nearshore coastal habitats. Summer migrants from the southern hemisphere make seasonal use of marine habitats. Where two or more OCS program areas were included in a population estimate, the population was apportioned across the OCS program areas unless particular population segments could be attributed to a specific OCS program area. Similarly, where population data was based on a geographic area that was larger than OCS program areas, such as including non-U.S. waters, the population was apportioned to the OCS program areas.

The total number of marine and coastal birds using an OCS program area is the primary determinant in ranking OCS program areas, because the number of birds using an area is directly related to the potential magnitude of effects on the bird population as a whole. Each OCS program area is assigned two abundance values based on its relative abundance of marine and coastal birds. For both coastal and marine birds, an OCS program area with relatively low population size is given a value of 1, moderate is given a 3, and high is given a 5. The following convention was used, which generally corresponds to natural breaks in the distribution of marine and coastal bird numbers:

Low (1)	< 250,000 individuals
Moderate (3)	> 250,000 to < 2,500,000 individuals
High (5)	> 2,500,000 individuals

Both marine and coastal birds in all OCS program areas have an equally high sensitivity* to oil spills. Therefore, all OCS program areas are assigned a sensitivity* value of 5 for both marine and coastal birds.

Threatened and endangered birds are typically perceived to have unique sensitivities to adverse effects that could affect the recovery of these species. Therefore, status under the ESA was considered a secondary factor for ranking OCS program areas for the relative sensitivity* of birds to oil and natural gas activities. Each ESA-listed bird species present in an OCS program area is given a value of 1.

Each OCS program area's relative sensitivity* score is calculated by summing (1) the product of the marine bird abundance and sensitivity* values (2) the product of the coastal bird abundance and sensitivity* values, and (3) the number of ESA-listed species.

$$\begin{aligned} & (\text{Marine Abundance Value X Sensitivity* Value}) \\ & \quad + \\ & (\text{Coastal Abundance Value X Sensitivity* Value}) \\ & \quad + \\ & \text{Number of ESA-listed species} \end{aligned}$$

Results

Population data was compiled on marine and coastal birds for each OCS program area as shown in Table 24. However, there were some challenges associated with compiling this data. Such challenges include (1) complete datasets were not available for seabirds, waterfowl, and shorebirds for all program areas; (2) while some datasets appeared to be highly accurate, this accuracy was not fully transferrable to the Proposed Program analysis because the datasets applied to a large geographic area that required subdividing according to country and/or program area, which assumed bird resources were evenly distributed; and (3) information contained in contemporary conservation plans reported information differently, often either as breeding pairs or individuals, but seldom accounting for non-breeding adult or juvenile bird sub-populations. A few plans also reported population data as a term that corresponded to a numeric range. Some of these ranges were wide. In such cases, and consistent with a conservative approach, the maximum number of a range was used for population estimates. While some inconsistency in the marine and coastal bird data sets was noted, this did not prevent the relative comparison of OCS program areas as data were combined at a scale that minor differences did not disproportionately influence the grouping by abundance, which was the primary factor in determining the vulnerability of marine and coastal birds to a large oil spill.

Table 24: Relative Environmental Sensitivity* to Impact of the OCS Program Areas for Coastal and Marine Birds

OCS Program Area	Score ¹	General Abundance (coastal/marine)	ESA-Listed Species ²
Chukchi Sea	32	moderate/moderate	STEI, SPEI
Central GOM	23	moderate/low	BRPE, LETE, PIPL
Eastern GOM	23	moderate/low	BRPE, LETE, PIPL
Western GOM	23	moderate/low	BRPE, LETE, PIPL
Beaufort Sea	22	moderate/low	STEI, SPEI
Cook Inlet	21	moderate/low	STEI

¹ The total score was calculated by summing (1) the product of the marine bird abundance and sensitivity* values (2) the product of the coastal bird abundance and sensitivity* values, and (3) the number of ESA-listed species. Higher scores indicate greater sensitivity* to OCS oil and natural gas activities.

² Birds listed as threatened or endangered: BRPE = Brown Pelican; LETE = Least Tern; PIPL = Piping Plover; SPEI = Spectacled Eider; STEI = Steller's Eider.

3.3.2 Fish

This analysis considers the sensitivity* of fish to OCS oil and natural gas activities (not only to spilled oil, as was done for birds), because most OCS program areas support varied and abundant fish and shellfish populations, including threatened and endangered species, non-listed species, and fishes and shellfish important to commercial and recreational fisheries (USDOJ, MMS, 2007). The following analysis discusses the relative sensitivity* of each OCS program area's estuarine, diadromous and marine fish and shellfish to potential negative impacts of OCS oil and natural gas activity. Most OCS oil and natural gas activities have the potential to alter fish behavior, and may cause physical injury of individuals in the immediate vicinity of airguns, and death of individuals in the immediate vicinity of explosive removals. Pelagic eggs and larval fish would be most sensitive to oil spills. This analysis of the sensitivity* of fish does not consider sensitivity* of coastal and marine habitats to OCS oil and natural gas activity, because they are discussed in sections 3.1 and 3.2, respectively.

While individual fish may be physically injured or killed in the immediate vicinity of air guns, explosive removals, or oil spills, OCS oil and natural gas activities are not expected to add significantly to the mortality of fish populations. However, individual species already at risk, as indicated by the ESA listings or status of U.S. fisheries stocks, may be more sensitive to species-level impacts from these activities and events.

There are estuarine, diadromous and marine fish and shellfish listed as either endangered or threatened species under the ESA in most of the six OCS program areas. According to the ESA, a species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become endangered in the future. The two ESA statuses are weighted by severity in Table 25 as follows. Individual threatened species are assigned a value of 5 and individual endangered species are assigned a value of 10.

Table 25 shows the number of marine fisheries stocks designated as overfished or subject to overfishing. A stock that is overfished has a biomass level below a biological threshold. A stock

that is subject to overfishing has a fishing mortality or harvest rate above the level that provides for the maximum sustainable yield or the largest average catch or yield that can continuously be taken from a stock under existing environmental conditions. Stocks can be designated in both categories and these two categories are weighted equally in this analysis. Each overfished stock or stock that is subject to overfishing in an OCS program area is given a value of 1.

This analysis used the weight of commercial landings to estimate relative abundance of fish for each OCS program area. The OCS program areas are divided into three categories of relative abundance to compensate for any bias in the data caused by timing, location, and effort of commercial fishing. The abundance categories used are:

Low (5)	< 200 million pounds;
Moderate (25)	200 million to 1 billion pounds; and
High (50)	> 1 billion pounds.

Commercial landings provided the most recent and complete dataset for the OCS program areas. While stock assessments may be more accurate, they are not available for all species and areas, and may not be as recent as the commercial landings data. While Alaska accounts for over half of the U.S. commercial landings, those values had to be allocated among the 15 Alaskan OCS planning areas (Woodby et al., 2005). Therefore, not every Alaskan OCS program area was given a value of high for relative abundance.

Each OCS program area's overall score was calculated by adding its relative abundance value to the sum of its ESA score and number of stocks subject to overfishing and/or overfished. Table 25 presents the relative sensitivity* of each OCS program area's fish population to OCS oil and natural gas activities.

Table 25: Relative Environmental Sensitivity* to Impact of the OCS Program Areas for Fish

OCS Program Area	Total Score ¹	ESA Species ²			Stocks Subject to Overfishing and/or Overfished ⁴	Relative Abundance (Value) ⁵
		Number Endangered	Number Threatened	Score ³		
Central GOM	68	0	1	5	13	50
Eastern GOM	34	1	1	15	14	5
Cook Inlet	30	0	1	5	0	25
Western GOM	18	0	0	0	13	5
Beaufort Sea	5	0	0	0	0	5
Chukchi Sea	5	0	0	0	0	5

¹ The total score was calculated by adding the abundance value to the sum of the ESA score and number of stocks subject to overfishing and/or overfished. Higher scores indicate greater sensitivity* to OCS oil and natural gas activities.

² Sources: USDOC, NOAA Fisheries, Office of Protected Resources, 2009b and 2009c.

³ Individual endangered species were given a value of 10 and individual threatened species were given a value of 5. The ESA score is the total number of species multiplied by their value.

⁴ Source: USDOC, NMFS, 2009.

⁵ Relative abundance: Low (5) = < 200 million pounds, Moderate (25) = 200 million to 1 billion pounds, and High (50) = > 1 billion pounds. Sources: USDOC, NOAA Fisheries, Office of Science and Technology, 2009; Woodby et al., 2005.

3.3.3 Marine Mammals

As a group, marine mammals include whales, dolphins, porpoises, seals, sea lions, walrus, dugongs, manatees, sea otters, and polar bears. Marine mammals are widely distributed throughout the world’s oceans and are represented in all OCS program areas. Marine mammals can profoundly influence marine ecosystems and are generally considered to be good indicators of changes in the marine environment.

The diversity of marine mammal species and their sensitivity* to OCS oil and natural gas activities vary among OCS program areas. For this analysis, recent marine mammal stock assessment reports prepared by the NMFS and USFWS (Angliss et al., 2009; Carretta et al., 2009; and Waring et al., 2009) were used to identify marine mammal species present in each OCS program area. Species may occasionally wander beyond the ranges identified in the stock assessment reports but this analysis excludes extralimital i.e., from out of the area sightings, such as humpbacks in Arctic waters, because of their relative rarity and unpredictability.

Each species in a program area was evaluated with respect to the following factors: the species’ listing status, sensitivity* to oil spills, and sensitivity* to underwater sound. Each of these factors was considered equal in importance and values between 0 and 10 were assigned to rate sensitivity* of each species within each factor. Differences in how a species may react to OCS oil and natural gas activities in high human use areas versus low human use areas were not evaluated because of the inherent complexity of marine mammal behaviors.

Listing Status

A marine mammal may be listed as “depleted” under MMPA or “threatened” or “endangered” under ESA. For each OCS program area, the listing status of each marine mammal species was identified. Recognizing that there are significant differences between the definitions of each status, a value of 1 was assigned for marine mammal stocks listed as depleted under MMPA, a value of 5 for species listed as threatened under ESA, and a value of 10 for species listed as endangered under ESA. Candidate species and species petitioned for listing are not given added value because their status is under review, and therefore, decisions on listings under ESA are uncertain.

This analysis includes recently listed species, such as the threatened southern Beaufort Sea and Chukchi/Bering Sea stocks of polar bear, thus adding to the value attributed to program areas that support these species. Critical habitat for listed species was considered in the marine habitat component (section 3.2) of this environmental sensitivity analysis and is not included in the marine mammal component.

Sensitivity* to Oil Spills

In general, marine mammals are affected by oil spills through direct contact, inhalation, or ingestion of oil or oil-tainted prey. Based on mortalities and injuries experienced during past oil spill events, marine mammal species known to be highly susceptible to oil spills (e.g., sea otters) were assigned a value of 10. In this analysis, Arctic species with limited access to open ice-free water were also considered highly susceptible based on perceived risks associated with these species' inability to avoid extended contact with spilled oil in a confined marine environment. All other species were considered less susceptible to oils spills and assigned a value of 5. Environmental sensitivity of shoreline habitat that some marine mammals may use is captured in the shoreline sensitivity analysis.

Sensitivity* to Underwater Sound

Exploration for oil and natural gas often requires noise-producing seismic surveys to locate and identify key geologic features. Offshore construction activities such as pile driving may also introduce sound into the marine environment. Many species of marine mammals depend on creation and detection of sound to navigate, find prey, potential mates or calves, and avoid danger.

All marine mammal species have some ability to detect anthropogenic sound, but values were assigned differently for species that depend on sound for critical life functions and that may be affected by sounds typically associated with OCS oil and natural gas activities, than for those species who operate in frequencies outside the normal range of sounds created by OCS activities. Species that do not use sound for navigation, underwater communication, or to find prey/mates were assigned a value of 1. Species that use sound for navigation, underwater communication, or to find prey/mates/offspring at frequencies outside the typical range of offshore development sound were assigned a value of 5. Species that use sound for navigation, underwater communication, or to find prey/mates at frequencies within the typical range of offshore

development sound were assigned a value of 10. The latter includes all deep diving cetacean species.

Calculation of OCS Program Area Rankings

For each species a score was calculated by adding the values given for that species' listing status, sensitivity* to oil spills, and sensitivity* to underwater sound. The resulting scores for each species within a program area were added to create an overall score for the OCS program area. The OCS program area scores were then ranked according to values with higher scores indicating a higher sensitivity*

OCS Program Area Rankings with Respect to Marine Mammal Sensitivity*

The marine mammal sensitivity* methodology described above yields the ranking of OCS program areas presented in Table 26.

Table 26: Relative Environmental Sensitivity* to Impact of the OCS Program Areas for Marine Mammals

OCS Program Area	Total Score ¹	Number of Species	Number of Species by Listing Status			Listing Status Score ²	Number of Species by Oil Spill Sensitivity*		Oil Spill Sensitivity* Score ³	Number of Species by Sound Sensitivity*			Sound Sensitivity* Score ³
			E	T	D		H	M		H	M	L	
Eastern GOM	255	20	2	0	0	20	0	20	100	7	13	0	135
Central GOM	225	18	1	0	0	10	0	18	90	7	11	0	125
Cook Inlet	182	12	4	0	1	41	1	11	65	4	6	1	76
Chukchi Sea	180	11	1	1	0	15	8	3	95	3	8	0	70
Western GOM	170	13	1	0	0	10	0	13	65	6	7	0	95
Beaufort Sea	155	9	1	1	0	15	8	1	85	2	7	0	55

¹The total score was calculated by adding the listing status, oil spill sensitivity*, and sound sensitivity* scores. Higher scores indicate greater sensitivity* to OCS oil and natural gas activities.

²Sum of the products of number of listed species and status value (i.e., endangered (E) = 10, threatened (T) = 5, and depleted (D) = 1).

³Sum of the products of number of species and sensitivity* value (i.e., high (H) = 10, moderate (M) = 5, and low (L) = 1).

3.3.4 Sea Turtles

Sea turtles are greatly influenced by ocean temperature, and therefore are not found in all OCS program areas. However, all sea turtles are listed as either endangered or threatened under ESA, and they are considered susceptible to oil and natural gas activities, including sensitivity* to possible oil spills, and possible hearing sensitivity to the low frequency sounds generated by exploration, pile driving, and drilling activities. Therefore, sea turtles are considered in this analysis.

The diversity of sea turtle species varies among OCS program areas. To identify sea turtle species likely to occur in OCS program areas and to determine their relative vulnerability, this analysis considered all Recovery Plans, 5-Year Reports for sea turtles, published by the NMFS and USFWS, as well as NMFS and USFWS Status Reviews for Sea Turtles Listed under the ESA (Plotkin et al., 1995) and Occurrences of Marine Turtles in Alaska Waters: 1960-1998 (Hodge and Wing, 2000). Species found in each OCS program area were identified and assigned values for (1) Presence (rare, seasonal, year-round); (2) Status (threatened and endangered under ESA); (3) Relative sensitivity* to oil spills (high); and, (4) Relative sensitivity* to underwater sound (medium). Further clarification of how values were assigned for each species and how the values were combined to rank OCS program areas is provided in the following discussion.

Presence

Sea turtles are found in only some of the OCS program areas and the number of species found in any given area varies. The distribution of most species of sea turtle is limited by water temperature and varies by season. They are highly migratory and therefore have a wide geographic range in tropical, sub-tropical, and temperate waters.

By default, OCS program areas with more sea turtle diversity may achieve higher scores than those with fewer sea turtle species. However, some species may be exceedingly rare and others may be year-round residents in an OCS program area. Year-round residents may be disproportionately affected by offshore activities and are factored higher. In this analysis, species rarely seen in an OCS program area, i.e., OCS program area is outside normal range, but area has a record of sightings, are assigned a value of 1. Species with seasonal or occasional visitors are assigned a value of 2. Species with year-round residents and areas known for nesting are assigned a value of 3. Program areas with no data indicating the presence of sea turtles were not further analyzed and were assigned a value of 0.

Status

All sea turtles have a protected status with respect to ESA and the Convention on International Trade in Endangered Species. They are either listed as “threatened” or “endangered” under ESA. Special consideration is given to these species when planning OCS oil and natural gas activities and formal consultations between BOEM and NMFS and/or USFWS as may be required by law. At this time, there is no critical habitat for any sea turtles in any of the OCS program areas. The presence of special status species in each OCS program area is important to

the decisionmaking process. Threatened species are assigned a value of 5 and endangered species are assigned a value of 10.

Relative Sensitivity* to Oil Spills

This analysis does not attempt to identify all possible interactions that may occur between sea turtles and oil. A relative sensitivity* to oil spills is assigned based on species biology and habitat restrictions. All sea turtles, regardless of species, are considered to be highly sensitive* to oil spills for several reasons, including their need to be at the surface of the water to breathe, migratory nature, relatively slow movement, presence in both deeper waters and shallower waters, high susceptibility to oil when it reaches the shore, and potential difficulty in detecting and avoiding spilled oil. Therefore, all sea turtle species were assigned a high sensitivity* of 10 relative to risks from oil spills.

Relative Sensitivity* to Underwater Sound

Exploration for oil and natural gas often requires noise-producing seismic surveys to locate and identify key geologic features. Offshore construction activities such as pile driving may also introduce sound into the marine environment. Data on sea turtle sound production and hearing are limited. Based on the structure of the inner ear, there is some evidence to suggest that marine turtles primarily hear sounds in the low frequency range and that turtles are insensitive to high frequencies. Based on the known data, for the purposes of this sensitivity analysis, it is assumed that sea turtles have low frequency hearing but possibly lower sensitivity* to sounds compared to other fauna. Therefore, acoustic impacts to sea turtles were assigned a medium sensitivity* of 5 relative to risks of acoustic impacts.

Calculation of OCS Program Area Rankings

The following function was used to calculate a value for each sea turtle species within each OCS program area:

$$Presence \times (Status + Oil \text{ Sensitivity}^* + Sound \text{ Sensitivity}^*)$$

All calculated values were added within an OCS program area to create an overall score for that OCS program area.

OCS Program Areas Rankings with Respect to Sea Turtle Sensitivity*

The sea turtle sensitivity* methodology described above yields the ranking of OCS program areas presented in Table 27.

Table 27: Relative Environmental Sensitivity* to Impact of the OCS Program Areas for Sea Turtles

OCS Program Area	Score ¹
Eastern GOM	360
Central GOM	345
Western GOM	345
Chukchi Sea	0
Beaufort Sea	0
Cook Inlet	0

¹Higher scores indicate greater sensitivity* to OCS oil and natural gas activities.

3.3.5 Combining Fauna and Ordinal Ranking

Marine fauna is the grouping of birds, fish, marine mammals, and sea turtles. Each fauna was first considered individually using the different scoring methods described above. The resulting scores were normalized for each fauna as shown in Table 28.

There are many normalization methods available, but not all are appropriate to apply to ordinal data. To create an overall marine fauna rank, the most appropriate method to apply to the four subsets of marine fauna scores (i.e., fish, birds, marine mammals, and sea turtles) is the min-max normalization method. This method subtracts the minimum value of a score subset from each OCS program area value and then divides the difference by the range of the subset scores, to transform the data into a new range of values within the interval [0,1]. This method was applied to the four score subsets. After applying the min-max normalization, the four normalized scores for each OCS program area were added to create a total normalized score with a range of [0,4]. The overall scores were ordered and ranked to obtain the marine fauna rank presented in Table 28.

**Table 28: Relative Environmental Sensitivity* to Impact of the OCS Program Areas
for Marine Fauna**

OCS Program Areas	Fish		Birds		Marine Mammals		Sea Turtles		Total Normalized Score ¹
	Score	Normalized	Score	Normalized	Score	Normalized	Score	Normalized	
Central GOM	68	0.89	23	0.09	225	0.24	345	0.96	2.18
Eastern GOM	34	0.41	23	0.09	255	0.34	360	1.00	1.84
Western GPM	18	0.18	23	0.09	170	0.05	345	0.96	1.29
Cook Inlet	30	0.35	21	0.03	182	0.09	0	0.00	0.47
Chukchi Sea	5	0.00	32	0.38	180	0.08	0	0.00	0.46
Beaufort Sea	5	0.00	22	0.06	155	0.00	0	0.00	0.06

¹Higher scores indicate greater sensitivity* to OCS oil and natural gas activities.

3.4 Marine Productivity

While marine productivity has been considered as a separate factor in previous program analyses, it is considered as a component of this analysis in order to more fully account for the biological aspects of the marine environment.

