



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

June 2012

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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
Bbl	barrel
Bbbl	billion barrels
BBO	billion barrels of oil
BBOE	billion barrels of oil equivalent
BEA	Bureau of Economic Analysis
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
CO ₂	carbon dioxide
CPA	Central Planning Area
CZMA	Coastal Zone Management Act
DEP	Department of Environmental Protection
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
EP	Exploration Plan
ESA	Endangered Species Act
ESI	Environmental Sensitivity Index
ESP	Environmental Studies Program
ESPIS	Environmental Studies Program Information System
FMP	Fishery Management Plan
FMV	Fair Market Value
FR	Federal Register
G&G	Geological and Geophysical
GDP	gross domestic product
GHG	greenhouse gases
GOM	Gulf of Mexico
GOMESA	Gulf of Mexico Energy Security Act

HAPC	Habitat of Particular Concern
IARPC	Interagency Arctic Research Policy Committee
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LADNR	Louisiana Department of Natural Resources
LNG	liquefied natural gas
Mbbl	thousand barrels
MBOE	thousand barrels of oil equivalent
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
NOI	Notice of Intent
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
OPEC	Organization of Petroleum Exporting Countries
PADD	Petroleum Administration for Defense Districts
PEIS	Programmatic Environmental Impact Statement
PFP	Proposed Final Program
PM ₁₀	particulate matter up to 10 micrometers
PP	Proposed Program
PSD	Prevention of Significant Deterioration
RFI	Request for Interest
SEMS	Safety and Environmental Management System
SO ₂	sulfur dioxide
TAPS	Trans-Alaska Pipeline System
Tcf	trillion cubic feet
TVD SS	True Vertical Depth Subsea
UERR	Undiscovered Economically Recoverable Resources

U.S.
USCG
USDOC
USFWS
USGS

United States
U.S. Coast Guard
U.S. Department of Commerce
U.S. Fish & Wildlife Service
U.S. Geological Survey

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 five year schedule of lease sales designed to best meet the Nation's energy needs. The Bureau of Ocean Energy Management (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.

BOEM is in the process of preparing a Five Year Program for 2012-2017. This document constitutes the Proposed Final Program (PFP), which is the third in a series of mandated leasing proposals developed for public review before the Secretary of the Interior may take final action to approve the new Five Year Program for 2012-2017. The document consists of the parts described below.

- Part I presents a summary of the PFP 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 PFP.
- 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 natural 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 Five 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 PFP 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 Final 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 November 2011 Proposed Program (PP).
- Part IV presents the detailed section 18 analysis prepared 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 2011 PP.

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

Introduction

This is DOI's Proposed Final Outer Continental Shelf Oil and Gas Leasing Program for 2012-2017, which BOEM¹ has prepared pursuant to the Act. Under section 18 of the Act, the Secretary of the Interior is responsible for preparing and maintaining 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," while also taking into account a range of important principles and considerations specified by the Act.²

Accordingly, the PFP presents the careful balancing necessary 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."³ The PFP is central to advancing the President's commitment to expanding safe and responsible domestic oil and natural gas production as part of a comprehensive, all-of-the-above strategy to meet the Nation's energy needs.

This PFP, which follows the January 2009 Draft Proposed Program (DPP) and the November 2011 PP, is the third and final proposed document that the DOI will issue in connection with establishing the new Five Year OCS Oil and Gas Leasing Program (Five Year Program) for 2012 through 2017.⁴ As required by section 18 of the Act, the PFP has been submitted to the President and Congress along with copies of the comments received on the PP, transmittal letters to Federal agencies and state governors, and responses to recommendations from the governors. The PFP must be submitted to the President and Congress for a minimum of 60 days before the Secretary can approve the Five Year Program. Assuming the new Five Year Program is approved, the first lease sale under the program is scheduled for November of 2012.

Overview of the Proposed Final Program

This PFP includes fifteen potential lease sales in six planning areas – the Western and Central Gulf of Mexico (GOM), the portion of the Eastern GOM not currently under Congressional moratorium, and the Chukchi Sea, Beaufort Sea and Cook Inlet planning areas offshore Alaska. That portion of the individual planning area that is being considered for leasing in a Five Year Program is referred to as the program area. A

¹ 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).

² 43 U.S.C. 1344

³ 43 U.S.C. 1344(a)(1)

⁴ The complete Five Year Program development process is described below in part II of this document.

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. Maps A and B show the areas proposed for leasing (Proposed Final Program Areas). These include the richest and most promising areas for oil and gas exploration and development on the U.S. OCS and together they include more than 75 percent of the total undiscovered, technically recoverable oil and natural gas resources estimated for the entire OCS. The PFP, therefore, advances the Administration’s *Blueprint for a Secure Energy Future*, 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 natural gas production.

Table A below describes the estimated undiscovered, technically recoverable oil and gas resource potential of each of the program areas included for leasing in the PFP.

Table A: Resource Estimates for the 2012-2017 Proposed Final Program⁵

Program Area	Estimated Undiscovered Technically Recoverable Resources		
	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Central Gulf ⁶	30.47	130.91	53.76
Chukchi Sea	15.38	76.77	29.04
Western Gulf	12.38	69.45	24.74
Beaufort Sea	8.22	27.64	13.14
Cook Inlet	1.01	1.20	1.23
Eastern Gulf (area not under Congressional moratorium)	0.25	0.65	0.36
Total Proposed Final Program	67.71	306.62	122.27
Total OCS	88.59	398.37	159.49

This PFP also is informed by the experience of the *Deepwater Horizon* event which caused the deaths of 11 workers and resulted in the release of nearly five million barrels of oil into the GOM. Since the *Deepwater Horizon* event, the DOI has raised standards for offshore drilling safety and environmental protection in order to both reduce the risk

⁵Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation’s Outer Continental Shelf, 2011. (2011 Assessment). Resource estimates for oil and barrels of oil equivalent (BOE) are expressed in billions of barrels of oil (Bbbl) and estimates for natural gas are expressed in trillions of cubic feet (Tcf).

⁶ A portion of the Central Gulf of Mexico planning area (CPA) and most of the Eastern Gulf of Mexico were placed under moratoria by the Gulf of Mexico Energy Security Act of 2006 and restricted from leasing until 2022. The area restricted is that portion of the Eastern planning area within 125 miles of Florida, all areas in the Gulf of Mexico east of the Military Mission Line (86° 41’W longitude), and the area within the CPA that is within 100 miles of Florida.

of another loss of well control in our oceans and to improve the Federal government's and industry's ability to respond in the unlikely event of another deepwater blowout and major oil spill. While offshore oil and natural gas exploration and development cannot be made risk free, these activities can be conducted safely and responsibly, with strong regulatory oversight and appropriate measures to protect human safety and the environment.

To best achieve the goals of making areas containing the vast majority of offshore oil and natural gas resources available for development and ensuring that such development occurs safely and in a manner that protects the environment and other ocean resources, BOEM has developed a regionally tailored approach to offshore oil and gas leasing. This regionally tailored strategy, described in detail below, recognizes that a one-size-fits-all approach to offshore leasing is not appropriate. Decisions about the OCS planning areas to be considered for potential leasing, as well as decisions about the configuration of individual lease sales within a planning area, must be based on the unique combination of resource potential, and environmental and social factors specific to individual OCS areas.

As detailed throughout the PFP, BOEM carefully analyzed and weighed the individual factors specified under section 18 of the Act to develop this regionally tailored leasing program. Based on this analysis, BOEM has developed the schedule of offshore oil and gas lease sales described below.