Productivity is a term used to indicate the amount of plant or animal biomass that is produced over a period of time. Primary production is the assimilation of organic carbon through photosynthesis. The most common example is simply a plant using energy from the sun to make organic matter. It is the basis for growth in most ecosystems. The productivity of the marine aquatic community is its capacity to produce food for its component species, which thus sets limits on the overall biological production in an ecosystem. Primary production in the marine environment is conducted primarily by phytoplankton; macroalgae, such as Sargassum or kelp; and submerged aquatic vegetation like sea-grasses. The rate at which this occurs is based largely on the plants' ability to photosynthesize. The methods of measuring phytoplankton productivity are relatively standard and results are normally expressed in terms of chlorophyll-a, or the amount of carbon fixed during photosynthesis per square meter of ocean surface per unit 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, fewer nutrients, primarily of terrestrial origin, are available for use by phytoplankton, and surface mixing due to wave action, down-dwelling, fronts, and convergence may push some phytoplankton down into the water column where light is insufficient for photosynthesis to occur.

Marine ecosystems can be significantly affected by the rates and magnitude of primary production within their boundaries. Any alteration 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. These effects on primary production would most likely be very short term in duration and of low magnitude.

For these reasons, OCS program areas have been ranked for relative sensitivity* by their areal averaged production, the annual amount of carbon produced per acre of ocean surface, rather than metric tons per year, as has been used in the earlier analyses. Areas with the highest mean levels of productivity are ranked highest, as the potential loss to the system would have the greatest effect that is seen as a reduction in the amount of biomass the area could support. This method allows for a direct comparison of each OCS program area without a bias towards ranking OCS program areas higher due to encompassing a larger area. It is important to note that

measurements of phytoplankton can vary greatly both spatially and temporally, resulting in significant differences in measurements within and between OCS program areas.

The BOEM is currently analyzing the results from a new analysis of OCS marine productivity and will include that updated analysis in the future relative sensitivity* analyses.

Table 29: Relative Environmental Sensitivity* to Impact of the OCS Program Areas for Marine Productivity

OCS Program Area	Metric Tons/yr	Acres (Millions)	Areal Averaged Production (Metric tons/acre/yr)
Cook Inlet	24,152,550	5.36	4.506
Eastern GOM	117,466,816	64.56	1.819
Central GOM	110,234,566	66.45	1.659
Western GOM	31,331,220	28.58	1.096
Chukchi Sea	8,237,533	62.59	0.132
Beaufort Sea	4,591,039	65.08	0.071

Sources: Continental Shelf Associates, 1990 and 1991.

4. Climate Change and Relative Environmental Sensitivity

4.1 Introduction

Climate change trends during the 20th century have been detected on all continents and oceans, suggesting noticeable relationships among atmospheric concentrations of anthropogenic CO₂ and other greenhouse gases, mean global temperature increases, and observed effects on physical and biological systems. Climate change effects, including warming air and water temperatures, rising sea levels, and more intense storms have been documented in many U.S. coastal regions. New scientific research shows that oceans are beginning to face yet another threat due to global warming-related emissions, a process referred to as ocean acidification. Basic ocean chemistry is changing because of the uptake of CO₂ released by human activities (Feely, et al., 2006). These changes will continue to affect the habitats and biota discussed in this environmental sensitivity analysis, possibly making them more vulnerable to human activities, such as OCS oil and natural gas exploration and development. Climate change is discussed in more detail in the Draft EIS.

This section provides an assessment of climate change effects on the relative environmental sensitivity of OCS program areas during the life of the 5-Year Program. The assessment examines the extent to which rising temperatures, sea-level rise, and ocean acidification may affect the environmental sensitivity of different areas of the OCS, as well as whether meaningful differences in the magnitude of these effects occur spatially. The time frame of interest is the period affected by the 2012-2017 program, which extends 40 years or approximately until 2050. This task is challenging because the overall response of the global climate to warming is inherently and extremely complex due to a number of positive and negative feedbacks that can have strong influence on the climate system (Intergovernmental

Panel on Climate Change (IPCC), 2007). The responses of physical and biological systems to global climate change bring additional complexities because climatic, biologic, and physical processes interact in complicated and nonlinear ways that are not fully understood at this time. Because of the inherent uncertainty in predicting future events and outcomes, and the complexities and incomplete understanding of the underlying science that exists at this time, climate change projections must be presented in probabilistic terms.

The IPCC uses a 10-fold likelihood scale ranging from virtually certain (>99 percent probability of occurrence) to exceptionally unlikely (<1 percent probability) to define consistent terminology for climate change projections. This assessment uses assumptions and projections from the IPCC report that are considered at a minimum to be likely (>66 percent) to occur, in order to focus on the most likely drivers of climate change effects on environmental sensitivity.

Projections of climate change and its effects are generally more reliable when applied to a large area, compared to a smaller area. It is currently difficult to model temperature changes, and the processes that temperature changes spawn, at smaller than continental scales (IPCC, 2007). Reliable projections are possible for areas the size of the Alaskan Arctic or GOM, but in most cases existing information does not support making more detailed distinctions at the scale of an individual OCS program area. This assessment uses projections and assumptions of climate change and its effects that can be reliably applied to large areas, such as the Arctic or GOM. The projected increased sensitivity of the larger area is applied to the individual OCS program areas that it contains.

Reliable projections of effects of climate change on individual, or groups of, species usually are made at high levels of generality. The IPCC (2007) concludes that it is likely (>66 percent chance of occurrence) that 20 to 30 percent of the plants and animals assessed so far are at risk of extinction within the next century, but does not indicate the specific species or groups of species most at risk. Thomas et al. (2004) suggest that up to 37 percent of a sample of land plants and animals could become extinct as a result of climate change by 2050, a date encompassing the 40-year life of the 2012-2017 program. These large extinction scenarios suggest that effects of climate change on species will be pandemic in marine and coastal environments. Research is beginning to identify possible climate change effects on specific fauna or groups of fauna, such as a recent report that identified marine birds as being particularly susceptible to climate change effects compared to other birds (Vié, et al., 2008), a relevant observation if validated with additional research. Generally, however, it is not possible to reliably identify individual species or species groups with relatively high extinction risks along with the OCS program areas where the extinction risks are relatively higher or lower. An exception is the Arctic in Alaska, which the IPCC (2007) identifies as an “Especially Affected Region” because of the projected high rates of warming that will likely result in substantial degradation of ice-water habitats that many species, and subsistence hunters, depend on.

4.2 Climate Change Factors Influencing Relative Sensitivity* and Marine Productivity

Climate change impacts on the ocean's physical properties, such as temperature, winds, precipitation, currents, sea level, salinity, and upwelling, will likely affect both open-ocean and nearshore ecosystems. Changes to the oceans are expected to cause species- and community-level shifts that will have consequences for species interaction and may ultimately affect ecosystem function. Distribution patterns of southern species may shift northward as water temperatures warm, but the colonization of new areas will depend on successful dispersal across barriers, such as from one estuary to another. The ability of species to adapt to different locations will depend on their ability to find suitable habitat, compete with other species for resources and avoid predators. Hence, the fundamental structure of complex food webs may change. For example, in some cases climate-induced changes may be positive if they increase habitat for depleted fishery stocks, while in other cases changes may be negative if they spread the distribution of invasive species or disease-causing microbes. Marine and coastal systems are being affected negatively by pollution, overfishing, and other stressors that may act in combination with climate change to damage ecosystems.

4.2.1. Temperature

Global mean surface temperatures have risen by $0.74^{\circ}\text{C} \pm 0.18^{\circ}$ between 1905 and 2005 (IPCC, 2007). The rate of warming for the past 50 years has been almost double the rate for the past 100 years ($0.13^{\circ}\text{C}/\text{decade}$). The IPCC projections suggest about a 0.8°C increase in temperature during the 40 year life of the Proposed Program.

Atmospheric warming has not been spatially uniform. In particular, Arctic temperatures have increased about twice as much as those in lower latitudes. The IPCC predicts that the Arctic will continue to warm at a faster rate than elsewhere during the time span covered by the life of the 2012-2017 program. Preferential warming in the Arctic is partially the result of the ice-albedo effect, which occurs when highly reflective ice is replaced by less reflective water and land surfaces resulting in more heat being absorbed by the land and water rather than being reflected back to the atmosphere. About 80 percent of the warmth caused by greenhouse gases has been absorbed in the oceans. Evidence for warming is widespread in the upper 700 meters of the global ocean (IPCC, 2007).

The IPCC reports that there is "high confidence" that rising ocean temperatures are associated with observed changes in marine biological systems. Ocean warming will continue during the life of the program proportional to atmospheric warming.

Environmental Sensitivity Factors Related to Temperature

Species Composition

Climate variation is a recognized, primary driver of marine ecosystems and associated biological resources (USDOC, NOAA Fisheries Service, 2009). Effects of warming temperatures have already been seen in the form of northward shift of species, change in migration patterns and timing, change in location and timing of reproduction, and increased disease. As warming drives

changes in timing and geographic ranges for marine fauna, it is important to note that entire communities of species do not shift intact. Rather, the range and timing of each species within an existing community shifts in response to its own sensitivity* to climate change, mobility, lifespan, and the availability of resources. The speed with which species can shift their ranges is influenced by factors including their size and lifespan. All of these variations result in the breakup of existing ecosystems and formation of new ones, with uncertain consequences (Karl et al., 2009).

While all OCS program areas will be affected by species migrations, the Alaskan Arctic will likely be relatively more affected. The IPCC (2007) concludes that the Arctic is likely (>66 percent likelihood) to be especially affected by climate change because of the impacts of high rates of projected warming on natural systems.

Most affected OCS program areas include the Beaufort and Chukchi Seas.

Coral bleaching

Warmer water temperatures cause coral to lose their symbiotic algae, a process called bleaching. Intensities and frequencies of bleaching events have increased substantially over the past 30 years, leading to the death or severe damage of about one third of the world's shallow water corals (Karl et al., 2009). The IPCC (2007) recognizes warm water corals as a resource that is likely (>66 percent likelihood) to be particularly affected by climate warming.

Most affected OCS program areas include the Western, Central, and Eastern GOM.

Permafrost thawing

The temperature at the top of the permafrost layer has increased by up to 3° C since the 1980s in the Arctic (IPCC, 2007). In the Alaskan Arctic specifically, the permafrost base has been thawing at a rate of up to 0.04 meters per year. Thawing of coastal soils is expected to result in more rapid rates of shore erosion. This effect is expected to be compounded by reduced duration and extent of shoreline protection provided by landfast ice and more exposure to ocean storms. The IPCC (2007) identifies coasts exposed to the Arctic Ocean, such as along the Chukchi and Beaufort Seas, as the most sensitive regions for permafrost thermal degradation effects, largely because of erosion issues.

Most affected OCS program areas include the Beaufort and Chukchi Seas.

Increases in Major Storm Frequency and Intensity

While stronger storms associated with global warming are likely to affect most coastal habitats, this effect is expected to be most evident along the southeast and GOM coasts (Karl et al., 2009). Observational evidence for an increase of tropical cyclone activity in the Northern Hemisphere Atlantic Ocean since about 1970 also suggests a substantial upward trend toward longer lasting and more intense storms (IPCC, 2007). The IPCC considers it likely (>66 percent likelihood) that increased tropical cyclone activity will occur, resulting in erosion, flooding, and landscape

disruptions that will affect the relative environmental sensitivity of coastal and nearshore environmental resources.

Most affected OCS program areas include the Western, Central, and Eastern GOM.

Sea-Ice Biome

The presence of sea ice and landfast ice in the marine environment of the Arctic and near Arctic creates a productive marine-ice biome essential for the flourishing and survival of marine animals and the traditional subsistence lifestyle. These environments provide hunting, resting and birthing platforms along the ice-water interface, generate local upwelling responsible for high productivity in polynyas, and release large quantities of algae growing beneath the ice surface into the food chain at ice melt. The IPCC (2007) considers it likely (>66 percent likelihood) that the Arctic sea-ice biome will be especially affected by climate change because of sensitivity* to warming.

Most affected OCS program areas include the Beaufort and Chukchi Seas.

Ocean Dynamics

Warming of the atmosphere and oceans can change the dynamic properties of ocean circulation. At this time existing information on climate change effects on the dynamic properties of the ocean does not support a reliable prediction of these effects on the relative environmental sensitivity of the different OCS program areas.

4.2.2. Sea Level

Recent global sea-level rise has been caused by warming-induced thermal expansion of the oceans, and accelerated melting of glaciers and ice sheets. Current predictions for future sea levels projected a rise in sea level from 8 to 24 inches by 2100 (IPCC, 2007). The amount of relative sea-level rise along different parts of the U.S. coasts depends not only on thermal expansion and ice sheet melting, but also on the changes in elevation of the land that occur as a result of subsidence or geologic uplift (Karl et al., 2009). In the past 50 years, sea level has risen 8 inches or more along some coastal areas of the United States and fallen in other locations.

A recent report (CCSP, 2009) identifies areas along the Atlantic and GOM coasts as undergoing relatively rapid inundation and landscape changes because of the prevalence of low lying coastal lands. The report identified submergence hotspots where, because of local subsidence, the rate of rise of sea level relative to the land is expected to be higher than in other parts of the area. Sea-level rise hotspots include coastal Louisiana adjacent to the Central GOM program area. Because these submergence hot spots occur as a result of local geologic factors, it is possible in these cases to assign climate change-elevated environmental sensitivity to specific OCS program areas.

Rapid submergence of these coastal lands would destabilize ecological and socioeconomic uses of the coastal zone through accelerated coastal erosion and the movement of marine

environments landward over terrestrial landscapes. Coastal environmental resources affected this way would be stressed and presumably made more sensitive to the impacts from OCS oil and natural gas activities.

Most affected OCS program areas include the Central and Eastern GOM.

4.2.3. Ocean Acidification

Ocean acidification refers to the decrease in the pH of the oceans caused by the uptake of CO₂ from the atmosphere. Atmospheric CO₂ reacts with seawater to form carbonic acid, leading to increased acidity in the oceans. The future pH of the ocean is predicted to decrease by approximately 0.3 to 0.4 units by the year 2100 (Orr et al., 2005). Higher latitudes will experience the greatest changes and impacts due to the increased solubility of CO₂ due to generally lower temperature (Karl et al., 2009).

Ocean acidification affects the process of calcification by which living organisms create shells and skeletons, with substantial negative consequences for coral reefs, mollusks, and some plankton species important to marine and coastal food chains (Karl et al., 2009). As a result, marine life that uses calcium carbonate to form protective shells or skeletal structures is unable to form these structures or the existing structures dissolve. Current evidence indicates that the calcification rates of warm corals will be reduced by 20 to 60 percent at double preindustrial atmospheric CO₂ concentrations (Kleypas et al., 2006). Potentially affected marine organisms include warm and cold water corals, mollusks and calcareous phytoplankton.

The IPCC (2007) concludes that progressive ocean acidification is expected to have negative impacts on marine shell-forming organisms and their dependent species. These effects would be relatively higher in cold water areas where sea water can absorb more CO₂.

This assessment, however, does attribute an effect of acidification to relative environmental sensitivity based on the absence of observed effects of acidification on ecological resources (IPCC, 2007), and uncertainties as to when effects from acidification would occur in different ocean areas.

4.3 Effects of Climate Change on Relative Environmental Sensitivity* and Marine Productivity of OCS Program Areas

Table 30 shows offshore and adjoining coastal areas where factors resulting from climate change could increase relative environmental sensitivity to OCS development. For example, increased sea-level rise would inundate coastal marshes causing land loss, but also exposing remaining marshes to greater impacts from oil spills by removing the protection of barrier islands. The relative effects of climate change are identified for groups of adjacent OCS program areas with similar climatic and ecological characteristics compared to other areas. Table 30 lists OCS program areas with effects on relative sensitivity from climate change based on the previous section. A high relative magnitude of effects from climate change was assigned to OCS program areas in which at least three climate change effects were expected to be relatively greater than in other program areas. A moderate relative magnitude was given to OCS program areas with one

to two projected effects. A designation of low relative magnitude does not mean that climate change effects will not occur, but that the magnitude of the effects is not expected to be relatively greater than the effects in other OCS program areas.

Table 30: Relative Effects of Climate Change on Environmental Sensitivity* of the OCS Program Areas¹

Geographic Region/ OCS Program Area	Climate Change Effects	Relative Magnitude
Arctic		
Beaufort Sea	Sea-Ice biome; species composition; permafrost thawing	High
Chukchi Sea	Sea-Ice biome; species composition; permafrost thawing	High
North Pacific		
Cook Inlet		Low
Gulf of Mexico		
Central GOM	Coral bleaching; increased storms; submergence	High
Eastern GOM	Coral bleaching; increased storms; submergence	High
Western GOM	Coral bleaching; increased storms	Moderate

¹ Source: Karl et al., 2009.

Climate Change Sensitivity Coefficients

Table 17 presents the OCS program areas grouped into three categories ranging from most to less sensitive* to impact from OCS oil and natural gas activities and considers increased sensitivity due to climate change and ocean acidification. This grouping uses a coefficient of 2.0 for high relative magnitude of effects, such as in the Alaskan Arctic, to apply to the overall environmental sensitivity. This coefficient is based on the temperature increase that has occurred in the Arctic double that of other areas. A linear relationship between temperature increase and environmental sensitivity in the Arctic is reasonable, because ocean and atmosphere warming there has directly resulted in increased sensitivity to the sea-ice biome and permafrost degradation. A coefficient of 1.5 is used for OCS program areas that are projected to experience moderate relative effects from global warming, a value half way between the value of 1.0 used for no relative effect of global warming and 2.0 for high relative effect.

5. Conclusion

The above environmental sensitivity analysis considers sensitivity* of the biological marine environment to multiple impact producing factors, such as oil spills, sound and physical disturbance, and increased sensitivity* due to climate change and ocean acidification. Because relatively small differences suggest a level of precision that is not possible for this analysis, Table 17 presents the OCS program areas grouped into three categories of relative sensitivity* ranging from “most” to “less” sensitive* to impact from OCS oil and natural gas activities. Categorization of an OCS program area as “less” sensitive does not mean that environmental

resources of that OCS program area are not sensitive, but as a collection are found to be relatively less sensitive than other OCS program areas to the types of impacts anticipated from OCS oil and natural gas activities.

To determine this grouping, the scores for each of the four ecological components were first normalized to a scale of 0 to 1, and then added together. A coefficient (see section 4.3) was then applied to the sum of the normalized scores for OCS program areas based on the relative level of climate change effects projected. The sums of the normalized scores were ranked from 1 to 6 with and without applying the coefficient for climate change. The OCS program areas defined as “more” sensitive* had scores equal to or greater than the average OCS program area score, while the OCS program areas defined as “less” sensitive* had scores less than the average OCS program area score.

After incorporation of climate change and ocean acidification, there was no change in the relative environmental sensitivity rankings for the OCS program areas that ranked “most” sensitive*. These OCS program areas also were one or more standard deviations greater than the mean OCS program area score. The OCS program areas defined as “more” sensitive* are less than one standard deviation greater than the mean OCS program area score.

Similarly after incorporation of climate change and ocean acidification, there was no change in the relative environmental sensitivity ranking for the OCS program areas that ranked “less” sensitive*. Several OCS program areas, including the Arctic OCS program areas, i.e., Beaufort and Chukchi Seas, had a significant increase in their overall sensitivity* rankings when increased sensitivity* due to climate change was considered.

In *California I*, the U.S. Court of Appeals for the District of Columbia Circuit held the relative environmental sensitivity analysis “must at least attempt to identify those areas whose environment and marine productivity are most and least sensitive to OCS activity.” In an effort to meet the Court’s requirement, yet avoid the appearance of unrealistic preciseness associated with a top to bottom ranking, this analysis, as summarized in Table 17, identifies the OCS program areas “most” relatively sensitive* to impact from OCS oil and natural gas activities as the Eastern and Central GOM.

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2. Industry Interest

The BOEM received comments from 24 energy companies and oil and gas trade groups and membership organizations. Strong support for BOEM's initiative to start a new 5-Year Program was expressed in all comments. Generalized support for opening all areas of the domestic OCS, opening then newly available moratorium areas, and utilizing new technologies also was common.

Nine exploration and development companies submitted comments in response to the 2009 DPP. Table 31 shows how many such companies identified a specific program area for potential leasing in the 2012-2017 program. The number of program areas that are being considered for leasing has changed from those presented in the 2009 DPP. As the six Proposed Program areas have had previous leasing activity programs and established interest, industry interest rankings are more homogeneous than they were in the response to the initial August 1, 2008, Request for Information and the 2009 DPP which proposed leasing in 12 areas. In this table, all nine

companies showed interest in the Chukchi Sea; eight each in the Eastern GOM, Central GOM, Western GOM, and Beaufort Sea; and seven in Cook Inlet. A summary of all industry comments is included in Appendix A.

Table 31: Industry Interest*

Planning Area	Number of Companies Expressing Interest in a Program Area
Chukchi Sea	9
Beaufort Sea	8
Eastern GOM	8
Central GOM	8
Western GOM	8
Cook Inlet	7

*Generalized industry interest was “high” with respect to expanding program planning to include all areas of the OCS. In many instances, interest in more specific areas was difficult to interpret from each company’s comment. For example, none of the industry comments expressed specific interest in the Cook Inlet planning area.

4. Equitable sharing of Developmental Benefits and Environmental Risks

Introduction

Section 18(a)(2)(B) of the Act requires that the Secretary base the timing and location of OCS exploration, production, and development on a consideration of, among other factors, “an equitable sharing of developmental benefits and environmental risks among the various regions.” Because developmental benefits and environmental risks generally accrue outside the regional OCS submerged lands, analysis of these factors usually goes beyond the strict requirements of the Act and considers the sharing of benefits and risks to the onshore U.S. population, particularly in the coastal areas near producing regions of the OCS.

Section 18 requires that the leasing program consider an equitable sharing of developmental benefits and environmental risks, the courts, however, have not defined a specific standard of equitable sharing that the Secretary is to achieve. As the Court recognized in *California I* and *California II*, the degree to which a proposed 5-year schedule of lease sales can achieve an equitable sharing of benefits and risks must be considered in light of a number of other factors, many of which are not under the control of DOI. The equitable sharing analysis is based on considerations that, while somewhat general, allow a fairly simple basis for judging the implications of programmatic decisions on the equitable sharing of developmental benefits and environmental risks.

The Secretary considers equitable sharing of developmental benefit and environmental risks among the regions, as described in this analysis, in the process of deciding whether to include any or all of the available planning areas in the Proposed Program.

Methodology

The equitable sharing analysis uses an economic impact approach rather than the benefit-cost approach used in estimating the Net Benefits of the program proposal. Economic impact

analysis and benefit-cost analysis offer two means of estimating benefits and costs, both of which provide valuable information for the 5-Year Program decision. Both are reasonable approaches to estimating social value and social costs, but the numbers they generate are not the same, as they represent different aspects of economic activity. The effects measured in a benefit-cost analysis reflect direct first-order real resource market outcomes, such as increased production and the accompanying increase in consumer surplus, as well as the costs imposed by the program decision. Some factors that often are considered a benefit, such as employment, are treated in a benefit-costs analysis as costs paid by society to conduct the activities that result in economic value. In contrast, while an economic impact analysis could include these output measures as well, it tends to focus upon broad macroeconomic measures, such as income, employment, wages, and revenue transfers, as they may be relate to specific industries and geographical locations. As the Secretary must make programmatic decisions for the benefit of the Nation as a whole, the benefit-cost approach is more appropriate for the Net Benefits or Social Value analysis, described earlier in this document, which present relative benefits and costs from the national perspective. However, for the equitable sharing analysis, it is the relative benefits enjoyed and distributed risks borne among geographic regions that are important. In addition, residents of local areas tend to view employment as a benefit, often resulting in the flow of money into their communities from elsewhere, rather than a cost of producing economic value. Therefore, the regional economic impact approach is used below.

Developmental Benefits and Environmental Risks

The nature of developmental benefits and environmental risks associated with the OCS oil and natural gas program has been well documented in previous 5-Year Program analyses. Those analyses concluded that, given the actual geographic distribution of oil and natural gas resources among various OCS planning areas, the existence of funds to mitigate risks, and the distribution of corporate ownership throughout the country, the 5-Year Program necessarily results in a concentration of both developmental benefits and environmental risks in the geographic areas adjacent to OCS oil and natural gas activity areas and also a wide distribution of other economic benefits and costs throughout the Nation. This analysis describes both phenomena.

Among the benefits accruing primarily to producing regions and nearby onshore areas are expenditures on the factors of production which provide direct, indirect, and induced employment and regional economic impact. Many of the industries conducting or supporting OCS oil and natural gas activities provide employment at higher-than-average pay. Employment and expenditures move through the economy with a share of revenues accruing to federal, state, and local governments. Producing regions and nearby onshore areas, as well as other coastal areas that are not near OCS oil and gas activities, also benefit from the reduced risk of accidents involving tankers carrying imported oil that would be necessary to replace forgone OCS production, should there be no new program.

Similar to the developmental benefits, the immediate environmental risks of OCS oil and natural gas activities are borne primarily by producing regions and nearby onshore areas. Environmental threats include risks to the natural capital found in the OCS's renewable and non-renewable resources. Environmental damages could include impacts to marine productivity, quality of aesthetic resources, human-ecological connectivity, and air and water quality. The Draft EIS for

the Proposed Program describes in great detail the potential risks and impacts of oil and natural gas activity on the marine, coastal, and human environment.

Economic Impact, Employment, and Social Benefits near OCS Activities

As in previous 5-Year Programs, this analysis examines the distribution of developmental benefits among coastal regions³⁰ near program areas proposed for OCS lease sales. The coastal regions examined in this analysis are:

- Alaska;
- Other Pacific states;
- Alabama, Mississippi, Louisiana, and Texas;
- Florida; and
- Rest of the United States

The BOEM used its recently updated regional economic impact models, collectively called MAG-PLAN,³¹ to estimate the relative economic effects on each of these regions that might result under the Draft EIS alternatives. The MAG-PLAN estimates reflect the fact that OCS oil and gas activities have sizable economic effects outside the nearby coastal areas. Companies do business with suppliers throughout the country and the world, and offshore workers usually work shifts of 1 to 4 weeks, alternating with the same periods off duty, allowing them to commute long distances. The MAG-PLAN also estimates spending in rest of the world, but those estimates are not used in this analysis.

The analysis has determined that the Proposed Program would have its greatest economic effect in the states adjacent to, and near, the Central and Western GOM. The GOM coast would receive about two-thirds of the employment and personal income generated by activities anticipated to result from the Proposed Program. In addition, as required by GOMESA, the States of Alabama, Mississippi, Louisiana, and Texas that are adjacent to producing areas will receive a 37.5-percent share of lease revenues from selected areas in the Eastern and Central GOM planning areas through FY 2016, and from leases issued after 2006 throughout the GOM program areas thereafter, subject to a \$500 million per year cap through 2055 in the additional areas (see “OCS Impact Assistance and Revenue Sharing Benefits,” below), and as required by section 8(g) of the Act, a 27-percent share of all federal OCS revenues, including bonus bids, rentals, and royalties, from leases within three miles of state waters will be provided to the adjacent state.

According to MAG-PLAN Alaska, the state would receive about four percent of the expected economic benefits generated from the Proposed Program. The *per capita* share of these

³⁰ This analysis uses regional groupings that are very similar to the Petroleum Administrative Districts for Defense (PADD), which provide regional groupings of states that track closely with the four OCS “regions,” although all inland states are grouped together as the Rest of the U.S. While Florida is a GOM coast state, it is adjacent to both the GOM and Atlantic OCS regions and is the most distant of GOM states from OCS activities and the Proposed Program areas. Alaska is considered separately as it is adjacent to its own OCS region and is quite different from the other Pacific states in terms of energy production, population, and other characteristics.

³¹ Both MAG-PLAN Gulf of Mexico and MAG-PLAN Alaska are being updated under contract. Draft versions of the revised models were used for this analysis, so the estimates provided here may change for the Proposed Final Program analysis. However, changes should be minor and not change any conclusions.

developmental benefits is greater for Alaska with its smaller population than for the states along the GOM coast. Results from MAG-PLAN Alaska indicate that the state would get about three-fourths of the employment generated by activities on the Alaska OCS portion of the program. To the extent that Alaska continues to develop the means to supply the goods and services needed for offshore oil and natural gas activities, the state would be expected to increase its share of the developmental benefits flowing from the new 5-Year Program and subsequent programs resulting in Alaska OCS lease sales. While Alaska would benefit from its share of 8(g) revenues and from tax revenues from companies developing both onshore and offshore infrastructure, it also stands to gain indirect revenues. However, there is concern that production from existing state projects will decrease to the level that it would no longer be sufficient to maintain the TAPS. The vast majority of the state's revenue comes from the oil and gas industry and the loss of this key pipeline would cause devastating economic effects. According to a report by the University of Alaska's Institute for Social and Economic Research, the loss of TAPS could cut Alaska's economy and workforce to half its current size. New oil production from the Arctic OCS could extend the life of the pipeline system for decades, resulting in new revenue from OCS production as well as continued revenue from projects on state lands.

Florida is estimated to receive less than five percent of the expected economic benefits generated from the Proposed Program. Because no nearshore areas directly off the coast of Florida are proposed for leasing, it is not expected that much economic activity would occur in Florida. However, there are opportunities for Florida industries to benefit from supplying goods and services to the OCS industry operating in the Eastern GOM and the eastern portion of the Central GOM. Many such opportunities would require investments in related infrastructure.

Environmental and Social Risks

The environmental and social costs³² expected from leases issued in this program primarily impact the adjacent coastal regions for the GOM, the Arctic, and Cook Inlet. Just as the producing GOM states receive the majority of the benefits, not coincidentally; these states are expected to face the most environmental risks as well. In addition to bearing most of the environmental costs, the adjacent states bear the brunt of downturns in the oil and gas industry which can have significant social consequences. The State of Louisiana commented in several letters to BOEM since 2006 that the state has supported a great deal of OCS oil and natural gas activity that results in disproportionate impacts. These cumulative impacts have resulted in coastal wetland losses. The BOEM has addressed these impacts in the Draft EIS and has responded to Louisiana's request to study alternatives to OCS areawide leasing that might mitigate the boom and bust cycles of energy development. A summary of the detailed analysis of alternative approaches to areawide leasing that may serve to further the many goals of the Act can be found in the part III discussion on Fair Market Value in this document.

Some effects are mitigated by monetary compensation and other funding. For example, the Fishermen's Contingency Fund 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. A more visible and recent example occurred in the wake of

³² For a discussion of the *Offshore Environmental and Social Cost Model*, see part IV.C, Comparative Analysis of OCS Planning Areas.

the *Deepwater Horizon*, when BP agreed to provide \$20 billion to a fund that can be used for natural resource damages, state and local response costs, and individual and business claims compensation. In addition, fishermen and others were hired to contain oil offshore and clean beaches and wetlands. Many of these workers stayed in local hotels and made purchases at other establishments along the GOM coast. However, as in other such large-scale emergency situations, those incurring *Deepwater Horizon*-related losses were not always those receiving the “benefits” of this increased activity. Therefore, it is impossible to assure that the massive number of compensation payments—even if adequate in the aggregate—reach the right people and institutions in the right amounts

The results of BOEM’s analysis of the NAA show that without the 5-Year Program, greater social and environmental costs would be imposed on U.S. regions other than the GOM coast and Alaska. For example, the Atlantic Region and inland areas would be at risk from the effects of increased tanker traffic transporting crude oil imports and increased domestic onshore oil and natural gas production. Therefore, regions without OCS areas in this Proposed Program receive benefits because Alaska and the GOM region bear the environmental and social costs and risks from this program.

The Atlantic coast states other than Florida are not near areas proposed for leasing, nor are they near oil and natural gas activities in general. These states would not be expected to experience noticeable employment or other labor income as a result of the program, nor would they face increased environmental risk from the program. On the other hand, to the extent that tanker imports into Atlantic ports are reduced by OCS production in the GOM, much of which is sent by pipeline to other parts of the country, the Atlantic coast states would enjoy a reduction in the environmental risk of tanker spills and emissions.

Similarly, the West coast states would not be expected to experience noticeable employment or other labor income as a result of the program. However, given its own oil and natural gas infrastructure, Southern California could experience some additional employment and income. Changes in environmental risk from the program would depend upon the extent to which tankers carrying Alaska OCS oil or imported oil, in the absence of a new program, provide offsetting risks of spills and emissions. The risk of impacts from a tanker spill would, in turn, depend in part on the volume of oil carried by tankers.

Effects of Draft EIS Alternatives on Equitable Sharing

An analysis of the groups of program options labeled Alternatives 2 to 7 in the Draft EIS shows similar patterns of sharing of economic activities. Alternative 2, excluding the Eastern GOM program area from the proposal, would not have an appreciable effect on the equitable sharing of development benefits and environmental costs, precisely because the program area is so small and is not expected to result in much production. Alternatives 3 to 7 would affect this sharing in rough proportion to the production anticipated from each excluded program area. However, within the regions used for this analysis, the specific alternative would affect the local population, whether in terms of reduced benefits and risks (Alternatives 3 and 4--excluding the Western and Central GOM) or in terms of foregone benefits and risks avoided (Alternatives 5 to 7--excluding the Beaufort Sea, Chukchi Sea, and Cook Inlet, respectively).

Geographically Dispersed Social Benefits and Risks

An important portion of the employment, labor income, and other economic impact benefits are shared with the Rest of the United States that would receive approximately a quarter of the total economic impact. See discussion under Economic Impact, Employment, and Social Benefits near OCS Activities, above. Those whose jobs require them to be physically offshore usually work extended shifts of 1 to 4 weeks on duty followed by the same period off duty, allowing them to commute from hundreds, even thousands, of miles away. In addition, the offshore oil and gas industry purchases goods and services from a vast network of suppliers throughout the country.

There are, however, other financial aspects of both benefits and risks that are shared somewhat widely. Benefits flowing from OCS leasing and corporate income tax revenues are widely distributed among the geographic onshore regions of the United States. Many billions of dollars of federal revenue benefits are disbursed annually through General Fund appropriations for various national functions, as well as through the Historic Preservation Fund and the Land and Water Conservation Fund for a portion of OCS-specific revenues.

Financial rewards for profitable OCS oil and natural gas operations in the form of stock dividends and increased stock values are also broadly distributed, as owners live throughout the country. Any benefits of an improved balance of trade or decreased risk of supply disruptions that could result from actions by hostile governments or a variety of other causes are shared nationally as well.

The same rationale that holds for the sharing of profits from OCS oil and natural gas activity holds for unprofitable ventures. The financial consequences of OCS oil and natural gas investments such as financial losses due to unprofitable ventures are shared by companies and individuals throughout the Nation. Some of the financial consequences of environmental risks, e.g., compensation by responsible parties for natural resource damages, may also be shared by companies and individuals beyond the producing regions. Payments for remediation, restoration or lost profits are transfer payments that provide the entities impacted by an event compensation for damage or losses.

OCS Impact Assistance and Revenue Sharing Benefits

Additional benefits to communities proximate to OCS oil and natural gas activities come from programs that allocate OCS oil and natural gas revenues to those states and coastal political subdivisions near OCS oil and natural gas exploration and development. Currently three programs provide OCS revenues to the coastal producing states.

1. Section 8(g) revenue sharing provides coastal producing states with 27 percent of revenues from all leases within three miles of a state's submerged lands boundary.
2. The Coastal Impact Assistance Program (CIAP) authorized by Energy Policy Act of 2005 provides \$250 million per year for each of the fiscal years 2007 through 2010 to Alabama,

Alaska, California, Louisiana, Mississippi, Texas, and their coastal subdivisions for coastal restoration and protection. The CIAP grant disbursements from existing allocations are expected to be issued through the 2012-2017 program time period.

3. The GOMESA provides the States of Alabama, Mississippi, Louisiana, and Texas that are adjacent to producing areas, a 37.5 percent share of lease revenues from selected areas in the Eastern and Central GOM planning areas through 2016. Beginning in 2017, GOMESA shares additional lease revenues from the Central and Western GOM, limited to \$500 million annually. Revenues distributed under the provisions of GOMESA are intended to help compensate for potential negative impacts of OCS activities and are reserved for uses specified in the Act, including coastal restoration and protection.

While impact assistance and other such programs provide a share of federal revenues to states adjacent to or near OCS leases to help to mitigate environmental risk, the Secretary cannot expand, extend, or otherwise revise the provisions to further the equitable sharing of the developmental benefits and environmental risks. However, should Congress be concerned that existing benefits and impact assistance or revenue sharing provisions do not sufficiently compensate states for environmental risks posed by OCS activities; it would need to pass legislation to do so. Multiple congressional proposals have been offered but not enacted over the last few years that would expand OCS revenue sharing.

Summary and Conclusion

The general findings and conclusions of previous 5-Year Program equitable sharing analyses are still valid. Some benefits and risks of OCS leasing are shared widely while others are concentrated in regions adjacent to areas of OCS oil and natural gas activity. The exclusion of most of the Eastern GOM, as well as all planning areas in the Atlantic³³ and Pacific OCS regions from 5-Year Programs from 1992 to 2008 precluded adjacent states and communities from sharing in direct benefits and risks resulting from those programs. Since the distribution of benefits associated with factors of production is linked significantly to the location of OCS oil and natural gas support industries, which exist primarily along the GOM, Southern California, and Alaska coasts, the Secretary's Proposed Program decision on an OCS leasing schedule for the period 2012-2017 is not expected to alter substantially the distribution of benefits and risks achieved under previous 5-Year Programs. The Southern California planning area, which has been excluded from 5-Year Programs since 1992, no longer receives new direct benefits and risks. While the New England and Mid- and South Atlantic states account for more than 25 percent of the Nation's oil and natural gas consumption and for only a small percentage of its production, the Atlantic is the only one of the four OCS regions without any oil and natural gas activities.

Federal leasing revenues that traditionally accrue to adjacent onshore areas, including pursuant to 8(g), CIAP and GOMESA, help to compensate the producing regions for the costs and environmental risks of OCS oil and natural gas activities. Additionally, measures such as the

³³ While there was a small Mid-Atlantic program area in the 5-Year Program for 2007-2012, the Mid-Atlantic sale was cancelled pursuant to the pre-sale process.

implementation of new lease stipulations and operating regulations remain available to reduce the risks borne by the affected areas.

Given the executive withdrawal of the NAB, the GOMESA moratorium in most of the Eastern GOM and a small portion of the Central GOM within 100 miles of Florida, and the exclusion the Atlantic and Pacific OCS regions from leasing in this Proposed Program, the employment and revenues generated and shared by the program, and the additional effort to mitigate risks, are the best attempt at achieving an equitable sharing of benefits and risks among all OCS regions.

5. Other Uses of the OCS

Section 18(a)(2)(C) requires the Secretary to examine the location of areas considered for leasing with respect to other uses of the resources and space within those areas. Other uses of the OCS that could affect or be affected by oil and gas leasing and ensuing activities are described below.

The following types of uses are addressed:

- Subsistence Hunting and Fishing Activities;
- Commercial Fishing;
- EFH and Habitat Areas of Particular Concern [pursuant to section 303(a)(7) of the MSFCMA, as amended and implementing regulations];
- Other Areas of Special Concern (onshore and offshore areas designated for special uses and protections, such as parks and sanctuaries);
- Tourism and Recreation;
- Military Operating Areas (GOM);
- Liquefied Natural Gas (GOM); and
- Nonenergy Marine Mineral Activities (GOM)

The information presented below summarizes detailed regional descriptions of the environment that are included in the 5-Year Program Draft EIS. The discussion of options in part III of this document includes pertinent summaries including “other uses” comments. Comments that BOEM received are summarized in Appendix A.

Alaska Region

Subsistence: Subsistence activities have value to the culture, lifestyle, society, economy, and communities in northern Alaska. Subsistence activities in the Beaufort Sea marine and coastal areas focus on the bowhead whale, caribou, freshwater and ocean fish, ducks and geese, and bearded seals. Species hunted for subsistence in the Chukchi Sea area include bowhead whale, beluga whale, caribou, seal, walrus, polar bear, fish, duck, and goose. Bowhead whaling is the single most valued activity in the North Slope subsistence economy today. Widely varying subsistence patterns in the vicinity of Cook Inlet reflect the area's diverse population. Generally, the inhabitants of small traditional villages harvest saltwater and freshwater fish and small sea mammals in the summer and fall, moose in the fall, and invertebrates and some sea mammals year round. In the larger industrial communities, the people generally fish in the summer and hunt in the fall, and fewer households partake in subsistence activities.

Commercial Fishing: Commercial fishing, which occurred only infrequently and on a very small scale in the past, does not currently occur in the Arctic program areas. Therefore, published fish stock assessments and monitoring data do not exist for those areas. Commercial fishing is an important segment of the local economy of the Cook Inlet region, focusing mainly on salmon and to a lesser degree on crab, shrimp, and halibut.