In sum, the PFP schedules a total of fifteen potential offshore oil and gas lease sales in six OCS planning areas. Twelve of these sales are planned for the Western and Central GOM and the portion of the Eastern GOM planning area that was made available for leasing under the GOM Energy Security Act (GOMESA) in 2006. Oil and natural gas resource potential in the GOM is well-understood and the infrastructure to bring oil and natural gas resources to market and to respond in the event of a spill or other emergency is mature.

The PFP also schedules three potential lease sales in planning areas off of the coast of Alaska – one each in the Chukchi Sea and Beaufort Sea planning areas that span the Alaskan Arctic and one in the Cook Inlet planning area offshore southcentral Alaska. As discussed below, these potential lease sales off Alaska are deliberately scheduled late in the program to allow for the further development of scientific information regarding the oil and gas resource potential in these areas, as well as the sensitive habitats, unique conditions and important other uses, including subsistence hunting and fishing, that are present in Alaskan waters and must be reconciled with energy resource development. North Aleutian Basin (NAB), which includes the rich and vital fishing resources of Bristol Bay, was withdrawn from leasing consideration by the President in a statement on March 31, 2010.

Table B below lists the location and timing of the proposed lease sales under the PFP.

Table B: Proposed Final 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
225	Eastern Gulf of Mexico**	2014
231	Central Gulf of Mexico	2014
238	Western Gulf of Mexico	2014
235	Central Gulf of Mexico	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
244	Cook Inlet***	2016
247	Central Gulf of Mexico	2017
242	Beaufort Sea****	2017

*As in the PP, the sales are not in numerical order for various reasons. As the 2009 DPP encompassed the 2010-2015 time period, many of the sales listed in that document were carryovers from the latter part of the Five 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 PFP and those sale numbers also are not available.

**Sales in the Eastern GOM would only include those areas that are not currently subject to moratorium under GOMESA.

***The Cook Inlet sale is listed as a special interest sale. On March 27, 2012, BOEM issued a Request for Interest, with respect to the Cook Inlet planning area. In light of responses to the Request, BOEM decided to proceed with the pre-sale process for the Cook Inlet and to place the date for a potential lease sale in 2016 to allow time to complete the necessary steps under the Act, develop additional resource and environmental information, and conduct analysis under NEPA.

****Beaufort Sea Sale 242 has been postponed from 2015 to 2017 in recognition of the significant overlapping of subsistence use, resource distribution, species habitat, and to allow more time to analyze and implement our focused leasing strategy in this area.

Regionally Tailored Leasing

The PFP is based on section 18 factors that resulted in leasing strategies that are tailored to specific planning areas in order to best achieve the dual goals of promoting prompt development of the Nation's oil and natural gas resources and providing the necessary protections for the marine, coastal and human environments. The region-specific strategies reflected in the PFP's approach to offshore areas across the OCS are designed to take into account current and developing information about resource potential, the status of resource development and emergency response infrastructure to support oil and gas activities, recognition of regional interest and concerns, and the need for a balanced approach to our use of the Nation's shared natural resources.

This innovative approach best fulfills DOI's responsibility under the Act to balance the various uses of the ocean resources when making leasing decisions, and advances BOEM's commitment to analyzing each potential action in light of the cumulative effects of related activities. Among other things, this Five Year Program establishes and defines parameters for application of this region-specific approach throughout the offshore leasing cycle prescribed under the Act.

Below is a discussion regarding the leasing strategy that BOEM has developed with respect to each of the planning areas that is included in the PFP, as well as the forward-looking strategy for potential oil and gas leasing in areas, such as the Mid- and South Atlantic planning areas, in which lease sales are not scheduled under the PFP but potential future activity is under active evaluation.

The Gulf of Mexico

The oil and natural gas resource potential of the Western and Central GOM, as well as that of the portion of the Eastern GOM not subject to the Congressional moratorium and made available for leasing by GOMESA, are the best understood of the OCS planning areas. The GOM currently supplies more than a quarter of the U.S. domestic oil production. Seismic data and other resource evaluations covering the GOM are extremely sophisticated, providing industry and BOEM with unparalleled detailed geological and geophysical information about the scope and location of oil and natural gas prospects in the GOM. Moreover, the existing infrastructure in the GOM to support offshore oil and natural gas activity, in terms of developing resources, as well as the systems and equipment necessary to respond in the event of an emergency, is mature and well developed.

Therefore, in the Central and Western GOM planning areas, which are the two OCS planning areas that combine the most abundant proven and estimated oil and natural gas resources as well as broad industry interest and mature infrastructure, the PFP includes

annual areawide sales of all legally available, unleased acreage, as has been the traditional leasing model in the GOM.⁷

The PFP also schedules two lease sales in the Eastern GOM planning area. This program area encompasses the Sale 224 area, a sale that was mandated by GOMESA and held in 2008, and a triangular-shaped region to the southeast that is not otherwise restricted. The majority of the Eastern GOM, including all acreage east of 86°41'W longitude and areas west of that longitude that are within 125 miles of Florida, and a small portion of the Central GOM within 100 miles of Florida are subject to Congressional moratorium until mid-2022 pursuant to GOMESA. These areas under moratorium are not included in this Five Year Program.

In summary, the PFP provides the following schedule for planning areas in the GOM:

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

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

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

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

Offshore Alaska

In this PFP, DOI is taking a balanced and careful approach to oil and natural gas leasing offshore Alaska. The PFP schedules one potential lease sale each in the Chukchi Sea and Beaufort Sea planning areas, set late in the schedule established under the Five Year Program,⁸ as well as one special interest sale in the Cook Inlet planning area if industry interest in that planning area remains sufficient to justify consideration of the sale.⁹

In light of both the significant resource potential that exists in the Alaskan Arctic and the substantial environmental challenges and the social and ecological concerns that are

⁷ 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 phase, in the GOM as well as Alaska planning areas.

⁸ Although the State of Alaska disagrees, as indicated in its letter dated February 8, 2012, with scheduling lease sales offshore of Alaska later in the Five Year Program, the Governor of Alaska has consistently supported sales in the OCS offshore Alaska. Moreover, scheduling oil and natural gas lease sales in the Beaufort Sea and Chukchi Sea is consistent with the State's administration of its offshore oil and gas program.

⁹ On March 27, 2012, BOEM issued a Request for Interest with respect to the Cook Inlet planning area. In light of responses to the Request, BOEM decided to proceed with the pre-sale process.

present as well, BOEM's regionally tailored strategy for any future offshore oil and gas leasing in the Arctic is markedly different from the traditional areawide leasing model applied in the GOM, in which all unleased acreage in the area is typically offered for sale, with the exception of limited areas that may be set aside for exclusion; for example, the Flower Garden Banks National Marine Sanctuary.

While this Program begins from the starting point that certain subsets of Arctic areas will be excluded because environmental and subsistence conditions strongly weigh in favor of keeping them off the table for exploration and development, BOEM's goal is to reorient the process for designing Arctic lease sales away from a model where the full area is included, except for specific exclusions. Rather, BOEM is developing a process in which it will continue to use incoming scientific information and stakeholder feedback to proactively determine, in advance of any potential sale, which specific areas offer the greatest resource potential while minimizing potential conflicts with environmental and subsistence considerations. This approach is guided by internal best practices from developing and implementing a "Smart from the Start" strategy for offshore wind, as well as recommendations from the U.S. Geological Survey (USGS) and the National Commission on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling that BOEM consider alternatives to areawide leasing, particularly for frontier areas like the Arctic.