EFH and Habitat Areas of Particular Concern: An EFH has been designated in all offshore Alaska areas that are proposed for leasing. Fishery Management Plans (FMP) in the Arctic exist for arctic cod, saffron cod, and snow crab. In the Beaufort Sea and Chukchi Sea areas, essential habitat has been established for all five salmon species. The Stefansson Sound Boulder Patch in the Beaufort Sea is a designated Habitat Area of Particular Concern (HAPC). Several HAPCs are located in the Cook Inlet. The FMPs in Cook Inlet cover the Gulf of Alaska groundfish, scallops, and salmon.

Other Areas of Special Concern: All of the areas proposed for leasing off Alaska are adjacent to coastal portions of national parks or NWRs. The Beaufort Sea program area is adjacent to the Arctic NWR (ANWR) and the Chukchi Sea program area is located off the Chukchi Sea Unit of the Alaska Maritime NWR. The Cook Inlet program area is near Lake Clark National Park and Preserve and the Katmai National Park and Preserve is located on the eastern shore of the Shelikof Strait, the southern portion of the program area.

Tourism and Recreation: In the Beaufort Sea and Chukchi Sea areas, recreation activities take place mainly in the summer and include fishing, boating, hunting, hiking, sightseeing, camping, and picnicking. Most nonresident activity is by tour groups that visit Barrow and Deadhorse where lodging is available. Hikers and river rafters also visit ANWR. The Cook Inlet area offers abundant high quality tourist and recreation resources that attract numerous state, national, and international visitors. Additional information relating to tourism and recreation in Alaska is available in the Draft EIS description of areas of special concern.

Military: Although there are military use areas within the Alaska Region, OCS oil and gas leasing and related activities are not expected to interfere with military operations.

Nonenergy Marine Mineral Activities: There is no current development of offshore nonenergy minerals in any of the Alaska OCS program areas under consideration for oil and gas leasing. There are sand and gravel deposits in the Beaufort Sea, but their value as a construction material is not known.

Gulf of Mexico Region

Commercial Fishing: The GOM fisheries are very important to the economies of adjacent coastal states. The GOM commercial fisheries include nearly 100 species from 33 families. Menhaden is the most important finfish harvested, followed by nine other species of significant value. Shrimp is the most important shellfish, along with various oyster, lobster, and crab species. Louisiana ranked first among GOM states in total commercial fisheries landed, followed by Mississippi, Texas, Florida's west coast, and Alabama.

EFH and Habitat Areas of Particular Concern: Approximately 33 percent of the species managed by the GOM Fisheries Management Council have been selected for EFH designation. They include invertebrate and reef fish species, red drum and other coastal pelagic species, and highly migratory species such as swordfish, tuna, and shark. Within the Central and Western GOM, several individual reefs and banks located offshore the Louisiana-Texas border have been designated HAPCs by the Council (NMFS 2010a; Table 3.7.4-3; Figure 3.7.2-1). The HAPCs in the Eastern GOM that could be affected by oil spills in the GOM include the Florida Middle Grounds, Madison-Swanson Marine Reserve, Pulley Ridge, and Tortugas North and South Ecological Reserve. The HAPC for bluefin tuna is located west of 86°W and seaward of the 100 m (328 ft) isobath, extending from the 100 m (328 ft) isobath to the Exclusive Economic Zone, the limit of U.S. jurisdiction (Atlantic Bluefin Tuna Status Review Team, 2011).

Other Areas of Special Concern: Special areas in the GOM include a national marine sanctuary, national park units, NWRs, a national estuarine research reserve, and national estuary program areas. The Flower Garden Banks National Marine Sanctuary covers a 124-square kilometer area located 177 miles offshore within the Western GOM. National park units along the GOM coast that are adjacent to areas considered for leasing include Jean Lafitte National Historic Park and Preserve in Louisiana, Padre Island National Seashore off Texas, and Gulf Islands National Seashore off Mississippi and Alabama. There are 28 NWRs located along the coast from Texas to Alabama. The Weeks Bay National Estuarine Research Reserve encompasses a small estuary in the vicinity of Mobile Bay adjacent to the Central GOM. National estuary program areas include the Galveston Bay and Corpus Christi Bay systems in Texas and the Barataria-Terrebonne Estuarine Complex and Lake Pontchartrain Basin in Louisiana.

Tourism and Recreation: The northern GOM coastal zone is one of the major recreational regions of the United States, particularly in connection with marine fishing and beach-related activities. The shorefronts along the GOM states offer a diversity of natural and developed landscapes and seascapes. The coastal beaches, barrier islands, estuarine bays and sounds, river deltas, and tidal marshes are extensively and intensively used for recreational activity by residents and tourists from throughout the Nation, as well as from foreign countries. Publicly owned and administered areas, such as national seashores, parks, beaches, and wildlife lands: as well as specially designated preservation areas, such as historic and natural sites and landmarks, wilderness areas, wildlife sanctuaries, and scenic rivers, attract residents and visitors throughout the year. Commercial and private recreational facilities and establishments, such as resorts, marinas, amusement parks, and ornamental gardens, also serve as primary interest areas and support services for people who seek enjoyment from the recreational resources associated with the GOM.

Military: The GOM is the most important over-water testing and training area in the United States, with areas designated for air-to-surface and air-to-missile testing, surface vessel testing, and training for air, surface, mine, and submarine operations. Areas used by the military include the Corpus Christi Operating Area off Texas for mine warfare and aircraft carrier landing training, New Orleans Operating Area off Louisiana for naval live firing maneuvers, and Pensacola Operating Area off Alabama and Florida for aircraft carrier landing training, naval

vessel shakedown testing, and live firing exercises. DOI and the Department of Defense coordinate activities and reduce use conflicts according to procedures established in a longstanding Memorandum of Agreement.

Liquefied Natural Gas (LNG): Natural gas is liquefied to concentrate a much greater volume of product in a given space to facilitate storage and transportation. In the GOM, LNG terminals have been planned, approved and built on the OCS. These facilities offload LNG from tankers into the existing offshore natural gas pipeline system. Currently, more than ten of these facilities are at the planning or permitting stages. The Gulf Gateway facility began operation 116 miles off the coast of Louisiana in 2005.

Nonenergy Marine Mineral Activities: Several minerals in the northcentral GOM have the potential to be developed. Two salt and sulfur operations exist on the OCS offshore Louisiana and other deposits are known to occur in the northcentral GOM. Sand deposits located in federal waters in the Ship Shoal area off Louisiana are being considered for use in restoring barrier islands to protect the state's coastal wetlands. Sands in federal and state waters off Mississippi and Alabama have the potential to be developed for glass production and for coastal restoration uses including beach replenishment.

D. Laws, Goals, and Policies of Affected States

The BOEM asked the governors of affected states to identify laws, goals, and policies of their states as relevant matters for consideration in the Proposed Program. No specific identification was provided for any of the program areas included in this Proposed Program.

E. Balancing Considerations under Section 18

Section 18(a)(3) of the Act requires the Secretary to “select the timing and location of leasing, to the maximum extent practicable, so as to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone.” Striking this balance based on a consideration of the principles and factors enumerated in section 18(a) is a matter of judgment for which no ready formula exists. Section 18 requires the consideration of a broad range of principles and factors rather than imposing an inflexible formula for making decisions. Thus, previous 5-Year Programs have scheduled as many as 37 lease sales in 22 planning areas and as few as 16 sales in 6 planning areas.

Some of the factors that section 18 specifies for consideration can be quantified, such as resource potential, and are embodied in the benefit-cost analysis that has been developed. Others are not as readily quantifiable and have therefore been described qualitatively. For example, environmental considerations such as aesthetics or concerns for certain species are extremely difficult to translate into accurate economic estimates. In order to provide the Secretary full and appropriate information for the Proposed Program decision, this document is supplemented by relevant NEPA documents and other analyses that present information relating to such environmental factors and other qualitative considerations. The information provided in these

separate documents and analyses, which is summarized in part II of this document, is incorporated by reference in this discussion.

As discussed in part I of this document, the 2009 DPP proposed sales in 12 of the 26 OCS planning areas, including the three Atlantic planning areas, two of the planning areas offshore California and the NAB, offshore Alaska, in addition to the six areas included in this Proposed Program. After the publication of the 2009 DPP, the Secretary re-engaged in the required section 18 analyses and decided to reduce the number of planning areas eventually included in the program from 12 to 6.

In deciding to reduce the number of planning areas included in the program, the Secretary performed the section 18(a)(3) balancing, informed by a consideration of the factors listed in section 18(a)(2). The factors listed in section 18(a)(2) were addressed in the 2009 DPP with respect to each of the 12 originally-proposed planning areas. The 2009 DPP's consideration of one of those factors, relative environmental sensitivity, section 18(a)(2)(G), was limited to shoreline areas, but this level of analysis was deemed insufficient by the U.S. Court of Appeals for the District of Columbia Circuit in *Center for Biological Diversity v. DOI*, 563 F.3d 466 (D.C. Cir. 2009). On remand in that case, the environmental sensitivity analysis was augmented to include an analysis of the entire OCS domain with respect to all 26 planning areas, including all 12 planning areas originally proposed for the 2012-2017 program. That augmented environmental sensitivity analysis was utilized in developing this program and is incorporated herein by reference.

Based on the incorporated consideration of the section 18(a)(2) factors, the Secretary then undertook the balancing required by section 18(a)(3). Section 18(a)(3) requires the balancing of the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone, and this balancing must take into account the factors enumerated in section 18(a)(2). As noted earlier, the Secretary applied the following guiding principles in conducting this balancing and selecting options for the size, timing, and location of areas proposed for leasing in this Proposed Program.

- Give priority leasing consideration to areas where the combination of previous experience; local, state, and national laws and policies; and expressions of industry interest indicate that potential leasing and development activities could be expected to proceed in an orderly manner;
- For areas with known estimated hydrocarbon resources, consider leasing if, from a national and regional perspective, anticipated benefits from development substantially outweigh estimated environmental risks;
- For areas with unknown or uncertain hydrocarbon resources, consider deferring if enhanced information is likely to become available that will allow for better decisionmaking in the next 5-Year Program;
- Seek to accommodate the recommendations of governors of coastal states and of state and local agencies;

- Time sales in frontier areas to make use of information from exploration on existing leases in order to 1) minimize impacts to the environment and coastal areas; 2) evaluate monitoring data; 3) better assess infrastructure needs; 4) enhance financial return in future lease sales; and 5) better define areas of greatest interest to industry;

As a result of applying these principles, the Proposed Program does not include 6 of the 12 areas included in the 2009 DPP—the three Atlantic planning areas, the two areas offshore California, and the NAB. The latter area was withdrawn from leasing consideration through June 30, 2017, by the President pursuant to section 12 of the Act and therefore is not available for inclusion in the 5-Year Program under section 18.

With respect to the Atlantic planning areas, in comments on the 2009 DPP, the States of Delaware and New Jersey, both adjacent to the North Atlantic planning area, voiced their opposition to oil and gas activities off their coasts and pointed to state policies and initiatives to move to renewable energy sources. Although the States of Virginia, South Carolina, and Georgia voiced support for leasing, the potential amount and location of oil and gas resources in the Mid- and South Atlantic planning areas are not yet known. Without such data and information, it is very difficult for the government to meet its statutory mandate to receive FMV for the Nation's oil and gas resources of the OCS. Accordingly, the Secretary is not including these two areas in this program. Instead, he is moving forward with an environmental analysis for potential seismic studies to support conventional and renewable energy planning in these areas and to inform future decisions regarding leasing in these areas.

With respect to California, in his comments on the 2009 DPP, the Governor of California reiterated that state's long-standing opposition by governors of both parties to new leasing off its coast. This position also is presented by the California Coastal Commission, the state agency with regulatory authority over federal activities on the OCS that affect the state's coastal resources pursuant to CZMA.

Because the GOM continues to be the region with the highest potential production on the OCS and has existing infrastructure and oversight capacity to limit potential environmental damage and adverse impacts on the coastal zone, the Secretary is including in the program the Western and portions of the Central and Eastern GOM that are not under congressional moratorium. In their comments on the DPP, both industry and the Gulf coast States of Texas, Louisiana, and Mississippi, reiterated their support for including GOM program areas for leasing consideration.

In the Arctic planning areas, the program takes a cautious approach by scheduling lease sales late in the program to allow for scientific and environmental studies, public meetings, and additional studies on oil spill response capabilities in the Arctic, as well as to allow time for activity performed pursuant to existing leases to generate information. The State of Alaska supported leasing activity in these areas in its comments on the 2009 DPP and such activity is consistent with state sales. There is strong industry interest in oil and gas activity based on known seismic data and existing production in the Beaufort Sea from the state/federal unit that is supported by existing infrastructure. While there is no existing production in the Chukchi Sea, hydrocarbons were discovered in the past but determined to be uneconomic to develop and produce at the time. Furthermore, industry interest was very evident in the historically high level of bidding in Chukchi Sea Sale 193. Of course, should it become evident that exploration and development

cannot occur in a way that does not harm the environment; the Secretary has the discretion to postpone or cancel a lease sale as appropriate to address these concerns.

In summary, after a thorough consideration of all the factors enumerated in section 18(a)(2), and a section 18(a)(3) balancing informed by this consideration, the Secretary has decided to include six planning areas, or parts thereof, in the program—the Western and Central GOM, part of the Eastern GOM, the Cook Inlet, and the Beaufort and Chukchi Seas.

Judicial Guidance

The U.S. Court of Appeals for the D.C. Circuit has elaborated in great detail on the statutory criteria for the balancing decision required by section 18(a)(3). Pertinent excerpts from the Court’s opinions stemming from litigation concerning previous 5-Year Programs are presented below.

The Court has stated the following concerning the weight to be accorded the three elements of section 18(a)(3).

That the Act has an objective—the expeditious development of OCS resources—persuades us to reject petitioners’ view that the three elements in section 18(a)(3) are “equally important” and that no factor is “inherently more important than another.” The environmental and coastal zone considerations are undoubtedly important, but the Act does not require they receive a weight equal to that of potential oil and gas discovery. A balancing of factors is not the same as treating all factors equally. The obligation instead is to look at all factors and then balance the results. The Act does not mandate any particular balance, but vests the Secretary with discretion to weigh the elements so as to “best meet national energy needs.” The weight of these elements may well shift with changes in technology, in environment, and in the Nation’s energy needs, meaning that the proper balance for 1980-1985 may differ from the proper balance for some subsequent five-year period. (*California I*, 668 F2d at 1317)

The following three statements of the Court pertain to the analysis of the section 18 factors and the Secretary’s discretion in weighing the results of that analysis:

(1) The Act recognized the difficult burden the Secretary must shoulder by stating that the selection of timing and location of leasing must strike the proper balance “to the maximum extent practicable.” The Secretary must evaluate oil and gas potential, which can be quantified in monetary terms, in conjunction with environmental and social costs, which do not always lend themselves to direct measurement. Because of this, they must be considered in qualitative as well as quantitative terms.

Although the secretarial discretion we have described is broad, as a result of both the general wording of the statute and the nature of the task the Secretary is asked to perform, the Secretary’s discretion is not unreviewable. The policies and

purposes of the Act provide standards by which we may determine whether the Secretary's decision was arbitrary, irrational, or contrary to the requirements of the Act. To do so, we consider "whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment." (*California I*, 668 F2d at 1317)

(2) In deciding whether to include an area, the Secretary weighed qualitative factors as well as quantitative factors. The Secretary listed among qualitative factors "national security, industry interest, and equitable sharing of development costs and benefits." The OCSLA specifically directs the Secretary to weigh such qualitative factors in his balance.

Taking qualitative factors into account implies that the inclusion of areas with a calculated NSV of zero may nonetheless be compatible with section 18(a)(3). (*NRDC*, 865 F2d at 307)

(3) The Secretary must make a good-faith effort to balance environmental and economic interests. So long as he proceeds reasonably, however, his decisions warrant our respect. (*NRDC*, 865 F2d at 308-309)

Other Considerations

Other relevant considerations that have implications for balancing environmental and socioeconomic issues and concerns with potential benefits of OCS activity are discussed in this document, the Draft EIS prepared for the 5-Year Program for 2012-2017, and in other referenced documents. Such considerations are summarized below.

Findings and Purposes of the OCS Lands Act. Title I of the Act Amendments of 1978 sets forth a number of findings and purposes with respect to managing OCS resources. Those principles generally pertain to recognizing national energy needs and related circumstances and addressing them by developing OCS oil and natural gas resources in a safe and efficient manner that provides for environmental protection; fair and equitable returns to the public; state and local participation in policy and planning decisions; and resolution of conflicts related to other ocean and coastal resources and uses.

Industry Interest. Interest, as indicated in the comments responding to the 2009 DPP, is summarized above. Industry interest is a key criterion for deciding whether to propose an area for a lease sale. However, it is not the sole and absolute indicator of the potential of an area to contribute oil and natural gas resources for regional and national use. Therefore, as with all of the balancing information discussed in this part, industry interest should be weighed with other considerations in deciding where and when to propose OCS leasing. The presentation of size, timing, and location options in part III of this document includes discussions of industry interest along with other significant considerations. Summaries of all industry comments are provided in Appendix A.

Information Incorporated by Reference. Documents pertaining to geographical, geological, and ecological characteristics, to local and national energy markets and needs, and to environmental and predictive information, as cited in part II of this document, are incorporated by reference.

Issues Raised in Comments. Comments received in response to the 2009 DPP are summarized in Appendix A. Those that correspond more specifically to program options are summarized in part III of this document.

Conclusions

The OCS holds vast potential for discovery and production of oil and natural gas, as outlined in previous sections above. In frontier areas such as the Arctic, further exploration would assist in the evaluation of the extent of natural gas and oil resources. In designing the Proposed Program, BOEM has relied on the best available environmental and hydrocarbon resource assessment information. The potential for environmental damage and the potential effects on the coastal zone of the respective areas considered for leasing are analyzed in the Draft EIS for the 2007-2012 program (November 2011), which has been incorporated by reference. The potential for safe and environmentally sound resource development and the extent of the Nation's energy needs outweigh the risk and likelihood of significant environmental damage, particularly when considering the consequences of certain energy substitutes³⁴ to a regular and dependable leasing program on the OCS. At the same time, the Proposed Program seeks to accommodate the recommendations of state and local governments and the policies of affected jurisdictions. All of these factors are reflected in the size, timing, and location of lease sales in the Proposed Program.

F. Assurance of Fair Market Value

The Act grants the Secretary the authority to issue leases on the OCS. Section 18(a)(4) of the Act states that “[L]easing 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 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.”

The FMV determination, made at the time of lease award, is not based on the value of the oil and natural gas eventually discovered or produced. Instead it is related to the value of the right to explore for and, if there is a discovery, to develop and produce hydrocarbons. This value is therefore based on the expected, not actual, activities and results that are anticipated to occur after the sale. Moreover, this value depends upon the conditions imposed on lessees by BOEM, such as diligence and drilling requirements, which may restrict lessee flexibility in attaining certain timing milestones and hence have a negative effect on expected or actual tract value.

³⁴ Among these are increases in imported oil, onshore oil and natural gas production, and coal used to generate electricity. See analysis of Net Environmental and Social Costs.

There are several major elements in designing OCS auctions such as lease sale timing, bidding systems, and sale terms and conditions for assuring that OCS leases are not awarded prematurely or for less than FMV. This section discusses important considerations used to evaluate options under these elements and includes an overview of the post-sale OCS bid adequacy process. Part III.B of this document discusses in greater detail the pre- and post-sale measures taken to assure the receipt of FMV for OCS leases as required by section 18(a)(4) of the Act.

The 5-Year Program includes general provisions for assuring the receipt of FMV. Those provisions include determining on a sale-by-sale basis whether or not to hold a sale, the leasing framework, the sale terms, and the bid adequacy procedures for the post-sale assessment of blocks receiving bids. Additionally, BOEM and BSEE enforcement of laws, regulations, and lease terms assure conservation of resources through diligent development of leases.

Optimal Timing

Part III.B of this document on Fair Market Value Options includes the approach BOEM will employ at the lease sale stage to determine whether or not the timing is favorable to hold a program area lease sale. This approach will help ensure that FMV is received by postponing leasing in areas where there may be greater value in waiting. If the analysis shows that timing may not be ripe, BOEM will evaluate alternatives including sale cancellation.