To facilitate this approach, BOEM will carefully consider specific subsets of the broader planning area that have the most promising oil and natural gas resource potential, based on analysis of geological and geophysical (G&G) data as well as information developed through any exploration under existing leases from previous sales. BOEM will further refine those areas in order to exclude or protect through mitigation environmentally sensitive habitats and subsistence uses based on ongoing scientific study and the incorporation of traditional knowledge supplied by Alaskan Natives.

Significant work must be done in the coming years to further develop and aggregate the scientific information and traditional knowledge that will be used to identify areas that may be made available for oil and gas leasing in the Chukchi Sea and Beaufort Sea planning areas under this targeted leasing model.

First, further scientific study and environmental assessment of the Arctic is necessary. In June 2011, USGS 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. 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 (Working Group). 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. The Working

Group's efforts are coordinated with scientific work across the Federal government – including through the Interagency Arctic Research Policy Committee (IARPC). Notably, BOEM currently has ongoing studies that are evaluating, for example, the Hanna Shoal habitat in the Chukchi Sea and the subsistence hunting and fishing patterns of Native Alaskans from the North Slope communities of Point Hope, Point Lay and Wainwright.¹⁰

Second, planning and designing lease sales in the Chukchi Sea and Beaufort Sea planning areas will take into account any information about geology and resource potential that may be developed as a result of G&G surveys and exploration under current leases in those areas.¹¹ 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. Ongoing government, academia, and industry research will contribute valuable information and aid in our understanding of sea-ice dynamics, marine mammal activity, and a variety of other issues pertaining to the Arctic. Important collaborations such as the recent agreement between an oil and gas company and National Oceanic and Atmospheric Administration (NOAA) to share industry data with that Federal Agency opens the door to new collaborations and data access that will further contribute to our collective knowledge.

Further, as offshore oil and natural gas exploration under existing leases moves forward, so too must near- and long-term planning with respect to infrastructure, including spill response preparedness. 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 resources are found and producers seek to engage in year-round production activities. Longer term planning is another major focus of the Working Group. This PFP provides time for contingency planning and infrastructure development that is needed to address these issues.

Defining the Targeted Leasing Model for the Alaskan Arctic

This PFP presents BOEM's current evaluation of a number of different factors that must be considered in the design of potential Arctic sales, which include resource potential, subsistence use, and environmental conditions. For example, Maps C and D for the

¹⁰ Map C regarding the Chukchi Sea planning area illustrates the Hanna Shoal regional and core study areas and describes the current information regarding subsistence use patterns in the Chukchi Sea, which includes primarily existing information for Barrow. BOEM's Environmental Studies Program (ESP) is planning a study (to begin in 2013) to provide updated baseline information concerning subsistence use by Native Alaskan communities in the Chukchi Sea, including among other things, resource harvest locations, areas of specific harvest intensity, and variation in duration of use.

¹¹ On August 4, 2011, BOEM issued a conditional approval of Shell's revised exploration plan (EP) for the Beaufort Sea to drill up to four exploration wells starting in summer 2012. On December 16, 2011, BOEM issued conditional approval of Shell's revised EP in the Chukchi Sea to drill up to six exploration wells beginning in the 2012 drilling season. On March 1, 2012, ConocoPhillips submitted an EP to drill up to 6 exploration wells, beginning in the summer of 2014, in the Chukchi Sea. BOEM must deem the EP complete and then approve the ConocoPhillips EP among approvals from other agencies necessary before the company may conduct any operations under the EP.

Chukchi Sea and Beaufort Sea planning areas respectively, depict a geospatial analysis of several data sources that is being used to assess these various factors and the interplay among them. The ultimate goal of using this analytical method is to design potential lease sales in the Chukchi Sea and Beaufort Sea planning areas that make significant oil and gas resources in defined areas available while minimizing conflicts with other uses of the OCS, consistent with BOEM's mandate under the Act to balance social, economic, and environmental considerations.

With respect to the oil and natural gas resources, the maps differentiate between areas of high, medium, and low hydrocarbon potential.¹² This data incorporates current geophysical, geological, technological, and economic information and employs a probabilistic methodology to estimate the undiscovered technically recoverable resources of oil and natural gas. Nearly all current and historical leases in these planning areas are located in areas defined as having high petroleum potential.

The maps overlay this resource information with subsistence data obtained through a series of socio-economic studies conducted over the past three decades in order to assess areas of high, medium, and low subsistence use.¹³ Further, the maps display important environmental information about the Arctic. These include, for example, the critical habitat area for the Spectacled Eider. They also include regional and core study areas concerning the Hanna Shoal habitat in the northeast Chukchi Sea, where scientific studies have documented sustained benthic productivity, accompanied by high concentration of water birds, walrus, and whales. BOEM's ESP is conducting an ongoing study of this Hanna Shoal area¹⁴ and is initiating a subsistence mapping study focused on the communities of Wainwright, Point Lay, and Point Hope that will inform future decisions.

¹² *Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf*, 2011.

¹³ BOEM's ESP sponsored a study, published in 2009 and entitled "Study Report No. 2009-006 Synthesis: Three Decades of Research on Socio-Economic Effect Related to Offshore Petroleum Development in Coastal Alaska" which includes an extensive presentation of data regarding subsistence use patterns of Beaufort Sea communities and other issues, collected through a series of community-specific technical studies conducted over the course of three decades preceding publication of the report. BOEM is initiating a similar study to map subsistence use patterns of Chukchi Sea communities. MMS – now BOEM – originally designed its template for subsistence research in the 1980s to provide baseline profiles of communities and areas, covering a wide range of topics that collectively described and explained subsistence patterns. These early reports compiled information from the literature, augmented with materials from key respondent interviews and the expertise of investigators. They provide the baseline and starting point for subsequent, community-specific studies of North Slope communities which ESP has continued to support throughout the three-decade period covered by the 2009 report. BOEM OCS Study 2009-003, "Subsistence Mapping of Nuiqsut, Kaktovik, and Barrow" analyzed social science survey data that collected variables of subsistence use such as species harvested, the location and frequency of harvest, and areas commonly used by individual hunters. The report aggregated this information to present it geospatially as a range of intensity of use. Areas at the higher end of the spectrum are defined for the purposes of this map as "high use", while areas with less intensity but some indication of use are defined as "medium use." BOEM recognizes that these data evolve, and will continue to incorporate new information as it becomes available.

¹⁴ The main objectives of the current study are to identify and measure important physical and biological processes that contribute to the high concentration of marine life in the Hanna Shoal area. BOEM will integrate data gained from this study with other relevant Chukchi Sea studies to provide a more complete understanding of environmental considerations such as food web dynamics and potential contaminant bioaccumulations.

BOEM will continue to expand and refine its analysis over the course of the implementation period for this Five Year Program, drawing on a range of information sources, including but not limited to:

- Information gained through any activity on existing leases;
- Ongoing scientific analysis – including science conducted through BOEM’s ESP and drawing from the range of available scientific information – and incorporation of traditional knowledge;
- Information gathered over the course of the pre-lease planning process – as discussed below; BOEM is implementing a number of measures to enhance the effectiveness and transparency of the pre-lease planning process; and
- Information gained through consultations and collaborations with other Federal agencies such as the NOAA and the U.S. Fish and Wildlife Service (USFWS) as well as with Alaska Native groups and communities with traditional knowledge of the use of the OCS, the scientific community; industry; and state and local governments.
- Information gained through collaboration and coordination with other entities such as the North Pacific Research Board and the Arctic Research Council that are involved in directing, conducting, or prioritizing science in the Arctic. Two specific examples include: BOEM is coordinating closely with IARPC and has had a role in developing the IARPC Arctic Research Plan for FY2013-2017 that was recently put out for public comment; and BOEM scientists are working with the National Science Foundation initiative Arctic Science, Engineering, and Education for Sustainability to ensure our science efforts are closely integrated and complimentary.