Leasing Framework

As discussed in part III.B, based on reviews of the results of the AWL Study, BOEM plans to continue using areawide leasing but will periodically evaluate fiscal terms to ensure the set of terms selected furthers the goals of the Act, with emphasis on timely leasing and drilling, meeting the Nation's energy needs through efficient resource recovery, and obtaining FMV for the sale of lease rights for drilling and extraction. The BOEM will continue to review actual sale results including tracts sold, bonuses offered, number of bids on the offered tracts, and the extent of company competition to determine if changes are needed in the composition and size of the lease sale to better provide for FMV and to make any changes to the leasing framework that would be beneficial to the program and the public.

Sale Terms

One of the key components in the government's receipt of FMV for OCS resources is the setting of the fiscal terms and length-of-lease terms for each sale, as described in part III.B of this document. Before each sale, BOEM evaluates these terms and considers whether to incrementally adjust them based on emerging market conditions, competition, and the prospective nature of available OCS acreage. For example, the royalty rate has been raised twice for GOM leases in recent years to capture a greater portion of revenue as oil and gas prices have risen substantially above levels that prevailed for virtually all previous years. Escalating rentals have been implemented recently for leases in GOM and Alaska for the Beaufort and Chukchi Seas to encourage timely exploration and development or earlier relinquishment. The length of the initial lease term for GOM leases recently has been changed in water depths of 400 to 1,600

meters to reflect the shorter time deemed necessary to explore for economic prospects. Most recently, the minimum bid was proposed to increase in the deepwater GOM to account for increases in oil prices and to encourage optimal timing of leasing for those blocks.

Following sales, the bidding is analyzed to determine whether or not the changes have impeded competition for leases and to see if additional changes or adjustments are necessary. Periodic evaluation of sale terms allows BOEM the opportunity to adjust them if market conditions warrant a change. The practice of making incremental adjustments allows BOEM to evaluate the results of a lease sale held with new sale terms and 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.

Block Evaluation and Bid Adequacy

The 5-Year Program includes a two-phase post-sale evaluation process for determining bid adequacy, as discussed in part III.B of this document. The current form of the bid evaluation procedures was instituted in 1983 in conjunction with the implementation of the AWL policy, but is dynamic and has 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). Since then, minor changes have been made to the bid adequacy process such as adjusting the water depth categories used in the analysis. The BOEM continues to look for opportunities to improve the process and has supported a major refinement in the tract evaluation model used in bid adequacy that is well underway. Moreover, in implementing the new 5-Year Program, there may be revisions made to the OCS bid adequacy procedures or their underlying components such as the tract evaluation model to incorporate knowledge gained from experience using the procedures, or to accommodate structural changes to the leasing process or sale terms.

The BOEM reviews all high bids received to help ensure that those accepted will represent FMV for the lease block. If a high bonus bid does not satisfy any of the required bid adequacy conditions, the bid is rejected. If a block is rejected, it may be re-offered at the next scheduled lease sale in that area. From 2005 to 2008, more than half of the tracts with bids rejected through bid adequacy received acceptable high bids when re-offered in a subsequent sale. Moreover, rejection of a high bid under the existing BOEM bid adequacy procedures has consistently resulted in significantly higher bids in subsequent sales for the same blocks, even when those blocks that did not receive subsequent bids are included in the calculation.

In GOM since 1984, BOEM has rejected total high bids of \$597 million on blocks that were re-offered and drew 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 exceed the government's reservation price. When bids exceed the reservation price, the government is confident it is receiving FMV.

Look-back studies show that the majority of OCS leases with economic hydrocarbon discoveries were assigned a positive value at the time of sale. However, BOEM has issued leases on blocks with subsequent material discoveries where the bid evaluation's value was not positive at the time of the sale and the lease was awarded for close to the minimum bid. 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 hydrocarbon accumulation target did not coincide with that of the lessee company. In those cases where new information became available after the lease is 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 identify a well that has been drilled to a target that is not coincident with the target that was sometimes evaluated pre-sale.

Conclusion

The 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. As presented in part III.B of this document, changes to sale terms, including the fiscal terms, bidding systems, and FMV procedures, are considered on a sale-by-sale basis to ensure new information is included and FMV is received. If BOEM changes the sale terms, bidding system, or bid adequacy procedures, any such changes are announced to the public and industry through the proposed notice of sale or other notification in the *Federal Register*, typically prior to the final notice of sale.

This appendix is part of a document prepared by the Bureau of Ocean Energy Management (BOEM) of the Department of the Interior. With the exception of publications whose title includes the agency name or as otherwise noted, all references in the document to BOEM include its predecessor agencies, the Bureau of Ocean Energy Management, Regulation and Enforcement and the Minerals Management Service.

Appendix A

Summary of Comments to January 21, 2009, *Federal Register* Notice Concerning Draft Proposed 5-Year OCS Oil and Gas Leasing Program for 2010-2015 and March 4, 2009, *Federal Register* Notice Concerning Extension of the Comment Period by 180 Days

Introduction

Section 18 of the Act, 43 U.S.C. 1344, requires the Department of the Interior (DOI) to prepare a 5-year OCS oil and gas leasing program. As an intermediate step in the preparation of the 5-Year Program for 2012-2017, the BOEM issued a *Federal Register* Notice (and a subsequent notice extending the comment period) soliciting comments on the Draft Proposed Program (DPP) for 2010-2015. This appendix is a summary of comments received in response to that Notice and includes comments received at and as a result of the four public meetings that the Secretary held in April 2009. Due to the high number of responses, not every comment is presented individually. Submittals have been condensed to express summaries of all of the ideas received by the BOEM by responder category. Responder Categories are listed below along with the number of comments received in that Category. A Summary of Comments compiled by Category follows.

Number of Comments by Category

Governors, State Elected Officials, and State Agencies	77
Local Governments, Tribes and Alaska Native Corporations	61
Members of Congress and Federal Agencies	29
Environmental and Other Related Interest Organizations	102
Oil and Gas Companies and Associations	24
Non-Energy Industry Businesses, Associations and Groups	110
General Public	541,776
Total	542,179

Summary of Comments

Governors, State Elected Officials, and State Agencies

The Alabama State Land Director supports domestic oil and gas.

An Alabama State Senator supports leasing in additional areas for stronger energy market.

The Alaska Governor strongly supported OCS activity off Alaska as vital to Alaska and Nation's economy and national security and supported revenue sharing with states.

Seven Alaska State Senators and two State Representatives supported OCS leasing for Alaska and national benefits. Federal production could help with the lessening of throughput in Trans-Alaska Pipeline. Industry needs to be held to stringent environmental standards and states deserve a share of the revenues.

The California Governor and Lieutenant Governor continue to oppose any new OCS leasing. They want to work with the Federal government on potential for renewables as part of West Coast Governors Agreement.

The California Coastal Commission urges removal of any areas off California. They question inclusion of areas without infrastructure onshore for processing.

The California State Lands Commission opposes the DPP and supports move to wind and wave in federal waters.

21 Colorado State Assembly Members strongly support offshore oil and gas leasing and renewables to create jobs, stabilize gas prices and sustain a more competitive economy.

The Delaware Dept of Natural Resources states that the state seeks to be a leader in energy efficiency and alternatives and believe oil and gas activities would hinder multi-state efforts for clean energy and could exacerbate climate change.

Six Florida State Representatives support access to resources in all areas including offshore Florida and most support revenue sharing.

The Indiana Lieutenant Governor supports DPP as state is dependent on natural gas. He states that access to all OCS areas should be a priority for provide energy, jobs, boost to the economy and there can be safe and environmentally sound development. States with production off their shores should have revenue sharing.

The Louisiana Governor supports expanded OCS leasing for the nation and to reduce pressure on Louisiana and supports greater revenue sharing.

Representatives of the Governors of Maine, New York, and Massachusetts as well as 74 Massachusetts General Assembly and the Massachusetts General Court strongly support renewables. Massachusetts wants Cape Wind.

The Maryland Governor opposes oil and gas activities in DPP timeframe but will reconsider in next planning cycle if there is a critical need for Atlantic resources, additional data on ecological value of such resources, and if activities can occur without adverse impact to submarine canyons, and revenue sharing with Atlantic states.

A Maryland State Representative supports the DPP and renewable energy projects

Six Michigan State legislature members support the 5-Year Program to stabilize consumer costs, strengthen economy and increase energy security. They say it is imperative to develop offshore resources including renewables.

The Mississippi Governor strongly supports expanded leasing and supports efforts to provide states and localities with their fair share of revenues

The Nebraska Governor supports DPP as there is a need to reduce dependence on foreign sources of energy and create jobs domestically.

The New Jersey Governor expressed strong, long-standing opposition to oil and gas development off the Atlantic Coast. The state is studying the natural resources within 20 miles of the coast that preliminarily shows the need to protect that area from oil and gas activities. He is concerned about potential oil spills and impacts to fishing and tourism. The Governor supports renewables and energy efficiency.

The New Jersey General Assembly passed a resolution opposing offshore drilling and encouraging use of renewables.

The North Carolina Governor supports development of range of domestic energy resources, but feels it is imperative that states have ultimate say in development off their coasts and share in revenues. The Governor has created a Governor's Scientific Advisory Panel on Offshore Energy to evaluate all potential offshore energy resources, including technical feasibility, benefits and concerns, and thorough inventory of regulatory issues. He says that they need more specificity on locations to comment and avoid making premature decisions.

North Carolina Department of Environmental and Natural Resources is concerned about potential consequences of oil and gas activity, but feels there needs to be more information to make an informed decision. The state is modifying its rules to make wind development more feasible.

North Carolina State Senators and Representatives support including an option for oil and gas development off North Carolina. They need more information and say they must have revenue-sharing and a minimum 20-mile buffer.

Two Ohio State Senators expressed support for the DPP in order to open new areas to the benefit of Ohio and the Nation by providing for sustainable energy policy and new jobs.

The Oregon Governor supported West Coast Governors Agreement on Oceans that emphasizes renewables. The state is very active in wave energy research.

The Rhode Island Governor opposed oil and gas and supported renewables. He said Rhode Island has more wind resources than oil and gas resources.

The South Carolina Governor supports the DPP on the assumption that offshore South Carolina has natural gas. They would be opposed to oil development and asks for a 35-mile buffer.

South Carolina State Senate and House leaders and 25 Senators and Representatives support the DPP for energy, economic, and national security. They stated that the General Assembly's Natural Gas Feasibility Study encourages offshore production as part of diverse portfolio of energy options.

The Texas Governor supports expanded leasing. He says the United States needs to diversify from hurricane-vulnerable Gulf. He supports revenue sharing with states and localities.

The Virginia Governor reiterates Commonwealth law in support of federal efforts to determine natural gas resources 50 miles off the coast. They do not support oil development. He says Virginia needs to know more to make decisions therefore requests Sale 220 be delayed.

Virginia Department of Environmental Quality reiterated the Commonwealth of Virginia Energy Policy as did the Governor. Most of their comments were on scoping for the EIS.

Virginia State Senate and House leaders and 5 State Senators strongly support the DPP and say that Sale 220 should not be delayed.

A Washington State Senator supports development of domestic oil and gas in all 31 sales. Failure to develop domestic resources will continue energy market instability.

Local Governments, Tribes, and Alaska Native Corporations

Baldwin County, Alabama, supports the 2010-2015 DPP for oil and gas in addition to renewable, nuclear, and coal as a balanced strategy to meet our Nation's energy needs.

City of Monroeville, Alabama, supports 2010-2015 DPP which proposes 31 sales in 12 OCS planning areas. It requests BOEM to open all proposed areas of the OCS to responsible oil and natural gas production with no restrictions such as arbitrary buffer zones

Aleutians East Borough, Belkofski Tribal Council, King Cove Corporation, Pauloff Harbor Tribe, Aleutian Pribilof Island Community Development Association, Aleutians West Coastal Resource Service Area, Bristol Bay Borough, Nelson Lagoon Tribal Council, Nelson Lagoon Corporation, Lake and Peninsula Borough, City of Sand Point, Unga Tribal Council, City of False Pass, Isanotski Corporation, and Shumagin Corporation, Alaska, supported North Aleutian Basin sale(s) provided fisheries are protected, exploration and development is done in an environmentally safe manner, stipulations allow employment and business opportunities to local residents, and revenue sharing be made available. They reserve the right to withdraw support if these requirements in this resolution are not met.

The Municipality of Anchorage, Alaska strongly supports new oil and gas leasing, exploration, development and production in the OCS including in the Chukchi and Beaufort Seas. Support is

based on the industry's safety record, the state's need for economic development, and revenue sharing for the state.

City of North Pole, Alaska, encourages Beaufort and Chukchi Sea lease sales move forward as proposed. The state and city would benefit from economic activity generated from seismic work, drilling, construction jobs, and royalties collected.

City of Akutan, Alaska, supports option #1 in DPP for North Aleutian Basin (NAB), subject to mitigation measures proposed by the Aleutian East Borough. It reserves the right to withdraw support if BOEM does not include these mitigation measures and if the baseline study is not completed.

Bristol Bay Native Corporation, Alaska, supports option #1 of the 2010-2015 DPP with North Aleutian Basin sales in 2011 and 2014 provided this schedule allows adequate time for the additional studies and outreach to communities prior to the sales. They will withhold final endorsement of any study until they feel certain that fishing, subsistence, and environmental priorities are well protected. Mitigation measures should provide adequate protection without overly restricting industry operations. Carefully planned oil and gas exploration and development in conjunction with increased use of renewable resources are the key to reducing dependence on foreign sources of energy.

The Affiliated Tribes of Northwest Indians, Alaska (Regional Organization), is concerned that insufficient study has been done on migrating salmon and other fish that impact distant areas. Actions thousands of miles away may impact a member tribe. They request that the Secretary enters into a cooperative agreement their organization and other tribes and initiate government-to-government consultation with tribes pursuant to the mandates of DOI. Prior to leasing oil or gas or alternative energy, they request that BOEM initiate formal consultation with any tribe in the vicinity of the lease and request to be treated as a "state" regarding revenue sharing.

Klawock Cooperative Association, Tribe, Native Village of Koyuk, Kongiganak Traditional Council, Nulato Tribal Council, Native Village of Kipnuk, and Native Village of Hooper Bay, Alaska local officials are opposed and cited the threat to subsistence lifestyle and/or commercial fishing. They request a halt to all future lease sales in Cook Inlet and Chukchi, Beaufort, and Bering Seas; and cancellation of leases in Chukchi Sea Sale 193. They request no oil and gas or seismic activity in Arctic Ocean until a comprehensive study is done; request that DOI does not approve Shell's exploration plan in 2010; and request permanent protection of the Arctic Ocean, Bering Sea/NAB, and Cook Inlet. They are concerned with global warming.

Curyung Tribal Council and Nunamta Aulukestai, Alaska, oppose NAB Sale 214 and requests DOI permanently remove Bristol Bay and NAB from leasing to preserve their subsistence culture. They were concerned about fish and wildlife impacts from seismic testing, discharge of contaminants into marine waters, infrastructure construction, and oil spills.

City of Dillingham, Alaska, requests that DOI remove Bristol Bay/NAB from the current 2007-2012 OCS Program and not include this area in the 2010-2015 Program due to potential harm to

fish and wildlife through impacts from seismic testing, discharge of contaminants, faulty transportation, or major spills which have a near certain chance of occurring.

North Slope Borough, Alaska, requested meeting in Barrow. They disagreed that issuing an "out-of-cycle" program would "jumpstart" planning and expand current Administration's options and requested new 5-Year planning process be halted. They state the need for a comprehensive inventory of offshore resources and suggest that comprehensive baseline data is lacking.

Native Village of Point Hope, Alaska, opposes and requested more time. The current 5-Year Program and new DPP fail to adequately consider environmental justice implications. The village requests that DOI delay the DPP process until nation-to-nation consultations on DPP can occur. They are concerned that Arctic waters are sacrifice areas for hydrocarbon resource development, and the DPP is out of step with good scientific, economic, ecological, and social policy.

Inupiat Community of the Arctic Slope, Alaska, drafted a Resolution supporting a moratorium on oil and gas leasing, exploration, and development activities in the Beaufort and Chukchi Seas. They are concerned about risk of oil spills, claim that the federal government lacks sufficient baseline information for Beaufort and Chukchi Sea ecosystems, and state that offshore leasing plans threaten the survival of the Inupiat culture and long-term health of the Arctic Ocean. They stated that BOEM rushed into industrial development without a sound basis in science, and over the objections of the local community.

Northwest Arctic Borough, Alaska, opposes offshore leasing and development on the OCS due to lack of comprehensive plan to protect the melting Arctic, lack of technology to clean up oil spills, search and rescue capabilities are under capacity, no comprehensive energy plan for the Nation and the Arctic, and that indigenous peoples' concerns are ignored.

Emmonak Tribal Council, Alaska, requests that Bristol Bay and NAB be permanently removed from leasing due to the area's ecological, economic, and cultural importance. They cite potential harm to salmon and other fisheries which would end their subsistence lifestyle. They believe that risks of offshore drilling to annual returns of living marine resources far outweigh any short-term benefits from oil and gas. Since climate change is affecting the region, they support renewable energy that will help to create jobs and lower the high cost of energy.

Organized Village of Kwethluk, Kwethluk I.R.A. Council, Alaska, requests that Alaska's shoreline be free from offshore drilling, specifically in the Bristol Bay region. Further drilling would further jeopardize wildlife habitat that were affected from the 1989 Exxon Valdez oil spill.

County of Ventura County Transportation Department, California, generally concurs with DPP. The County Air Pollution Control District requests the air quality assessment consider emissions from all project-related motor vehicles, ocean going vessels and construction equipment. The County Planning and Regulatory Division requests the environmental impact statement (EIS) to include discussion of onshore infrastructure, proposed and existing that will support project.

City of Fort Bragg, Fort Bragg City Council, City of Goleta, City of Santa Cruz, County of Santa Cruz, County of Sonoma, County of Mendocino, County of Humboldt, County of San Luis Obispo, City of Watsonville, City of Capitola, San Diego County, Santa Barbara County, and Shelter Cove, California, oppose oil and gas leasing due to various issues: scenic beauty, threat to tourism and fishing, and potential impact of an oil spill; amount of resources do not justify leasing--likely uneconomic; there are current leases not developed. They request their coast be withdrawn from new leasing consideration and oppose lifting of moratorium on California OCS due to proximity of Monterey Bay National Marine Sanctuary, as well as serious risk of toxic spills, and potential devastating effects on marine wildlife such as sea otters, sea birds, whales and other threatened and endangered species.

Town of Duck, North Carolina, opposes any exploration for gas or oil on the OCS off the coast of North Carolina or Virginia due to tourism income and jobs. There is no proof that OCS gas or oil exploration can be done safely and without harming the environment.

Dare County, North Carolina, opposes any exploration for gas or oil on the OCS off the coast of North Carolina or Virginia with no evidence uncovered to demonstrate any benefits. There is no proof that OCS gas or oil exploration can be done safely and without harming the environment. It supports non-fuel alternatives for energy production and measures to promote energy conservation and urges reinstatement of long-term moratoria.

Members of Congress and Federal Agencies

98 Representatives support the DPP as part of "all of the above" energy approach. There is a need for creating new jobs, lower energy costs for middle-class families and small businesses, reducing dependence on foreign oil. The DPP is appropriate and provides maximum flexibility. They cite the Chukchi Sea as having as much potential as the Gulf of Mexico (GOM) already has produced.

70 Representatives urged the President to leave newly available areas open for access to create jobs and increase government revenues.

67 Representatives urge swift and decisive action to implement science-based precautionary management for federal portions of the Beaufort and Chukchi Seas as well as the Arctic Refuge and the National Petroleum Refuge--Alaska. They recommend establishing an inter-agency task force to develop a comprehensive conservation and energy plan for the Alaska Arctic. Pending completion of the comprehensive plan, the government should take a precautionary approach to managing the Arctic by suspending the expansion of industrial activity including offshore oil and gas activity, exploration and development, additional shipping, commercial fishing, and mining.

36 Senators support DPP and renewables so Nation can produce its own energy to bolster the economy, create jobs, and decrease dependence on foreign sources.

34 Senators support the DPP for the following reasons: Energy prices need to be low for consumers and businesses; and failure to utilize domestic energy resources leaves America dependent on foreign oil and threatens energy, economic and national security. The Nation can

balance production and protection of the environment. There is a need for revenue sharing with producing states to be fair to these states.

16 Representatives expressed strong support for the DPP as a step toward a better and more secure energy future that utilizes all resources. They support efforts to develop renewable sources, but stated that natural gas and petroleum will remain a large part of the energy landscape for decades.

Alaska Congressional Delegation is supportive of offshore oil and gas. One Senator had concerns about impacts on subsistence practices on the North Slope and salmon fishing in Bristol Bay.