Building on broad-based analysis at the Five Year Program stage, ongoing analysis will support more focused decision-making in the context of defining and planning each of the specific lease sales in the Chukchi Sea and Beaufort Sea planning areas. Should the Secretary decide to move forward with lease sales, the sale planning stage would include a more definitive set of decisions about which blocks to offer, the terms of the sale, and specific lease stipulations and conditions.

In working to finalize this PFP, BOEM has prioritized the development of tools that will facilitate the identification and design of this targeted lease sale strategy for areas offshore Alaska. As described in greater detail in the Enhancements to the Leasing Process section below, a series of new tools will facilitate this ongoing analysis and provide increased transparency to the public throughout the implementation of the program.

The Chukchi Sea Planning Area

As mentioned above, the PFP schedules one potential oil and natural gas lease sale in the Chukchi Sea planning area in 2016. The PFP maintains a 25-mile nearshore buffer area that was excluded in the 2009 DPP. This area was an alternative analyzed in the 2007-2012 EIS. This area in the Chukchi Sea is excluded in this PFP for the same reasons it

was excluded in the 2007-2012 Program, and those reasons are incorporated here by reference.¹⁵ As BOEM moves forward to define potential areas in the Chukchi Sea planning area that may be offered for oil and natural gas leasing, no acreage within this 25-mile exclusion area may be considered for leasing.

Moreover, based on current information regarding both resource potential and areas of significant subsistence use, the Secretary has decided to remove an additional area north of Barrow from consideration in defining any future oil and natural gas lease sale area in the Chukchi Sea planning area. As delineated in Map C of the Chukchi Sea planning area, this additional deferral area is located north of Barrow and covers approximately 1,163,409 acres and 208 OCS lease blocks beyond the northern edge of the 25-mile exclusion area.

After evaluating current information regarding resource potential and subsistence use in the Chukchi Sea planning area, the Secretary determined that it is appropriate at the PFP stage to exclude areas in the Chukchi Sea planning area that (1) involve at least medium intensity subsistence use or higher; (2) allow for unencumbered subsistence use; (3) are contiguous with and extend the boundary of an existing deferral area¹⁶, and (4) do not include significant acreage identified as offering high resource potential. Analysis of the Chukchi and Beaufort Seas¹⁷ planning areas shows that this portion of the Chukchi Sea area described above meets those criteria, and is appropriate for exclusion at the PFP. This area does not include any blocks that are currently leased or have been leased in the past. While there is a sliver of acreage in this exclusion area that is identified as having high resource potential, the sliver does not include significant acreage, and including this sliver in the program area would not allow for unencumbered use of the entire medium subsistence use area.

Finally, it is important to note that the study that identified the subsistence use data focused on the communities of Barrow, Nuiqsut, and Kaktovik, which accounts for the areas of high and medium subsistence use being focused on in areas around those communities. At this point, we do not have similarly relevant data around the communities of Wainwright, Point Lay, and Point Hope; which necessitates the study referenced above that will map subsistence use data in these areas. The additional subsistence data made available by this study, along with other analysis, will be considered when making future decisions about the size and scope of potential lease sales.

¹⁵ As discussed in “Chapter II: Alternatives Including the Proposed Action” of the 2007-2012 Programmatic EIS.

¹⁶ Contiguous, unencumbered subsistence use areas are logistically essential to allow the small vessels used by native communities, uninterrupted access to the areas for which their livelihood depends.

¹⁷ The existing Barrow subsistence whaling deferral described later covers all full lease blocks that meet the criteria listed for exclusion.

The Beaufort Sea Planning Area

The PFP schedules one oil and gas lease sale in the Beaufort Sea planning area in 2017. As reflected in Map D of the Beaufort Sea planning area, the PFP excludes two subsistence whaling deferral areas near Barrow and Kaktovik from leasing. These areas in the Beaufort Sea are excluded in this PFP for the same reasons they were excluded in the 2007-2012 Program, and those reasons are incorporated here by reference.¹⁸ As demonstrated on the map, the Beaufort Sea planning area is complex, with significant overlap between areas that may offer significant hydrocarbon resource potential and other uses, including subsistence hunting and fishing. Therefore, it is necessary to take the time available prior to the scheduled potential sale to further analyze the resource potential in the area, including consideration of any exploration activity in the Beaufort Sea planning area under existing leases, and further develop scientific information and incorporate traditional knowledge regarding environmental factors and subsistence uses. This ongoing analysis will inform decisions about the configuration of the Beaufort Sea planning area lease sale, as well as any specific mitigation measures that may be appropriate.

The Cook Inlet Planning Area

The PFP schedules one special interest sale in the Cook Inlet planning area in 2016. This sale was initially scheduled in the PP for 2013, but in light of broad industry interest in the planning area, as expressed in response to the RFI that BOEM issued on March 27, 2012, BOEM has moved this sale to later in the program to accommodate appropriate NEPA analysis and planning. At this point, industry has expressed sufficient interest in oil and natural gas leasing in the Cook Inlet planning area for BOEM to proceed with planning for a potential sale, including conducting an EIS evaluating the potential effects on the entire planning area of an oil and natural gas lease sale in the area.

The Atlantic

This PFP does not schedule lease sales in the North Atlantic, Mid-Atlantic, South Atlantic or Straits of Florida planning areas, consistent with the principles of regionally tailored leasing that underlie the entire program. While certain Atlantic states are supportive of offshore oil and natural gas leasing in the Mid- and South Atlantic planning areas, many other Atlantic states expressed concerns about oil and natural gas development off their coasts and in neighboring areas. While the DPP issued in January 2009 included the North, Mid- and South Atlantic planning areas as under consideration for potential inclusion in the program, a number of specific considerations, discussed below, support the Secretary's decision in the PP and PFP not to schedule lease sales in these areas at this time. Accordingly, BOEM is proceeding with a region-specific strategy to address these considerations and support future decision-making regarding whether, and if so where, potential offshore oil and gas lease sales in the Mid- and South Atlantic planning areas would be appropriate.

¹⁸ As discussed in "Chapter II: Alternatives Including the Proposed Action" of the 2007-2012 Programmatic EIS.

First, current G&G information regarding oil and natural gas resource potential in the Mid- and South Atlantic is based on older data collected in the 1970s and 1980s. Tremendous advances in instrumentation and technology for the acquisition and analysis of G&G data have been made in the intervening decades. Modern G&G data, including seismic surveys and other scientific information, is needed to evaluate the resource potential in these areas and to inform decisions about whether and where any leasing should take place. Accordingly, BOEM has assigned a high priority to moving forward to facilitate resource evaluation in these areas, including conducting a Programmatic EIS relating to G&G surveys in the Mid- and South Atlantic planning areas. BOEM issued this draft EIS for public comment in March 2012 and expects to complete the EIS in late 2012 or early 2013, which could mean G&G surveys in the Mid- and South Atlantic may move forward as early as 2013.

Second, there are complex issues relating to potentially conflicting uses, including but not limited to those of the Department of Defense (DOD), which must be addressed so that any potential future leasing activity in these areas is configured appropriately. For example, in response to the 2009 DPP, DOD identified significant conflicts in the proposed Sale 220 area offshore of Virginia such that it believed that “no oil and gas activity” should be conducted in 72 percent of the proposed sale area and that no permanent oil and gas facilities should be located in an additional 5 percent of the proposed Sale 220 area.¹⁹ DOI respects the military’s mission in protecting the United States and will continue to work closely with DOD to understand and deconflict the military’s needs in these areas as we consider future energy development in the Mid- and South Atlantic planning areas.

Finally, as DOI moves forward in these areas with facilitating the evaluation of the resource potential and deconflicting potential oil and gas activity from other uses, so too should longer-term analysis and planning be completed for the infrastructure and resources that would be necessary to prepare for such activity. Currently, the Mid- and South Atlantic planning areas lack the infrastructure necessary to support oil and gas exploration and development, including infrastructure necessary to support exploration and development activity and for responding to emergencies such as a spill.

Taken together, these factors supported the Secretary’s decision not to include the Mid- and South Atlantic planning areas for evaluation at the PP and PFP stage of development of this Five Year Program. Thus, they may not be considered at this PFP stage, under the section 18 winnowing process. However, as summarized above, BOEM is currently pursuing a specific strategy to develop modern, robust scientific information about the scope and location of potential oil and gas resources in the Mid- and South Atlantic and to resolve significant potential conflicts between oil and gas activity and other important OCS uses in these areas, including military, fishing, and vessel traffic uses as well as environmental and infrastructure concerns.

¹⁹ September 18, 2009, letter to MMS Director from the Office of the Under Secretary of Defense

The Pacific

The four planning areas off the Pacific coast were not included for potential oil and natural gas leasing in the PP, therefore are not available for consideration in this PFP under the section 18 winnowing process. This determination was consistent with the requirements of section 18 of the Act, which 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. Consistent with the principles of section 18 and the resulting regionally tailored leasing strategy, this Five Year Program specifically seeks to provide appropriate weight to the recommendations of governors of coastal states and of state and local agencies. The exclusion of the Pacific Coast is consistent with the long-standing interests of Pacific coast states, as framed in an agreement that the governors of California, Washington, and Oregon signed in 2006.²⁰ This agreement expressed the governors' opposition to oil and gas development off their coasts, and these states continued to voice these concerns, including in formal comments on the 2009 DPP.

Enhancements to the Leasing Process

BOEM finalized this PFP in a manner that addresses the substantial public input the agency received following issuance of the PP in November 2011. BOEM received over 280,000 written comments, and heard from a range of stakeholders in public hearings that were held in the GOM region, Washington D.C., and in Alaska, including in communities across the North Slope. Many of the comments focused on BOEM's approach to leasing and generally requested additional spatial deferrals, temporal deferrals and mitigations for specific areas in the Arctic and the GOM. As discussed above, while DOI has taken action in this PFP with respect to adjusting the subsistence deferral area in the Chukchi Sea planning area, the regionally tailored approach to leasing underlying the PFP, as well as the multi-staged process under the Act, specifically contemplate further decision-making regarding the location and configuration of offshore oil and natural gas lease sales, including with respect to potential deferrals and mitigation measures, at later stages in the process.

In light of the many comments requesting deferrals and mitigations and BOEM's own review of its leasing process under the Act, BOEM has developed a range of enhancements designed to increase public engagement and transparency with respect to leasing decisions to be made after publication of this PFP. These enhancements also address numerous comments that focused on the importance of developing a strategic approach to leasing on the OCS. Specifically, BOEM has developed tools to increase transparency and public dialogue throughout the stages of the leasing process defined by the Act in order to ensure that each step in the leasing process provides a meaningful opportunity to incorporate feedback and new information. This approach highlights and strengthens many important decision points that exist in the leasing process established

²⁰ West Coast Governors Agreement on Ocean Health, September 18, 2006

by the Act, which begins with the Five Year Program, continues through the planning and execution of each individual lease sale, and follows with post-lease planning and oversight of operations.

The multi-staged process under the Act provides many opportunities for BOEM to take into account public input and developing scientific information in making determinations regarding the timing, geographic location, configuration and specific conditions, including mitigation measures, of each lease sale. The tools described below are designed to enhance each stage of the process.

Annual Progress Reports

Beginning with this PFP, BOEM is committing to publish an annual progress report on the Five Year Program that includes an opportunity for stakeholders and the public to comment on the program's implementation. Under section 18(e) of the Act, the Secretary must review an approved program each year. Historically, this review has been an internal process with BOEM reporting to the Secretary any information or events that might result in the Secretary's consideration of a revision to the program.

This new annual progress report will provide the public an overview of the activities that have occurred during the previous year, including but not limited to:

- Statistics of sales that have occurred in the previous year including the number and location of lease blocks and the dollars collected on high bids;
- An aggregate collection of all newly enacted deferrals and mitigations;
- A summary of completed and ongoing safety and environmental studies;
- Regulatory updates;
- A discussion of any significant new drilling activities; and
- A summary of any significant incidents.

The findings of this annual progress report may lead the Secretary to revise the program by delaying, cancelling, or reducing the size of scheduled lease sales, which generally does not require revision of the Five Year Program under the Act. If any revisions -- such as including new areas for consideration or adding more sales in areas already included in the program -- are considered significant under the Act, then the full section 18 process must be followed with respect to those changes, which may result in the preparation of a new Five Year Program.

Mitigation Tracking Table

As described above, BOEM may incorporate additional spatial deferrals, temporal deferrals, and mitigation measures at a number of different points in the leasing process under the Act. BOEM will continue to use new information, including developing scientific information, to inform decisions at each successive stage. In some cases, BOEM may determine that a certain decision is best suited for a later stage in the process once additional information or analysis becomes available. For example, BOEM has a

number of ongoing studies concerning the Chukchi Sea and Beaufort Sea planning areas that will be used to help determine the configuration, including potential area exclusions in light of environmental concerns or subsistence use, of any lease sales in those areas.

Many comments on the PP requested specific deferrals and mitigation measures. Accordingly, BOEM is establishing a tracking table to provide increased visibility into the consideration of these recommendations at each stage of the leasing process. Beginning with the Five Year Final EIS, this tool will track the lineage and treatment of suggestions for spatial exclusions, temporal deferrals, and mitigation from the Five Year Program to the lease sale phase and on to the plan phase. The tracking table will allow the public to see how and at what stage of the process their concerns are being considered. Thus, the tracking table will increase the public visibility of the iterative and progressive nature of the leasing process under the Act. In addition, the tracking table is a vehicle for BOEM to provide the public with information about the consideration of comments and proposals at multiple decision points in the offshore oil and gas leasing process.

The Pre-Lease Sale Process

BOEM is taking a number of steps to enhance opportunities for the public to comment and provide new information in the pre-lease sale planning process. The first step of the pre-lease sale process is the Call for Information (Call) and the Notice of Intent (NOI) to prepare an environmental analysis. Historically, the Call has generally asked for industry to nominate specific blocks or descriptions of areas within the program area for which they have the most interest, while the NOI requests comments on issues that should be addressed and alternatives that should be considered. To enhance this step in the pre-lease sale process and to make it more robust and inclusive, BOEM will implement a number of enhancements.

BOEM will use both the Call and the NOI as vehicles to ask for specific recommendations about areas of concern that could warrant consideration for mitigation measures or removal from the sale. In the areas of the GOM where BOEM proposes to continue with areawide leasing, this information will help to identify specific concerns that may demand particularized mitigation measures such as additional lease stipulations. In the Arctic, BOEM will use the information gained through this process, in combination with resource estimates, information from potential exploratory drilling, environmental reviews, and other data, to focus leasing on the most promising tracts, while protecting important Arctic habitats and critical subsistence activities.