16 California Representatives all oppose drilling in Northern California Planning Area. Some oppose activity in all areas. They are concerned about key marine ecosystems and protection of endangered species from oil spills.

A California Congressman supports commonsense energy policy that includes conventional and renewable sources and suggests sensible buffer zones. States should have rights from 25-50 miles offshore, revenue sharing, and strict environmental protections

A California Congressman opposes the DPP as development anywhere in the OCS it would add so little and take so long. HeE is particularly concerned about Northern California coast. Future should be clean renewable energy.

Two Florida Representatives support the compromise reached in the GOM Energy Security Act of 2006 and oppose opening any new areas under moratoria. Particular concern was expressed about impacts on military operation and readiness.

Georgia Congressional Delegation supports offshore drilling for energy independence, national security, and economic well-being. Exploration is consistent with economic growth and environmental protection.

Two Louisiana Senators and 7 Representatives support OCS development to create jobs. It is safer to produce oil and gas domestically than import. Some expressed opposition to new taxes on producers and support expanded revenue-sharing with states.

A Louisiana Senator supports DPP and development of offshore renewables to produce domestic energy, bolster economy, create jobs, and decrease dependence on foreign sources.

A Maine Senator supports wind and tidal projects off Maine. If there is oil and gas activity, there should be revenue sharing with states and locals and suggests a buffer around Georges Bank for oil and gas activity.

11 Massachusetts Representatives oppose inclusion of North Atlantic Planning Area as oil and gas would threaten fishing and tourism, with particular concern about Georges Bank. Interior should encourage diligence on non-producing existing leases.

A New Jersey Senator and 14 representatives oppose oil and gas development off the Atlantic Coast, want Sale 220 delayed or removed, and support renewables. They were concerned about potential oil spills and impacts to fishing and tourism.

A New Jersey Congressman supports DPP to open new areas including off the state and supports revenue sharing.

A South Carolina Congressman supports opening OCS areas, particularly off eastern states like South Carolina and suggests a buffer to preserve coastal areas.

A Texas Congressman supports DPP and renewables to provide jobs and produce domestic energy.

A Utah Congressman and former Pennsylvania Congressman expressed support for oil and gas development and noted support for renewable energy, but not as an only source. They also cited energy security and dependence on foreign oil, jobs, tax revenue, need for affordable energy, and good environmental and safety record.

Five Virginia Representatives support offshore oil and gas development off Virginia's coastline and support sale 220. They say 79 percent of Virginians support OCS offshore Virginia and cite a state study that the economic benefits will result in \$7.84 billion in capital investment, \$644 million in new jobs, and \$271 million in state and local taxes over 10 year period.

Four Virginia Representatives requested that DOI abstain from any work on a Mid-Atlantic sale until the remand analysis (for the 2007-2012 program) is completed to meet the specifics of the Court's opinion as well as to apply a common sense re-analysis of the leasing program.

Two Virginia Representatives opposed drilling offshore Virginia and asked that Sale 220 be cancelled. They cited the armed forces and National Aeronautical and Space Administration's (NASA) extensive and exclusive use of some of the area. They appreciate the use of the ocean to generate renewable energy.

Department of Defense (DOD) informed DOI that they have developed four categories of potential compatibility between DOD operations in the OCS planning areas and OCS oil and gas activities: (1) Unrestricted, (2) Site Specific Stipulations, (3) No permanent oil and gas surface structures, and (4) Incompatible. There are five planning areas where there are potential incompatibilities and request additional information regarding compatibility of alternative energy initiatives. In mid-September, 2009, DOD met with BOEM staff to present OCS maps depicting these areas.

Department of Transportation Pipeline and Hazardous Materials Safety Administration submitted a "No Comments" letter.

Marine Mammal Commission recommends establishing buffer zones prohibiting oil and gas production on and around sensitive areas and requests that BOEM review the inventory of

marine protected areas on the Department of Commerce's website. The BOEM should work with the Department of Energy (DOE) to integrate its new 5-Year Program into a long-term energy conservation plan which includes: projection of the country's long-term energy needs based on expected population growth and economic expansion; description of existing and potential sources and development trends; alternative approaches to meet projected needs and potential impacts associated with those alternatives; a large-scale program aimed at reducing per-capita energy demand achieving greater efficiency, developing alternative sources, and reducing greenhouse gas production; and develop standards for information to be obtained prior to initiation of new energy-related operations.

The NASA requests that any oil and natural gas lease sales specifically prohibit areas off the Virginia and North Carolina coasts that would interfere with NASA's Wallops Flight Facility, national defense, or MARS's (a Virginia and Maryland sponsored commercial spaceport) current and future activities. They refer to a similar prohibition for oil and gas leases on the east coast of Florida in areas adjacent to the Kennedy Space Center and Cape Canaveral Range mandated by congressional intent. Specifically, NASA requests that the sector from 90 degrees to 180 degrees from Wallops Island be excluded from consideration for any offshore oil and gas leases.

Environmental and Other Related Interest Organizations

Alaska Center for the Environment, Alaska Community Action on Toxics and 12 other groups requested that DOI forbid and vacate Chukchi Sea, Beaufort Sea, and Bering Sea leases. Industrial noise and potential oil spills would have a significant impact on endangered species. There is also a lack of Alaska scientific baseline information.

Alaska Marine Conservation Council and seven other groups advocate for removal of Bristol Bay from the program. Comment letter contains a list of 58 native organizations, tribes, local governments, villages, fishing organizations, and other local/regional entities that have taken a position opposed to Bristol Bay offshore drilling

Alaska Wilderness League, Center for Biological Diversity and 13 other groups want to remove Chukchi, Beaufort, and Bering Seas sales from the 2007-2012 OCS program; cancel the 2010-2015 DPP; and start over with a new comprehensive, science-based, and balanced approach for managing the Arctic.

Americans for Tax Reform encourages enacting an expedited leasing process, not reinstating the offshore drilling bans, and states that expansion would create jobs, promote economic growth, and help states balance their budgets.

California Coastal Protection Network requests that no leases be issued off the California coast.

Capital Integrity Group supports opening new areas in the Atlantic, Pacific, Gulf of Mexico, and Alaska region, and including all areas for both the 2007-2012 and 2010-2015 programs. Offshore energy will create jobs and revenue.

Center for Regulatory Effectiveness requests that BOEM expand the DPP to include discussion of the legal precedent of *State of California ex rel. Brown* and that the primary emphasis under OCSLA is oil and gas leasing which counterbalances Executive Order 13158 on avoiding harm to the nearly 1,700 Marine Protected Areas. There is no reliable data that oil and gas operations affect sperm whale foraging.

Citizens for Sound Conservation states that the DPP will benefit state economies by creating more jobs and revenue as well as benefiting national security by increasing independence.

Clean Ocean Action, a broad-based coalition of 125 conservation, environmental, fishing, boating, diving, student, surfing, women's business, service and community groups, and others is concerned about the potential for collisions from placing oil and gas platforms near traffic lanes near New Jersey and New York. There is concern about pollution and physical alteration of habitat.

Coalition for Affordable American Energy and nine other groups request that DOI hold all lease sales with no arbitrary buffer zones to keep energy prices stable, create jobs, and produce significant federal revenue.

Community Environmental Council opposes oil and gas leasing off the California coast. It wants consultation for renewable planning and project placement modeled after the Channel Islands National Marine Sanctuary Committee. If there is activity, it wants state and county revenue sharing. Santa Barbara and Ventura counties' coast should be included in any renewable leasing plan.

Consumer Energy Alliance and New Jersey Economic Development and five other groups supported oil and gas development, via testimony at the regional meeting. They cited jobs, tax revenue, need for affordable energy, strong safety record and energy security

Environment America states that DOI should avoid drilling in areas previously protected by the congressional drilling moratorium and keep all GOMESA restrictions. It supports safe and environmentally sound development in the Central and Western GOM but opposes anywhere else. There should be more scientific studies of biological resources in new areas and marine spatial planning completed before any leasing is considered.

Environmental Defense Fund requests that DOI focus on the federal involvement in degradation and need for active restoration of the Louisiana wetlands. It suggests modification of "fair market value" of oil and gas leases to ensure that revenues are at a minimum sufficient to fund the environmental restoration made necessary as a result of the leasing practices. Consider the physical impact of near-shore and on-shore OCS-related infrastructure on Atlantic and Pacific coasts and revise DPP to account for the need of coordination between the oil and gas and renewable energy leasing processes.

Foundation of Sustainable Living states that at least half of energy growth never reaches the consumer because it is lost in an inefficient fuel chain and distribution over long distances. Therefore, generating energy off the coasts and distributing to inland areas will not help the

economic situation. Money should be spent on improving the energy systems in place by plugging leaks which would improve efficiency. Support localizing power stations instead of large centralized stations.

Get Oil Out wants to end all leasing off the California coast.

League of Women Voters of California requests that DOI remove California sales from the program as the long-term economic health of the California coast is dependent on tourism and other less industrial activities. It supports research into alternative energy technologies appropriate for ocean application.

National Association of Regulatory Utility Commissioners has formed a moratoria study group that includes state commissioners, industry, public interest groups, universities, and DOE, the Federal Energy Regulatory Commission, DOE's Energy Information Administration, Bureau of Land Management, and BOEM. They sent a letter that the study uses a special model to consider social, economic, and environmental effects of maintaining oil and gas exploration and production moratoria.

National Taxpayer's Union stated that increased OCS production would stabilize fuel prices, lower utility bills, create new jobs, and enhance the Nation's fiscal security.

Northcoast Ocean and River Protection Association opposes OCS leasing because of atmospheric, oceanic, geologic, and biotic impacts.

Northeast Commission, North Carolina, recommends offering new lease opportunities in the Atlantic and Pacific which ultimately provide maximum flexibility to properly utilize domestic energy resources, strengthen national security, and spur economic growth.

Oceana and Pew Environmental Group organized a petition signed by over 400 PhD level scientists to delay or avoid Chukchi and Beaufort Sea leasing until there is additional scientific understanding of the consequences for this rapidly changing ecosystem

Ocean Defenders Alliance, California, stated that anything that does not naturally belong in the ocean poses a threat to wildlife feeding, migration and reproduction.

Otter Project submitted a petition opposing offshore oil along the Pacific coast. It advocated slowing renewable development until testing on a small scale can occur with new technologies along less sensitive stretches of coastline.

Pacific Environment requests that DOI cancel all Alaska lease sales and develop an alternative program that incorporates recommendations of the Interagency Ocean Task Force and adequately balances the needs of the Nation with the health of its ecological and cultural heritage.

Pelican Audubon Society, Florida, requests a stop to further Arctic leasing expansion until there is a much greater understanding of the ecosystem.

Resource Development Council supports DPP, especially in Chukchi and Beaufort Seas and North Aleutian Basin. There is a need to boost the Alaska economy, extend life of the Trans-Alaska Pipeline System (TAPS), and reduce dependence on foreign energy. They are confident that industry can explore safely and reduce energy footprint. Mitigation measures can address subsistence and fishing concerns. Revenue sharing for state and local communities is supported.

Santa Barbara Channelkeeper states that the risk of oil spills, noise, air and water pollution threaten a delicate habitat and endangered species as well as tourism and fishing industries. It opposes revenue sharing as elevating financial interests over environmental interests

Sierra Club (several state chapters), Conservation Voters of South Carolina, and Georgia's Center for a Sustainable Coast focused comments on Mid- and South Atlantic OCS. They oppose opening these areas because of limited resources, that oil and gas activity is inconsistent with a clean energy policy and that an analysis of OCSLA section 18 factors counsels against it because there is insufficient existing information about the areas.

Sierra Club, Virginia Chapter, requests that DOI cancel the Virginia Lease Sale 220 as it is contrary to Virginia's energy policy, large data gaps exist, and there are tremendous environmental and economic risks.

SOS California supports increased production as a means to reduce natural oil seepage. It suggests tying oil and gas production revenue towards funding renewable energy infrastructure.

Surfrider Foundation, Outer Banks Chapter, states that offshore drilling puts North Carolina jobs at risk.

Surfers Environmental Alliance, Santa Cruz Chapter, and Surfrider Foundation, Santa Cruz, oppose OCS leasing and state that oil spills cause huge damage to the environment and coastal economies.

Oil and Gas Companies and Associations

Alyeska Pipeline and Alaska Petroleum Joint Crafts Council support DPP, stating that it is important to have a schedule of regular sales in the Beaufort and Chukchi Seas. The TAPS is critical energy infrastructure and is now under capacity with need for more production from Beaufort and Chukchi Seas.

American Gas Association supports DPP and strongly urges opening up as many areas of the OCS as possible to natural gas and oil production in order to increase future domestic energy supplies and maintain reasonable prices for consumers.

American Petroleum Institute supports DPP in all areas. New access is necessary since past restrictions have compelled industry to "pick over the bones" in search of commercial quantities of hydrocarbons. Buffer zones are not needed since BOEM already has authority to develop lease or permit conditions to address effects on human, marine, and coastal environments.

Exclusions are not needed since industry has safely operated in sensitive areas such as Flower Garden Banks. Revenue sharing with states has been successful under GOMESA and should be expanded. Mandatory unitization is not necessary since BOEM can require under existing authority and companies have an incentive to maximize resource potential. Without substantial streamlining, the regulatory approval process will grind to a snail's pace.

American Public Gas Association, representing municipal gas distribution systems, public utility districts, county districts, and others strongly supports DPP, especially in Atlantic and Pacific areas previously under moratoria. Specifically it supports proposed leasing in four areas off Alaska, two areas off Pacific, three areas in GOM, and three areas off Atlantic

Anadarko Petroleum Corporation supports DPP and opening all new areas for leasing. While Central and Western GOM are still vital areas, the previously off-limit areas of the Atlantic, Pacific, most of Eastern GOM and Alaska are potentially resource-rich areas. Expanded OCS access is a national priority.

Chevron supports all new proposed areas in DPP. Focus leasing on those areas with expected resource potential and industry interest. Portions of areas can be offered as areas are refined during the traditional individual lease sale process. Energy from renewable sources will increase but oil will continue to be the lion's share of transportation fuels and natural gas for power generation in the near future. Traditional oil and gas exploration and development can co-exist with new uses on the OCS. Development of one energy resource in the OCS should not be at the exclusion of development of any others. Do not establish arbitrary buffer zones. There should be revenue sharing only for coastal states actively supporting hydrocarbon development off their coasts, as long as additional revenue costs are not imposed on industry to fund the states' portion.

Cobalt International Energy supports DPP. There is a need for a comprehensive and diversified energy strategy that includes combinations of new access, efficiency and conservations, and a predictable fiscal regime.

ConocoPhillips supports DPP, especially in the Chukchi Sea. Company has invested \$506 million on 98 OCS leases and tens of millions of dollars on environmental studies in the Chukchi Sea. The TAPS is currently flowing at a third of pipeline capacity and Arctic OCS production can significantly extend the life of TAPS. It is committed to exploring the Chukchi Sea responsibly with respect for the environment and in a manner that also respects the subsistence way of life of the residents of Alaska's North Slope.

Deep Gulf Energy LP supports DPP in all possible areas. Energy can be produced in an environmentally safe manner, as evidenced by the federal government's rigorous environmental and safety standards and by the fact there had not been a major spill in over 28 years.

Devon Energy Corp. supports DPP in all proposed areas. Bans that restrict drilling to 50 miles offshore will not provide energy in the short term. Proposals to require states to approve leasing off their coasts but do not include revenue sharing are counterproductive to energy development. It is unlikely that industry would purchase any seismic data prior to confirmation that a lease sale will be conducted in a planning area.

Eni Petroleum supports DPP and the need for a consistent schedule of lease sales in Beaufort and Chukchi Seas. If not allowed to drill domestically, businesses will look elsewhere in the world.

ExxonMobil supports DPP and agrees with reasons identified by BOEM, including the recent increase in energy prices and that no other country prohibits access like the United States does to 90 percent of the lower 48 states. Neighboring countries, Canada and Mexico, are expanding exploration. Concentrating production mostly in the Central and Western GOM is bad for supply when hurricanes hit. The DPP is long overdue but do not repeat past occurrences such as 1) reducing the sale area just before the sale date since significant expenditures were made in analyzing the area (e.g. EGOM Sale 181); 2) not returning the investment plus interest in a timely manner if issued leases were denied exploration and production activities (e.g. Manteo, off North Carolina coast); and 3) not relying on sanctity of contract and rule of law (e.g. deepwater royalty relief).

Florida Natural Gas Association supports DPP and 60 percent of Floridians support offshore gas drilling. There is a need for access to resources off Florida's coast to enhance jobs and economic development; generate federal, state, and local revenues; improve energy security; and diversify supply. Revenue sharing for states such as Florida is needed.

International Association of Geophysical Contractors strongly supports DPP, especially in Eastern GOM, Central GOM, Western GOM, Cook Inlet, Beaufort Sea, Chukchi Sea, North Aleutian Basin, and North, Mid, and South Atlantic. Additionally, expand leasing to all areas of the OCS, not just in those areas. It can take many years and substantial expense, especially in frontier areas, to acquire geophysical data, evaluate, test, develop infrastructure, and ultimately produce hydrocarbons. States and localities with oil and gas development should directly receive a portion of OCS revenues. Areawide leasing should be continued in the GOM and other areas where possible. Seismic information is urgently needed to help inform the decisionmaking processes regarding what resources are available and the fair market value of those resources.

Marathon Oil Co. supports DPP in all OCS areas. All proposed areas should be open with no arbitrary restrictions such as buffer zones or mandatory unitization requirements. It strongly opposes decisions to limit leasing in the Eastern GOM based on proximity to Florida's coast. Exclusions of this nature ignore the long and excellent environmental record established by offshore oil and gas producers. Also, it oppose leasing exclusions for acreage east of the military mission line since BOEM and DOD can successfully cooperate and mitigate multiple use issues without resorting to a no-leasing restriction.

Municipal Gas Authority of Georgia strongly supports DPP. It supplies natural gas to municipalities in Georgia and neighboring states whose customers and communities have been impacted by skyrocketing energy prices. The DPP will create domestic jobs, decrease dependence on foreign energy, stabilize energy prices and strengthen national security.

National Ocean Industry Association and four other energy-related trade groups strongly support DPP. Proposing to hold 12 lease sales in 26 planning areas is too conservative and they urge expansion of leasing to all areas of the OCS where there is an interest in hydrocarbon

development. Areawide leasing should continue in GOM and other areas where possible. The lease sale schedule should be predictable and reliable. The new 5-year plan should be as flexible as possible, so the federal government will be nimble in responding to changing circumstances and needs of the country. Regarding the EIS, BOEM should add areas left out of the DPP in case Congress adds these areas back later so that a tiered or supplemental EIS can be done instead of a whole new 5-Year Program EIS. Additionally, the EIS should consider the socioeconomic benefits of the Proposed Program on people living in all 50 states, as well as the socioeconomic impacts of not producing offshore energy.

Offshore Inland Marine and Oilfield Services Inc supports opening all areas in DPP, citing jobs, much needed revenue brought to government from industry, and reducing dependence on imports.

Offshore Operators Committee supports DPP in all proposed areas. Access in the Atlantic and Pacific is important. The areas expanded in the Eastern GOM are known to contain rich resources of oil and natural gas. It urges BOEM not to eliminate any of the proposed lease sales and minimize any restrictions such as buffer or no-activity zones that reduce access to acreage. The BOEM should prioritize the schedule of lease sales listed in the DPP and host those sales earlier in the schedule that are believed to have the highest resource potential.

Pacific States Environmental Contractors, Inc supports California leases in new DPP. The Company provides environmental services to California offshore petroleum industry.

Piedmont Natural Gas strongly supports DPP, especially off North and South Carolina coasts. Access to offshore natural gas is important for consumers, creating new jobs, bringing in trillions of dollars in tax receipts and royalties to federal and state governments, increasing national security, and is favored by recent public opinion polls. Seven out of ten North Carolina people favor such access to energy supplies.

Shell supports DPP and urges the Secretary to open Alaska. The resource potential offshore Alaska is very promising. There is a need to resolve federal permit process issues that were the focus of Alaska litigation.

Numerous energy companies and energy-related entities also attended one or more of the regional meetings and presented similar comments as summarized above.

Non-Energy Industry Businesses, Associations and Groups

Agricultural Energy Alliance represents more than 100 growers and agribusinesses in support of opening new areas in DPP. The farm sector depends on significant use of natural gas. They cite the need for a stable supply of affordable natural gas, jobs creation and economic growth, lessening dependence on foreign oil and strengthening national security.

Alaska Fishermen Association opposes opening up NAB. Proposed leasing area in NAB directly overlaps vital habitat and fishing grounds for salmon, cod, red king, crab, flatfish, halibut,

herring, and pollock. It is concerned about negatively affecting the state's \$2 billion annual fishing industry.

Alaska Independent Fisherman's Marketing Association, Bering Sea Fisherman's Association and eight other groups stated the health of Bristol Bay and Bering Sea fisheries affects many organizations and businesses. They requested that DOI remove Bristol Bay from leasing because sustainable fisheries provide greater economic benefit than drilling for oil.

Alaska Miners Association depends on a secure supply of petroleum products. OCS development can be done without harming the environment. The regulatory requirements now in place make OCS development in Alaska the best in the world.

Alaska Trucking Association, Inc states that the 2010-2015 DPP is insufficient to support future economic growth and reduce dependence on imports. The DOI should open Alaska OCS areas as the highest priority with the Central and Western GOM following.

Arctic Controls, Inc states that the 2007-2012 OCS program should not be vacated. Many Americans have livelihoods tied to current and future lease sales. Government should promote policies that encourage job promotion and creation while growing the economy and providing the Nation with energy.

Associated General Contractors of Virginia supports expansion to improve energy security and meet the growing Virginia state demand for energy.

Associated Industries of Florida generally supports DPP. Drilling in Eastern GOM is okay more than 25 miles off the coast. There are needs for oil and gas supplies to be stable and affordable, secure American jobs, and reducing dependence on energy imports. Revenues from oil and gas activity should be used to fund alternative energy options.

American Chemistry Council states that revenue sharing is the key to generating additional revenues for local governments and creating jobs.

American Forest and Paper Association states that the DPP grows the economy, secures the Nation's energy supply, and keeps jobs in America.

American Iron and Steel Institute states that the Nation needs all energy sources to keep prices low, reduce dependence on foreign oil, create jobs, and grow the economy.

American Trucking Associations strongly supports OCS leasing program for the 31 proposed sales in all areas. The federal government needs to ensure industry has access to adequate supplies of fuel at reasonable prices so that motor carriers can continue to deliver to America.

Brinderson Engineering and Construction supports all California OCS development and cites EIA statistics that 80 percent of energy demand will be supplied by fossil fuels despite increases in renewables by year 2030.

Carolinas Associated General Contractors supports oil and gas leasing in the Southern Atlantic and the inclusion of offshore South Carolina in the 2010-2015 DPP due to ever improving technology. They believe that offshore production can co-exist with the state's booming coastal tourism industry. It is important to develop energy domestically, including the Atlantic and Pacific OCS, in conjunction with conservation and alternative fuels, to support the future energy needs of the country.

Centennial Coverages, Inc states that renewables and traditional sources of energy are complimentary. Resources belong to the American people and can generate government revenue. It requests removal of barriers to the OCS and avoidance of regressive, putative taxation of industry.

Chambers of Commerce for Anchorage and Greater Fairbanks support the DPP, specifically the full inclusion of Alaska's OCS including the Beaufort Sea, Chukchi Sea, and North Aleutian Basin.

Chambers of Commerce for Arkansas; Brazosport Area, Texas; Georgia; Mobile, Alabama; Ohio; and South Carolina generally support the DPP, favoring opening all offshore areas to production with no restrictions to increase the oil supply, the Nation's security, and jobs; help with balance of payments; and promote economic growth.

Chamber of Commerce, Gold Coast Hispanic, California, supports DPP, especially in California. It represents California businesses that rely on affordable and stable energy. It cites job and energy security and says industry operates safely and without harming environment.

Chamber of Commerce, Greater Easley, South Carolina, supports the DPP, especially off South Carolina to create jobs and bring in revenue. The South Carolina General Assembly Offshore Natural Gas Feasibility Committee returned a favorable report for responsible offshore production off South Carolina.

Chambers of Commerce for North and South Carolina request that all three proposed Mid-Atlantic lease sales be included in the 2010-2015 DPP and in the Proposed Program. Also, they request that all available lease areas including the GOM, Atlantic, and offshore Alaska, be included and urge Congress to act to provide states with a fair share of revenues derived from oil and gas production off their coasts.

Chemistry Council of New Jersey and several small business owners supported oil and gas development via testimony at the regional meeting, citing jobs, revenues, and high energy costs.

Dameo Trucking Inc supports all New Jersey OCS development, citing that doubling of fuel costs for the business the layoff of workers. It supports renewables but says wind power will not support 18-wheelers. The National Academy of Science study says oil spills account for less than 1 percent of oil in the ocean. It supports offshore development as long as oil rigs are no closer than 10 miles off New Jersey coast and says oil and gas development can be done safely, without hurting environment.

Divecon supports all OCS development in California, citing the need for jobs and revenues in California. The offshore industry can operate safely and not harm the environment.

Egli Air Haul, Alaska, states that vast oil and gas reserves need to be brought back online. Significant jobs and revenue are at stake in Alaska alone. It supports the existing 5-Year Program.

Fairweather Inc, Alaska, states that an effective energy policy that safely develops American resources will help industries that rely on crude oil and natural gas, strengthen national security, and create new jobs.

Farwest Corroton Control Company, a small business supplier to the west coast petroleum industry, supported all California OCS development. Expanded OCS access means energy security into the future, reduction of oil imports, jobs in a down economy, and tax revenue for governmental agencies.

Felkel Group states that DOI should focus on creating domestic oil, gas, nuclear, renewables, alternatives, and conservation for national security, energy security, and economic security.

Fertilizer Institute states that natural gas is an essential chemical feedstock for nitrogen fertilizers. Expanded production can insure a healthy industry by providing stable, secure, and reliable supplies of natural gas. Increased revenue will help with federal deficits.

Florida Minerals and Chemistry Council supports DPP to meet growing demand and economic security. Opening up access to offshore energy resources, including renewables, would alleviate demand and create jobs. Offshore energy production could grow Florida's economy by \$6.4 billion and create 34,000 jobs. It claims that 59 percent of Floridians support oil and gas drilling.

Florida Transportation Builders Association Inc and the Florida Trucking Association support the DPP and expanded production as a means to create domestic jobs and decrease dependence on foreign energy.

Frontier Plumbing Supply states that Alaska needs to be included in DPP due to need to reverse decline in TAPS, support jobs, reduce reliance on foreign oil, and help transition to new energy sources. Alaska represents an estimated 25 percent of global untapped supplies of oil and gas.

Garden State Seafood Association, Atlantic States Fisheries, and Fisherman's Dock Cooperative opposed both oil and gas development and renewables via testimony at the regional meeting, over concerns about any conflicts with fishing.

Georgia Chemistry Council supports DPP to strengthen national security and provide much needed jobs. Industries that rely on crude oil and natural gas need stable prices,

Glaser & Associates supports DPP, citing jobs, energy security, supply stability, good safety record, and lessening dependence on hostile nations. The family business makes fasteners and depends on the California energy sector.

GSI Gulf States, Inc and 13 other business entities support the DPP and expanded OCS exploration.

Harvey Canal Industrial Association, Louisiana supports DPP and the opening of new areas as broadly as possible. The 5-year plan is the backbone of oil and gas industry. A study was cited that found that the new areas could lift production by 1 million barrels per day of oil and 3 billion cubic feet per day of gas. Keep incentives for oil and gas industry to help with capital investment. It supports renewables but says the country cannot rely on them exclusively.

Hoefler Consulting Group states that Alaska oil and gas produces 35,000 jobs annually and contributes \$72 billion over a 50-year period to the economy. Jobs are created throughout 50 states and generate government revenue.

Industrial Energy Consumers of America strongly supports DPP in all proposed areas. Increased OCS energy production lowers energy prices, increases reliability, creates jobs, increases federal revenue, and improves the balance of trade and national security. There are few things that the federal government can do that create more benefits than implementing this 5-year plan. Recognizing the lead-lag times from leasing to production, the government must act now to lease these areas of the OCS.

Jefferson Parish Economic Development Commission, Louisiana, generally supports DPP and requests that BOEM focus on developing areas that are now off limits to drilling. There is a need to create jobs and lessen dependence on foreign oil. New revenues would help cash-strapped local and state governments

Laborers' International Union of North America requests that DOI expand drilling, citing the economic impacts of jobs and reducing reliance on foreign oil.

Manufacture Alabama supports DPP, citing jobs, energy security, revenue for government, and money not sent abroad.

McAngus Goudelock & Courie, a South Carolina law firm, supports including South Carolina in the 5-year plan. Increased domestic production would reduce the global carbon footprint of production because American environmental standards are more stringent than other countries.

Michigan Manufacturers Association requests that DOI open all proposed areas to leasing as a benefit to all states, not just coastal states. There is a need to stabilize energy prices, bring jobs, generate revenue, and reduce foreign imports.

National Federation of Independent Business, South Carolina Chapter, supports moving forward with the 2007-2012 OCS program; supports the 2010-2015 DPP for all available leasing areas in the GOM, Atlantic and offshore Alaska; and supports renewables as well. It urges Congress to provide states with a fair share of revenues derived from oil and gas production from off their coasts.

North American Submarine Cable Association is concerned that the DPP has no mention to existing or future submarine telecommunications cables transiting the OCS planning areas. All rules must adhere to international law, not implicitly designated to "corridors" within the planning areas. Do not place extraordinary burdens on submarine telecommunications cable systems.

North Carolina and South Carolina Farm Bureau Federations support the 2010-2015 DPP and urges BOEM to include sites off the coast of North and South Carolina as potential areas for environmentally responsible development.

North Carolina Petroleum and Convenience Marketers requests revenue sharing for North Carolina and advocates expansion for job creation and economic growth.

North State Animal Hospital, California, opposes all drilling off the California coast. The Point Arena Basin is a particularly pristine marine environment that would be threatened by any offshore developments. Reinstate the ban in California.

North West Technical Services, Alaska, supports DPP.

Ohio Manufacturers Association and the Ohio Trucking Association strongly support DPP. Offshore energy production benefits all, not just those in coastal states. Open all proposed areas for jobs, prices, and revenues.

Outer Banks Visitors Bureau opposes oil and natural gas exploration off the coast of North Carolina. Tourism is a major concern and it is not convinced exploration can be done safely. Tourism generates more income, tax revenue, and jobs for Dare County than might be generated by petroleum industry.

Pacific States Environmental Contractors, Inc supports California leases in new DPP, saying that these resources can be developed safely while still protecting the environment. The company provides services to California offshore petroleum industry.

Pennsylvania Chamber of Business and Industry supports DPP and opening the OCS in all new areas. Developing the Nation's own resources creates jobs, decreases dependence on foreign oil, and stabilizes energy prices that are at the core of economic and national security.

PHI Inc requests that DOI should expand production because of safety record and to reduce volatility of energy prices and supplies.

Plastics Industry Trade Association states that high energy prices have hampered the plastics industry and contributed to lost jobs. There is a need to increase supplies of oil and gas and lower prices.

Price Gregory Company supports DPP, especially in Alaska. Jobs and revenue are at stake.

Principal Tech Services, California, supports DPP.

Prosperity Alaska represents Alaska businesses, associations, and workers and supports DPP, citing economic development, jobs, and national security. It says that 35,000 Alaska jobs would be created and revenues would benefit government. The Council of Foreign Relations reports that lack of domestic energy production undercuts U.S. national security.

PSB Industries Inc, General Air Division, requests an effective energy policy that safely develops American resources to help industries that rely on crude oil and natural gas, strengthen national security, and create new jobs

Sun Engineering Services, Inc supports DPP, especially in California. Developing resources will create jobs, stabilize prices, and heal economy.

United Association of Journeyman and Apprentices, Plumbing and Pipe Fitting Industries of U.S. and Canada, supports expansion for job creation, energy security, and expanded revenue for coastal states.

United Fishermen of Alaska are concerned about NAB and list specific fisheries protections and mitigation measures to be attached to offshore leases, such as oil spill response plans, commitments for long term monitoring, and fishermen's compensation for damages.

U.S. Corrugated, Inc supports DPP, especially off South Carolina. These resources could help with the volatile energy prices, economic stagnation, rising unemployment faced today and create more jobs and bring revenue generation for both states and the Nation.

Venture Hydraulic supports offshore drilling in California.

Virginia Agribusiness states that expanded production will create jobs and decrease dependence on foreign energy.

Virginia Automatic Merchandising Assn, Inc supports the 2010-2015 DPP for all available leasing areas in the GOM, Atlantic and offshore Alaska. The DPP is important for securing the Nation's energy future.

Virginia Forest Products Association strongly supports DPP, the opening of all new areas, and a sensible energy policy for industries that rely on oil and gas resources. It cites energy price stability, jobs, economic growth, decreasing dependence on foreign oil, and energy security.

Virginia Hospitality and Travel Association advises BOEM to open all new areas in DPP. The travel and hospitality industry relies on affordable oil and gas. At stake are jobs, energy security, and stable supply of oil and gas.

Virginia Manufactured and Modular Housing Association states that DPP provides the Nation with opportunity to produce its own energy, benefit economy by creating jobs, and reduce dependence on foreign oil.

Virginia Petroleum, Convenience and Grocery Association supports DPP, especially in Virginia, while safely developing resources, strengthening national security, and supplying much needed jobs.

Virginia Trucking Association strongly supports DPP and opening of all new areas. The trucking industry, which is vital component of the U.S. economy, is impacted by skyrocketing energy prices so there is a need to stabilize price volatility and reduce dependence on foreign oil.

Virginia and North Carolina Wholesalers and Distributors Association supports DPP because it creates new jobs, decreases dependence on foreign oil, destabilizes price volatility, and spurs economic growth.

Warren Norman Company Inc supports an "all of the above" approach for energy needs. Responsible exploration or production of domestic natural resources should include GOM, Alaska, Pacific, and Atlantic, specifically South Carolina.

W.H. Nuckols Consulting advocates aligning decisions on OCS energy development with other policy decisions of national significance such as the Ocean Policy task Force. Environmental analyses should be focused on what will be the result when an impact occurs, not if it will occur. For seismic and other noise at sea, BOEM should query Navy acoustic experts for the role of noise in the ocean in general. There is no robust scientific information to show that ecosystems with naturally occurring petroleum inputs are immune from major ecological damages from spills. The BOEM should develop a data clearinghouse of new renewable energy technologies in U.S. waters.

Yukon River Drainage Fisheries Association requests that DOI remove NAB from the OCS program. Offshore drilling in NAB threatens vital subsistence needs, commercial fisheries, and culture and may cause the loss of the "wild salmon" label if water is not clean.

Numerous non-energy business entities attended the various regional meetings. Most expressed support for domestic oil and gas development, citing high energy costs and effects on the economy. Others, particularly in coastal areas, were opposed and expressed concern about the effects on tourism.

General Public

More than 541,000 comments from private citizens were received regarding the next 5-Year Program for oil and gas leasing on the OCS. Respondents in favor of increased OCS development cited job creation; helping national and local economies; reducing energy prices; increasing revenue for federal, state and local governments; reducing dependence on foreign oil; and the U.S. safety and environmental record that makes it safer to produce oil and gas domestically than to import it. Those generally opposed cited the risk of oil spills to ecosystems and local economies, mainly tourism and fishing industries; harm to marine mammals from spills and noise; climate change; there are not enough resources to justify the risk; and there is a need more data and studies.

This appendix is part of a document prepared by the Bureau of Ocean Energy Management (BOEM) of the Department of the Interior. With the exception of publications whose title includes the agency name or as otherwise noted, all references in the document to BOEM include its predecessor agencies, the Bureau of Ocean Energy Management, Regulation and Enforcement and the Minerals Management Service.

APPENDIX B

POTENTIAL MAGNITUDE OF ENVIRONMENTAL AND SOCIAL COSTS OF A “CATASTROPHIC” SPILL EVENT IN THE CENTRAL GULF OF MEXICO (GOM) PROGRAM AREA³⁵

1. Introduction

In the aftermath of the *Deepwater Horizon* event in April 2010, BOEM is making consideration of the potential impact of low-probability/high-consequence events more explicit in its assessments of future exploration, development, and production activities on the OCS, including analyses conducted in its development of the 5-year leasing program. As described below, impacts that would be considered outside the normal range of probability given the inherent risks of oil production-related activities, that might be categorized by the government or the public as “catastrophic,” result from the interaction of a range of physical and human factors. The same initial event could proceed along very different impact trajectories with a change in even one of these factors, making it difficult to predict what the impacts of future events would be other than to say they could be very large in human, economic, and environmental terms. Depending upon one’s definition, the potential for “catastrophe” is not solely a function of the quantity of oil released, as the uncontrolled release of X barrels at a particular location at a particular time of year could have more significant economic or environmental effects than a release of 10X barrels under different circumstances.

For illustrative purposes, the approach is described in the context of an event in the Central GOM program area. In general, BOEM is interested in developing an inventory of vulnerable resources and economic values, as well as an understanding of the range of potential environmental and social costs in each category. Wherever possible, BOEM is interested in understanding the potential costs to society in quantitative or monetary terms, recognizing that the type and scale of actual costs would be highly dependent upon the circumstances of the event and its aftermath. For the Proposed Final Program decision document, BOEM expects to use the same approach found in this appendix for the Central GOM to extend the analysis to address the potential environmental and social costs of a catastrophic event in each of the program areas.

This appendix presents BOEM’s proposed general approach to the consideration of the potential environmental and social costs should there be a catastrophic release event in one of the program areas³⁶. The appendix supplements the section 18 net benefits and equitable sharing analysis found in part IV of this document. The results of this inventory of impact categories will aid the decision maker in considering the potential range of impacts of a catastrophic spill event prior to

³⁵ This analysis was prepared with the assistance of Industrial Economics, Inc., the company that is redesigning and updating the *Offshore Environmental Cost Model* described briefly in part IV.C of this document.

³⁶ A program area is a planning area, or a portion thereof, considered for future leasing in the 5-Year Program.

making the Proposed Program decision. Additional environmental analysis related to a potential catastrophic event can be found in the Draft EIS published concurrently with this document.

2. Description of a Catastrophic Oil spill Event

For oil and gas activities on the OCS, a catastrophic event is any high-volume, long-duration oil spill or well blowout, regardless of its cause (e.g., a hurricane, human error, terrorism). The National Oil and Hazardous Substances Pollution Contingency Plan further defines such a catastrophic event 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). For this consideration of potential environmental and social costs, a catastrophic event in the Central GOM is presumed to begin with the release of approximately 2.7 to 7.2 million barrels of oil, from a deep water well about 50 miles offshore, over a period of 3 to 4 months.

The alternative to production from a new 5-Year Program, i.e., conducting no lease sales for at least the relevant 5-year period, is increased consumption of substitute energy sources, such as increased imports of foreign oil. Therefore, BOEM is also considering the potential costs to society of low probability/high consequence spills from tankers that would be delivering foreign oil to GOM ports to replace foregone Central GOM oil production.³⁷ Table 1 provides a general profile of such tankers.

Table 1: Profile of Tankers Transporting Imported Oil to the Central GOM Program Area

Type	Deadweight Tonnage Range	Cargo Range (bbl)	Maximum Wing Tank Capacity (bbl)	Percentage of Central GOM Traffic
Ultra large crude carrier	300,000 – 550,000	1,920,000 – 3,520,000	250,000	57.3%
Very large crude carrier	200,000 – 320,000	1,280,000 – 2,048,000	137,000	12.5%
Suezmax	120,000 – 180,000	768,000 – 1,152,000	96,000	21.1%
Aframax	79,000 – 120,000	506,000 – 768,000	55,000	0.3%
Small*	55,000	352,000	25,000	8.8%

* Most smaller tankers are used for transport of oil on inland waterways such as the Mississippi River or for the transport of oil products such as No. 2 fuel or heavy fuel oil. Some of that transport is between refineries and other inland ports.

Design features on double-hulled tankers generally ensure that no more than 50 percent of a tanker’s total cargo volume could be lost under any reasonable “worst-case discharge” scenario, so for the purpose of this analysis, BOEM assumes a catastrophic event would involve an ultra large crude carrier (ULCC) tanker of 550,000 deadweight tonnage and a maximum cargo of 3.52 million barrels grounding within 50 miles of shore and releasing up to 1.76 million barrels of its cargo. Because ULCCs would necessarily be offloading at the Louisiana Offshore Oil Port

³⁷ See explanation of estimated market substitutions for OCS production in Net Social Value section of part IV.C of this document.