This approach to the pre-lease process will complement the tracking table, which BOEM will update to indicate where feedback is considered and instances where it has led to a specific mitigation measure, or to removal of an area. Within the Call and NOI themselves, BOEM will provide a link to a tailored map identifying areas in which specific mitigation measures or exclusions have been determined to apply or are under consideration. This tailored map will allow the public to view multiple layers of existing data and afford the opportunity to provide new data to better inform decision-makers.

See Figure 1 and the more detailed discussion of the lease sale process in part III of this document.

Assurance of Fair Market Value

Section 18 requires that the government receive 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. 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 Five Year Program. Further, the PFP 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 during the latter years of the current 2007-2012 program have incorporated a number of enhanced approaches to ensure FMV and provide incentives for diligent development. Examples from the previous program included adjusting initial lease periods 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 Five Year Program usually takes two and a half to three years. BOEM began the preparation process for the Five Year Program by publishing a Request for Information on August 1, 2008 (73 FR 45065). BOEM then published the 2009 DPP for a 2010-2015 program and an NOI to prepare an EIS on January 21, 2009 (74 FR 3631) with the statutory minimum 60-day comment period. 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 were summarized in Appendix A of the PP document. Scoping meetings for the Five Year EIS, scheduled to be held during the initial 60-day comment period, were postponed.

In light of the comment period extension and BOEM's evaluation 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 as the first of three decision proposals for the 2012-2017 program; the PP as the second proposal for the 2012-2017 program; and this PFP as the third and, assuming final approval by the Secretary, the last proposal for the 2012-2017 program. If unchanged, this PFP will succeed the current 2007-2012 program, following that program's expiration on June 30, 2012. The 2012-2017 program will be effective on the day that the Secretary approves the program, and that date will be no sooner than 60 days following submission of this PFP to the President and Congress.

The 2009 DPP proposed 31 OCS lease sales in 12 of the 26 OCS planning areas, including the three Atlantic planning areas, two of the planning areas offshore Pacific, four offshore Alaska, including the NAB – which includes Bristol Bay – in addition to the three areas in the GOM included in the PP and PFP. The 2009 DPP contained the section 18 analysis on all 26 planning areas. At the PP step, BOEM analyzed six areas, pursuant the Act, in the decision document, and, pursuant to NEPA, in the Five Year Draft EIS. At this PFP step, there is further analysis of the same six areas in this decision document and the accompanying Five Year Final EIS.

On March 31, 2010, President Obama and Secretary Salazar 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 Five Year EIS would proceed for eight of the twelve areas included in the 2009 DPP, including the Beaufort Sea, Chukchi Sea, and Cook Inlet off the coast of Alaska; Western, Central, and Eastern GOM; 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, President Obama withdrew the NAB from leasing consideration through June 30, 2017, pursuant to section 12 of the Act and therefore it was not available for inclusion in the Five Year Program under section 18. The decision to exclude the North Atlantic and offshore California was made with consideration of comments concerning these 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 natural gas activities off their coasts and pointed to state policies and initiatives to encourage development of 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. That position was also presented by the California Coastal Commission, the state agency which has regulatory authority, pursuant to the Coastal Zone Management Act (CZMA), over Federal activities on the OCS that affect the state’s coastal resources.

After the President’s March 31, 2010, announcement and in light of the *Deepwater Horizon* event on April 20, 2010, the President and Secretary stressed the need to heighten the 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 separated into two bureaus, 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.

BOEMRE, introduced performance-based workplace safety standards (described below) 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). 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 had to develop a comprehensive Safety and Environmental Management System (SEMS) program by November 2011, which identifies the potential hazards and risk-reduction strategies for all stages 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 September 2011, BOEMRE published a follow-up proposed rule, “Oil and Gas and Sulphur Operations in the Outer Continental Shelf—Revisions to Safety and Environmental Management Systems” (SEMS II). The proposed rule includes procedures that authorize any employee on a facility to cause work to stop— 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. A final rule is expected to publish in 2012. In the meantime, in response to several requests, BSEE issued Notices to Lessees (NTL) 2011-N09 in October 2011, to provide lessees and operators guidance on the development and implementation of a SEMS program.

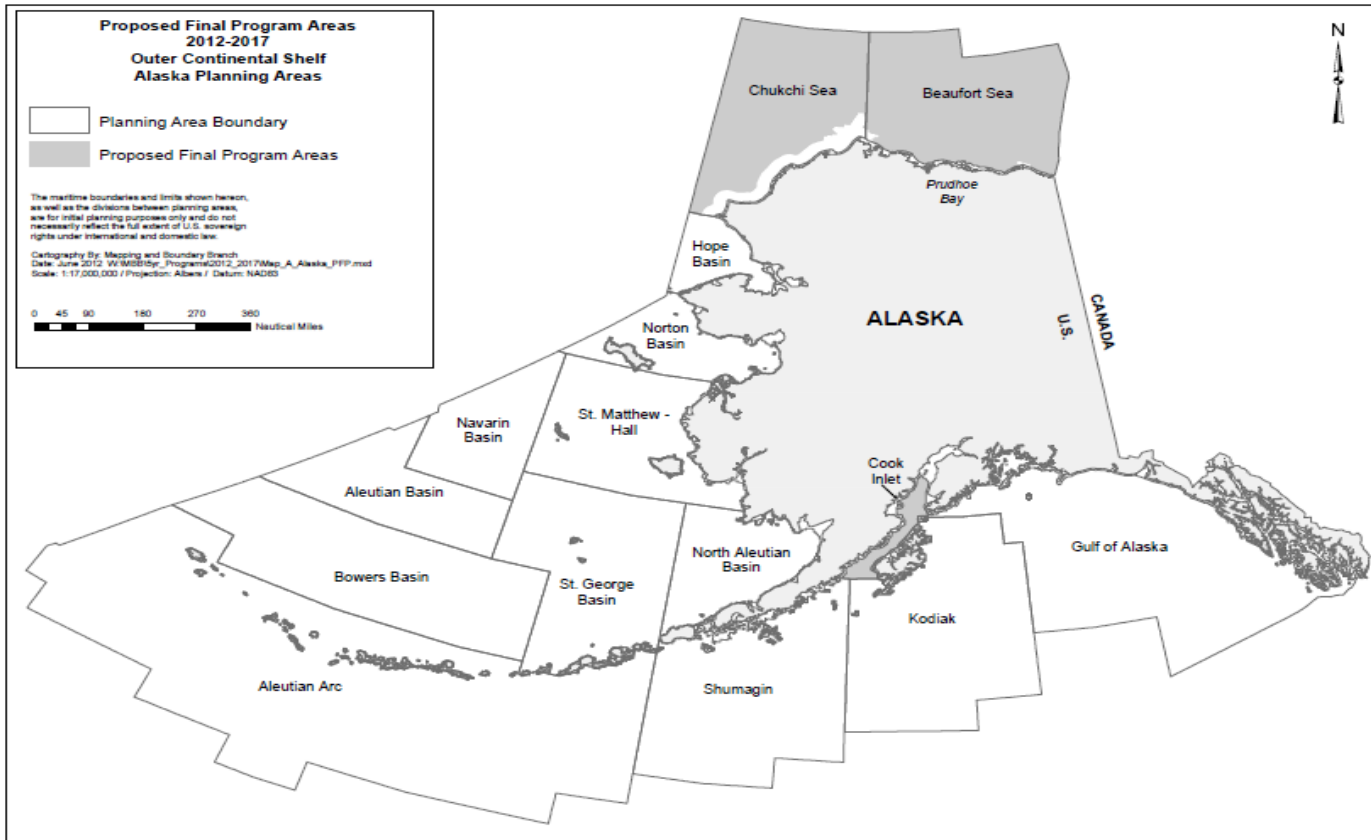
In addition to these important new rules, BOEMRE issued additional guidance to operators on complying with existing regulations. NTL 2010-N06 outlines the information that must be provided in an operator’s exploration or development plan, including a well-specific blowout scenario, a worst-case discharge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

BOEMRE’s NTL 2010-N10 describes the requirement for 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. 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 respond promptly to a deepwater blowout or other loss of well control.