(LOOP) or lightering to smaller tankers in the offshore lightering zones, it would be highly unlikely that the spill would occur closer than 50 miles to shore. The largest event in the nearshore GOM would likely be a spill from an Aframax tanker headed towards the Houston Ship Channel after lightering in the Western or Central GOM. The maximum spill volume in that case would most likely be 384,000 barrels.

3. Effects of a Catastrophic spill Event on Potentially Vulnerable Environmental Resources and Socioeconomic Sectors

In the broadest terms, a catastrophic event in the Central GOM program area would have the potential for (1) direct impacts on the region's physical and biological resources, (2) direct impacts on the public's use and enjoyment of these physical and biological resources, and (3) direct and indirect impacts on regional economic activities, many of which are dependent upon healthy physical and biological resources. The Draft EIS provides a broad analysis of these three impact categories in the context of a GOM, well blowout-type, and catastrophic spill event. This appendix complements the Draft EIS analysis by (1) identifying additional subcategories with resources that might allow representation in monetized values, (2) noting differences in the nature or scale of impacts that might be associated with a tanker spill, compared to a well blowout, and (3) providing additional information on the measurement of potential impacts in monetary terms.

As described above, a catastrophic event is assumed to be characterized by the release of a large volume of oil over a long period of time. However, the volume and duration of the release are only two of the factors that will influence the nature and severity of the event's impacts. Other factors, that alone or more likely in combination, can influence a catastrophic event's impact or the ability to predict its impact, include but are not limited to:

- For wellhead blowout events:
 - The size and complexity of the geologic reservoir and the pressure under which oil is contained in the reservoir.
 - The relative maturity of the production field since the dynamics of a more mature field are likely to be better understood than a newer, "frontier" region.
 - The water depth at which the event occurs.
 - The human response to the event in terms of well control.

- For wellhead blowout events or those resulting from tanker spills:
 - The location of the event relative to the coastline.
 - The response infrastructure and capability at or in operational proximity to the event location.
 - The nature and extent of immediate containment actions at the source and thus the period over which the oil release is uncontrolled.
 - The nature and extent of response actions including booming, skimming, burning, or the use of dispersants as oil moves away from the event location.
 - The properties of the oil and the degree to which it evaporates or weathers under local environmental conditions.
 - The influence of prevailing winds or ocean currents on oil in the water.
 - The season in which the event occurs.

This analysis does not attempt to describe a specific scenario that accounts for each of these variables and adjusts the impacts accordingly. Rather, BOEM describes the types of impacts that are plausible when large volumes of oil are released into the environment. Potential effects are distinguished, as appropriate, for the four phases of an event--the immediate aftermath of the event itself; the period during which released oil is entirely offshore; the period of onshore contact with the oil; and the period of longer-term impact after containment and cleanup activities are ended.

When describing the potential impacts associated with a catastrophic event, it is important to distinguish between changes in economic *value* and changes in regional economic *activity*. Value, more specifically net economic value or consumer surplus, is measured by what individuals are *willing to pay* for something above and beyond what they are required to spend. This concept of value is recognized as the appropriate measure to compare the costs and benefits of policy alternatives and measure damages resulting from injury to natural resources.³⁸ Alternatively, economic activity reflects commercial revenues, employment, tax receipts, et cetera and is generally driven by consumer expenditures.

Because economic values and regional economic activity measure different things, they should be viewed as providing complementary, yet different, perspectives on the economic implications of a spill/release event. In the discussion that follows, impacts that might be measured as changes in consumer surplus are distinguished from those that are properly measured in terms of revenues or other indicators of economic activity.

3.1 *Potential Effects on Physical and Biological Resources*

Each phase of a catastrophic blowout event has the potential to result in adverse impacts to coastal or marine habitats and wildlife.

- During the initial event, an explosion or fire associated with a blowout could disturb a large amount of sediment if the blowout occurs outside the wellbore, below the seafloor.
- During the offshore spill phase, oil in the pelagic zone or at the surface could result in population-level impacts to offshore biological resources, including federal- and state-listed threatened and endangered species. In addition, natural processes such as flocculation and human intervention, such as the use of dispersants, could expose benthic communities to oil. Bottom-disturbing response activities like vessel anchoring could also have an adverse impact on benthic communities.
- During the onshore contact period, potential impacts to biological resources would expand to coastal species and degradation of sensitive coastal habitats could occur, even if mitigated by response actions such as the use of booms and skimmers. Any resulting loss of vegetation could lead to erosion and permanent land loss.
- Over the longer term, habitat loss or impairment caused by exposure to oil could result in additional adverse changes in biological populations by disrupting the

³⁸ For example, see U.S. Environmental Protection Agency's *Guidelines for Preparing Economic Analyses* (2000) and U.S. Department of the Interior Natural Resource Damage Assessment Regulations (43 CFR Part 11).

elements required for successful reproduction. The chronic effects of sublethal exposure to oil could result in losses that exceed mortality due to oiling, if these residual effects influence a significant proportion of a population or disproportionately affect an important population segment.

The impact on physical and biological resources resulting from a spill of imported oil from a tanker would be largely the same as those resulting from a blowout. The exception would be that the potential for acute and chronic effects on biological organisms in the water column, and not on the ocean surface, would be reduced.

Measuring the impact of a catastrophic event or tanker spill in monetary terms is increasingly dependent on the use of “equivalency analyses” such as habitat equivalency analysis or resource equivalency analysis,³⁹ rather than efforts to try to estimate social welfare values for natural resources for which there is no “market price” such as through stated preference techniques that estimate consumer surplus through the creation of hypothetical markets. In general, equivalency analyses determine the necessary scale of actions such as habitat restoration that would deliver a quantity of natural resource services equal to the “residual” impact, or the reduction in services over time, attributable to the event after taking into account response and cleanup activities. Once these analyses are completed, and one or more restoration actions have been identified and scaled to the loss, the actions’ implementation costs become the monetary measure of the event’s impact. The magnitude of these costs can vary considerably based on their location, scale, and complexity.

3.2 *Potential Effects on Public Uses*

The Central GOM program area and the GOM in general, offer numerous opportunities for the public’s use and enjoyment of coastal and marine resources. These include beach use, hunting, wildlife viewing, and other recreational activities, particularly in state- and federally-managed parklands, and recreational fishing. A catastrophic blowout event or tanker spill would result in a decrease in the number of trips taken by the public for the purpose of engaging in one or more of these activities, due to activity prohibitions, the imposition of other use restrictions, or simply the public’s perception of the quality and availability of natural amenities in the event’s aftermath.

When oil from a catastrophic blowout event or tanker spill reaches the shoreline, the use of oiled coastal beaches would be restricted or prohibited at least until the completion of cleanup activities. Beach use might decline also due to perceptions and concerns about the quality of the beach environment at locations where the oil does not come in contact with the shore. The magnitude of the impact will be a function of factors such as the length of oiled beach, the season(s) in which prohibitions or restrictions on beach use are in place, and the effectiveness of cleanup or other response activities. Each year, members of the public take a total of approximately 15 to 20 million trips to the beach in the coastal area associated with the Central GOM, the beaches of Louisiana, Mississippi, and Alabama. The annual number of trips to beaches in the coastal areas associated with the Western GOM (Texas) and the Eastern GOM

³⁹ For a brief explanation of habitat equivalency analysis, and resource equivalency analysis, see the draft documentation for the *Offshore Environmental Cost Model* at www.boem.gov.

(GOM coast of Florida) are even higher with more than 30 million and nearly 100 million, respectively (Roach et al. 2001). In the aftermath of a catastrophic event or tanker spill in the Central GOM either during or just prior to the peak beach use season, a significant number of trips in one or more of these regions could be foregone. Beach use is an integral component of the broader tourism industry, and thus the monetary impact of reduced use can be considered one component of a measure of the change in regional economic activity within this sector following a spill event. However, a change in recreational use is commonly assessed as a change in social welfare or consumer surplus based on economic studies that estimate the value the public places, independent of their expenditures, on an activity such as a trip to the beach. For example, Parsons et al. (2009) describes a state-of-the-art travel cost random utility maximization model developed for the National Park Service to estimate economic losses attributable to hypothetical beach closures at the Padre Island National Seashore in Texas. This study established a mean loss of approximately \$20 per trip. Thus, the potential impact of a catastrophic event or spill, given circumstances that maximize the number of foregone trips, could be measured in the tens of millions of dollars.

From Texas to the Florida Keys, the GOM's coastal zone is home to two dozen National Wildlife Refuges (NWR) and numerous state parks. In addition to beach activity that occurs at some of these areas, the public utilizes them for a variety of land-based recreational activities, such as hunting and wildlife viewing. As with beach use, a catastrophic blowout event or tanker spill has the potential to cause the closure of one or more of these areas for an extended period of time, resulting in a reduction in the number of trips, and economic losses determined by the value that members of the public place on a single trip. An event in the Central GOM could have an impact along or near the adjacent coast, or in other GOM regions where the oil might come to be located. Visitation rates at NWRs in the GOM range from thousands per year at smaller units to tens of thousands per year at larger units. In 2006, the U.S. Fish and Wildlife Service (USFWS) estimated the per-day values the public placed on hunting and wildlife viewing in the GOM states, ranging from \$30 to \$60 for hunting and from \$12 to \$28 for wildlife viewing (USFWS, 2009).

Recreational fishing, both from shore and by boat in state or federal waters, is a major public use of GOM natural resources that would be disrupted by a catastrophic spill event. In 2009, residents of and visitors to the Central and Eastern GOM areas combined to take approximately 22 million recreational fishing trips with approximately two-thirds offshore Florida and approximately one-third offshore Louisiana, Mississippi, and Alabama (Pritchard 2009). In the Western GOM offshore Texas, resident and non-resident participants spent more than 15 million days fishing in 2006 (Southwick Associates 2006). A catastrophic event in the Central GOM program area could result in the closure to recreational fishing for a period of several months, of up to 40 percent of state and federal waters in the GOM at the closures' peak (NOAA Fisheries, 2011). If the event were to occur immediately prior to or during the peak summer fishing season, the impact, as measured by the number of foregone trips, would be substantial. In economic terms, the impact could be measured in social welfare terms by valuing each of the foregone trips using consumer surplus values similar those used for other recreational activities. Alternatively, it may be appropriate to consider the impact in terms of recreational fishing's contribution to the regional economy. In 2009, consumer sales associated with recreational fishing totaled nearly \$10 billion across the GOM states. These expenditures supported more

than 90,000 jobs and more than \$5 billion in personal income (National Marine Fisheries Service, 2010). If a catastrophic event were to prevent or otherwise limit the scale of recreational fishing activity for some part of a calendar year, in any part of the GOM, the monetary impact in regional economic terms could be substantial.

3.3 Potential Effects on Regional Economic Activity

While measures of changes in social welfare or consumer surplus are appropriate in the context of cost-benefit analyses and assessments of natural resource damages, the alternative, and more commonly cited way of considering the impact of a catastrophic blowout or tanker spill event, is to assess its effect on regional economic activity in terms of jobs, labor income, and value added. In the areas near the Central GOM and along the GOM coast in general, the regional economy is dominated by the oil and gas, tourism and recreation, commercial fishing, and commercial shipping sectors. Though not explored here in detail, the economic context in which an event occurs could have an effect on the short-term or long-term impact. For example, during a recession or other period of low economic growth, workers who lose their jobs as a direct or indirect result of a catastrophic event may have difficulty finding new employment, thereby increasing the severity of the economic effect.

3.3.1 Oil and Gas Sector

In the aftermath of a catastrophic blowout event and less likely in the aftermath of a tanker spill, a suspension of at least some offshore oil and gas activities would be likely to allow for review and possible additional revision of safety and operating procedures. In addition, the pace at which new exploration activities are permitted might decrease for some period of time. If either outcome applied to a large area or continued for more than a few months, the regional economic effect could be pronounced, as it would have an effect on a wide range of firms that provide materials and services throughout the oil and gas value chain. In the extremely unlikely case of more than one such event in the same area, attitude changes could lead to long-term or permanent loss of some economic activities. Employment for spill cleanup operations would provide temporary employment to some workers but not necessarily for those affected by the slower pace of activities. The potential scale of this impact is indicated by measures of the sector's size within the GOM region. According to a recent study, the entire sector, including major companies and independents operating in shallow and deep water environments, directly employed more than 90,000 people and indirectly employed an additional 120,000 people in 2009 (IHS Global Insight 2010). Sector-related induced employment in 2009, that is, the employment supported by expenditure of income earned by sector employees, was estimated to be more than 170,000. In total, the industry accounted for nearly 10 percent of employment in GOM coast metropolitan areas. The income associated with direct labor employment was estimated to be more than \$15 billion in 2009, increasing to more than \$30 billion when it includes income associated with indirect and induced employment. An additional measure of the oil and gas sector's size and the potential impact of a catastrophic event is its value added, or the economic contribution of all industry inputs. The estimated value added in 2009 was more than \$42 billion on a direct basis and nearly \$70 billion in total of direct, indirect, and induced bases.

3.3.2 Tourism and Recreation Sector

Prior to oil from a catastrophic blowout event or tanker spill reaching shore or migrating some distance away from the source, water dependent tourism and recreation activities could be

affected in the vicinity of the spill. Effects such as reduced participation and thus reduced economic activity could also be observed during the early stages of an event over a larger area within the GOM due to perceived or anticipated changes in the availability or quality of ocean and coastal resources. As the event continues over an extended period of time and as oil spreads over a larger area or comes into contact with coastal resources, the impact on tourism and recreation would become more widespread, particularly if the event occurred during the summer season. Employment for spill cleanup operations would provide temporary business for hotels, caterers, and similar businesses, but the income and employment would not always accrue to the same businesses and employees who suffered from the negative effect on normal tourism and recreation activities.

The scale of the impact on the tourism and recreation sector could be significant given the size and importance of this sector to the Central GOM economy and to the GOM economy as a whole. Tables 2a and 2b presents an overview of the scale of the tourism and recreation sectors in this region. These data describe both the “coastal” and “ocean” economies of each state as constructed from county level data. The coastal economy data comprise all industries and activities in the “leisure and hospitality” sector in counties that are adjacent, in whole or in part, to the GOM. The ocean economy data are limited to industries and activities in the “tourism and recreation” sector that are defined as being ocean-dependent.

Table 2a: Measures of the GOM Coast Tourism and Recreation Sector (Coastal Economy)

Region	State	Annual Coastal Economy		
		Businesses	Employment	Wages (millions)
Central GOM	LA	4,649	86,508	\$1,880.2
	MS	821	27,447	\$599.8
	AL	1,330	25,554	\$365.4
Eastern GOM	FL*	16,296	294,114	\$5,912.2
Western GOM	TX	11,613	256,567	\$4,736.7
TOTAL		34,709	690,190	\$13,494.3

* Gulf coast counties only

Source: National Ocean Economic Program 2011a, 2011b

Table 2b: Measures of the GOM Coast Tourism and Recreation Sector (Ocean Economy)

Region	State	Annual Ocean Economy **			
		Businesses	Employment	Wages (millions)	GDP (millions)
Central GOM	LA	2,918	65,796	\$1,023.9	\$2,501.8
	MS	529	10,315	\$154.0	\$386.3
	AL	816	13,977	\$165.3	\$354.1
Eastern GOM	FL ***	7,781	124,222	\$2,111.5	\$4,903.2
Western GOM	TX	3,666	68,182	\$904.7	\$1,882.6
TOTAL		15,710	282,492	\$4,359.4	\$10,028.0

* 2008 data **2004 data *** Gulf coast counties only

Source: National Ocean Economic Program 2011a, 2011b

The scope and scale of the impact of a catastrophic event over the longer term would depend both on the speed and success of cleanup activities and on the time required for the public to regain confidence that tourism and recreation-related amenities have returned to their pre-event condition. One study of the potential for impact on tourism revenues from events comparable to the *Deepwater Horizon* event concluded that the long-term economic effect of the event could be in the range of \$7.6 billion, if effects dissipated within 15 months, to nearly \$23 billion if observable effects continued for up to three years (Oxford Economics, 2010).

3.3.3 Commercial Fishing Sector

Similar to recreational fishing, the commercial fishing sector in the GOM could be disrupted by a catastrophic blowout event or tanker spill in the Central GOM program area, with up to 40 percent of state and federal waters closed to fishing at the closures' peak over a period that could extend to several months after the event. The impact of the spill would depend on the season in which it occurred and the location of areas subject to closure, since commercial fisheries have both spatial and temporal characteristics. However, as with other sectors, the potential for impact is large if fishers do not have the ability to move from closed to open areas in an economically rationale manner, thereby without experiencing a significant change in net revenues due to greater fuel and other costs associated with harvesting in a less preferred location. Over the longer term, after cleanup and other response actions are complete, this sector also may be susceptible to a slower-than-expected return to baseline market conditions if consumers perceive continuing issues with the quality or safety of seafood products. The characteristics of the GOM seafood industry, summarized in Table 3, indicate the potential scale of the economic impact of a catastrophic event. With income and value added measured in the billions of dollars on an annual basis, an event that caused significant disruption of commercial activity even for part of a year would likely result in substantial regional economic impacts.

Table 3: Measures of the Gulf of Mexico Commercial Fishing Industry, 2009

Region	State	Landings Revenue (thousands)	Sales (thousands)	Employment	Income (thousands)	Value Added (thousands)
Central GOM	LA	\$284,425	\$1,691,033	29,185	\$574,212	\$803,135
	MS	\$37,998	\$289,241	6,392	\$112,625	\$146,527
	AL	\$40,530	\$391,300	8,759	\$148,409	\$196,785
Eastern GOM	FL ¹	\$81,264	\$9,091,865	45,321	\$1,698,487	\$3,038,846
Western GOM	TX	\$150,232	\$1,682,135	18,874	\$473,749	\$716,100
TOTAL		\$594,449	\$13,145,574	108,531	\$3,007,482	\$4,901,393

¹ Florida data from this source are for the entire state; 70 percent of the totals are reported in this table based on the Florida GOM coast's proportion of trips and pounds landed as reported by the Florida Fish and Wildlife Conservation Commission (<http://myfwc.com/research/saltwater/fishstats/commercial-fisheries/landings-in-florida/>)

Source: NMFS, 2010

3.3.4 Commercial Shipping Sector

A catastrophic spill event has the potential to disrupt commercial shipping of domestic and international freight as well as passenger transportation within the GOM marine transportation system. In particular, a significant and persistent oil spill could cause delays in vessel movement, and economic losses, resulting from the need to decontaminate vessels prior to their entry into a port. As measured by the amount of cargo moving in and out of the ports on an annual basis, 10 of the U.S.'s 15 largest ports are located in the GOM, with the ports of South Louisiana, New Orleans, Baton Rouge, Mobile, and Lake Charles in the Central GOM (U.S. Army Corps of Engineers, 2009).

3.4 Other Considerations

In the aftermath of a catastrophic spill event, consideration of economic impacts can extend to additional factors that may be important to or directly affect the local population. Such factors are:

- **Compensation programs**—Payments from a responsible party to individuals or commercial interests that inject money into a local or regional economy.
- **Property value impacts**—An oil spill can have a very short-term impact on coastal property values if it results in transactional delays or in reduced sales prices for properties on the market at the time of the event. Over the longer-term, however, a catastrophic event is unlikely to have a direct effect on property values, as decisions to purchase coastal property involve consideration of a variety of factors including risks from hurricanes or oil spills that may have a low probability of occurrence. Data reporting median sales prices in GOM coast counties indicate increasing values in many cases in the months since the *Deepwater Horizon* event (FNC, 2010).
- **Economic impact of response activities**—Following a catastrophic event, workers in the oil and gas or commercial fishing industries, for example, who face temporary

or permanent job dislocation may find short-term employment as part of the response activities. Similarly, an influx of workers involved in the response would likely offset some or all of the losses that would otherwise be experienced by local commercial establishments, particularly hotels, restaurants, and other service industries that are dependent on tourism.

- **Regional shifts (transfers)**—Some recreational spending would be transferred to other industries and/or geographical areas. For example, if Alabama or GOM coast beaches in Florida were closed, tourists may instead take vacations along the Texas or Atlantic coasts.
- **Restoration**—While catastrophic events can be devastating to a community, they sometimes can focus efforts and lead to spur substantial restoration efforts that lead to improvements that would not otherwise have occurred or may have taken much longer.

Although the effects usually would not be concentrated locally, a catastrophic event could have a major effect on the entity(s) deemed responsible (or potentially responsible) for the event. For example, within 6 weeks of the *Deepwater Horizon* event, the value of BP's stock lost tens of billions of dollars. Stocks of oil and gas companies are widely held by pension funds and by individuals around the country, so costs may be felt far from the location of the event.

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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.