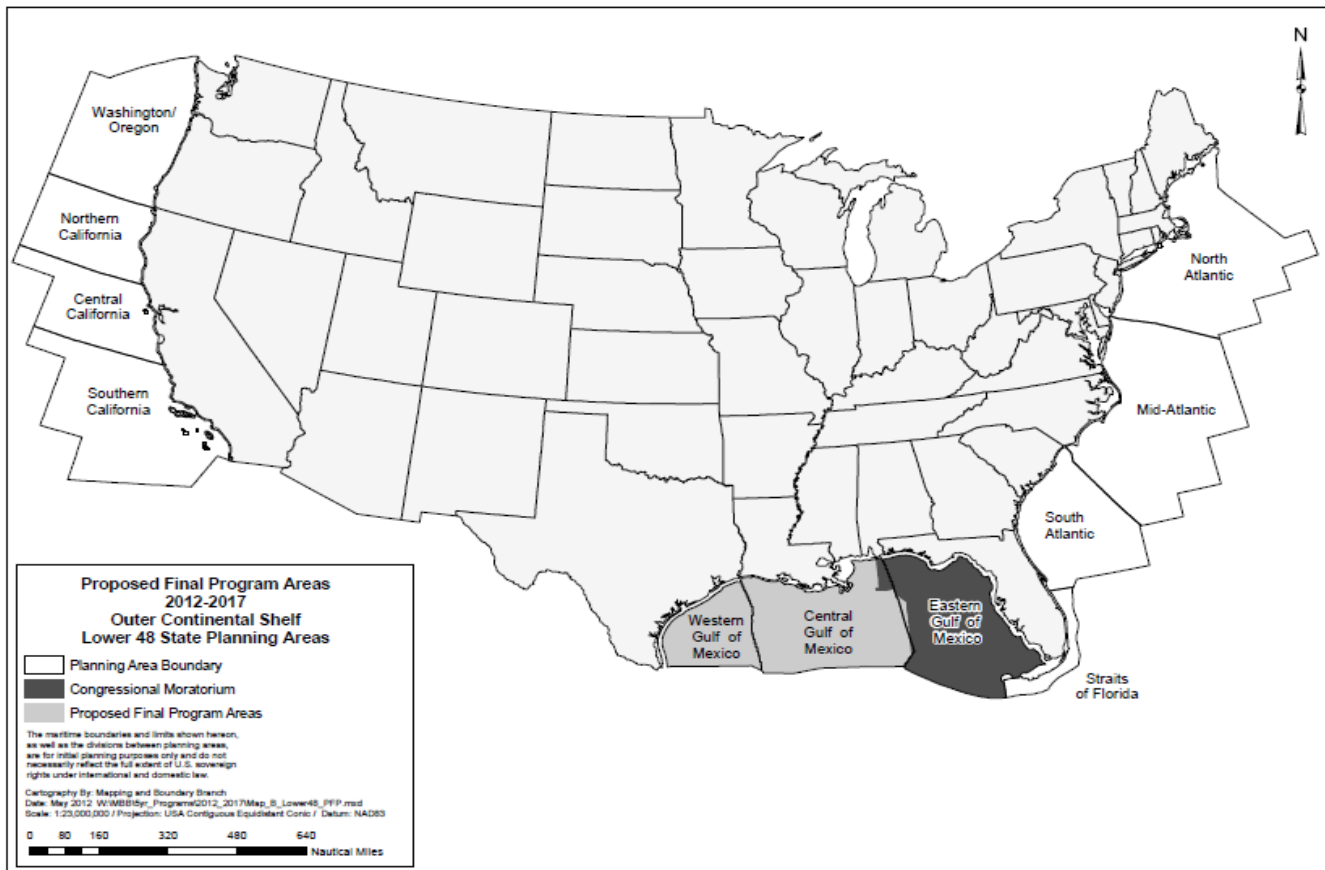
The *Deepwater Horizon* event and subsequent requirements described in NTL 2010-N10 also created new impetus for industry-driven containment technology. For example, the offshore oil and natural gas industry has formed two consortia – the Marine Well Containment Company and the Helix Well Containment Group – to develop and make available to operators subsea containment systems, including capping stacks and systems for the capture of flow from a well. BSEE requires all operations covered by NTL-2010-N10 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 also have focused on strengthening the institutions responsible for managing offshore resources and enforcing compliance with safety standards. On May 19, 2010, the Secretary 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 reorganization on October 1, 2011, BOEM manages the environmentally and economically responsible development of the Nation’s offshore resources, including preparation and maintenance of the Five Year Program. BSEE is responsible for safety and environmental enforcement of offshore oil and gas operations, including permitting and inspections, and ONRR handles revenue collection and disbursement.

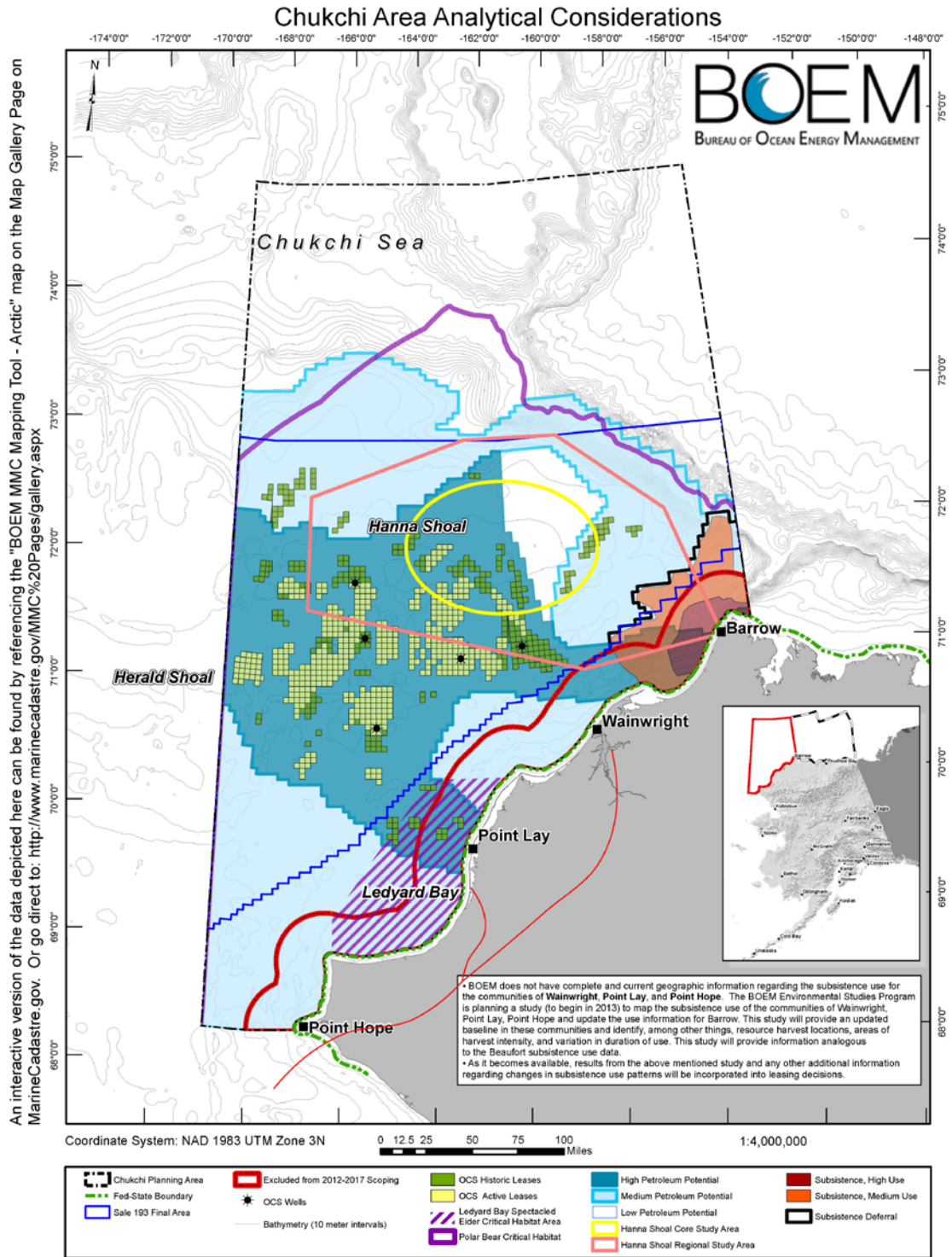
In developing the PP and now this PFP, BOEM carefully considered the risks associated with oil spills and the measures needed to reduce the likelihood of spill occurrence and to mitigate damage in the unlikely event of a blowout. BOEM also considered the significant safety and environmental improvements and reforms implemented by BOEM and BSEE since the *Deepwater Horizon* event; as well as improved industry capabilities such as the development of subsea containment systems. The Five Year Final EIS includes extensive consideration of these reforms, as well as a detailed comparison of current standards with previous regulatory requirements. It concludes that the new measures create a more robust regulatory system that strikes the right balance so 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 Five Year Final EIS for the 2012-2017 Program.



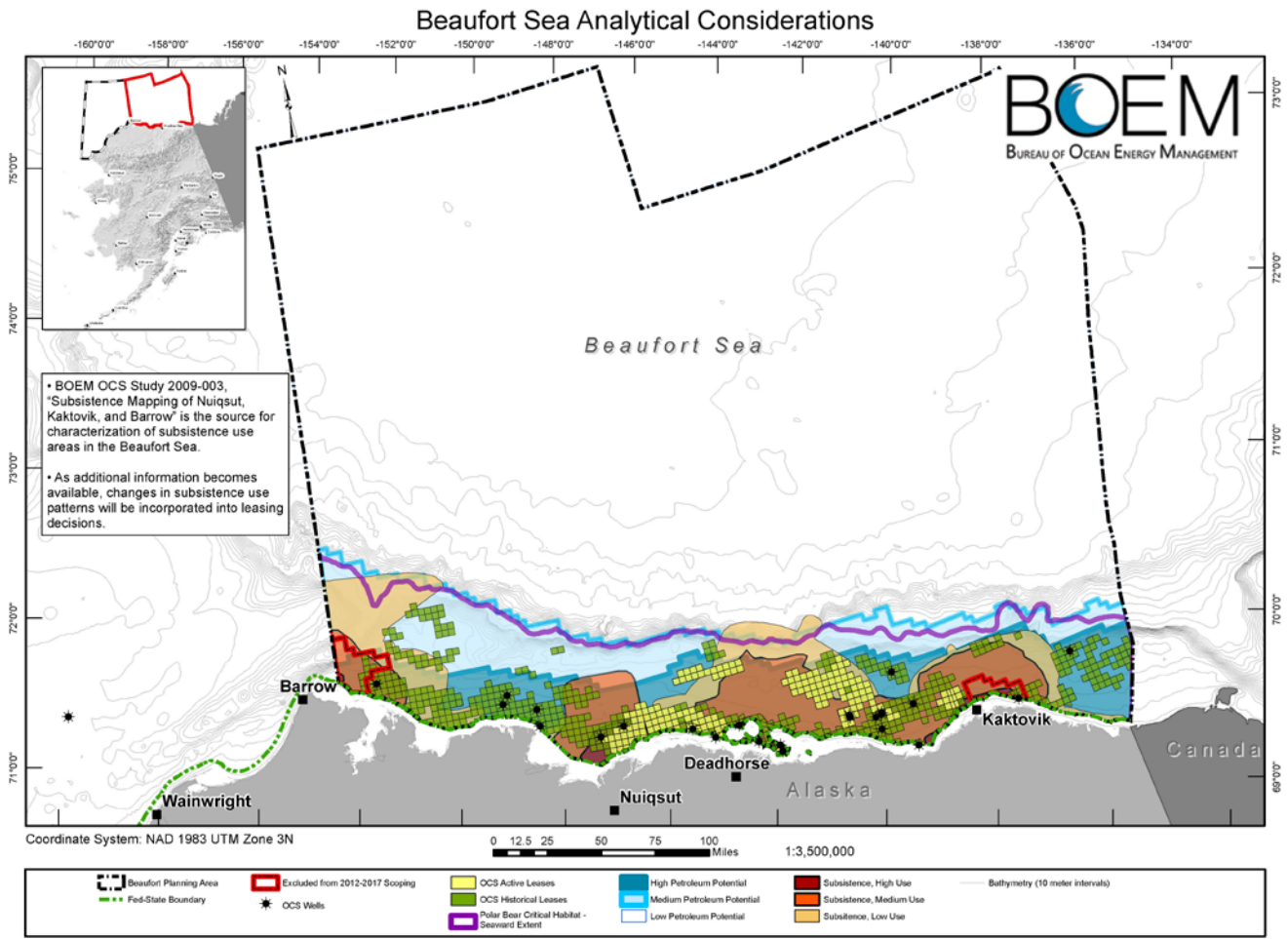
Map A: Shows the Alaska Program Areas



Map B: Shows the Lower 48 State Program Areas



Map C: Shows Chukchi Sea Analytical Considerations



An interactive version of the data depicted here can be found by referencing the "BOEM MMC Mapping Tool - Arctic" map on the Map Gallery Page on MarineCadastre.gov. Or go direct to: <http://www.marinecadastre.gov/MMC%20Pages/gallery.aspx>

Map D: Shows Beaufort Sea Analytical Considerations

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

A. Procedural Requirements

The development of the PFP is one of several steps in the process of preparing the new Five Year Program. This document is the third and, the last proposal of OCS lease sales for the 2012-2017 timeframe. Before a new Five Year Program may be approved and implemented, BOEM must solicit and consider comments received on a draft proposed program, proposed program, and Five Year Draft EIS, and issue a Five Year Final EIS and a proposed final program to submit to the President and the Congress for a minimum of 60 days. The key steps in preparing a new Five 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 Five Year Program for 2010-2015, to commence two years before the expiration of the Five Year Program for 2007-2012, and announced the start of scoping for the associated EIS. 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 Five Year Program for 2010-2015. BOEM announced the 2009 DPP and NOI 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 statutorily-mandated minimum 60-day comment period. The Secretary later extended the comment period to 240 days and it closed on September 21, 2009. Extension of the comment period and other intervening events precluded an approved program from covering the originally-proposed 2010-2015 time frame. Nonetheless, comments received at the four public meetings that the Secretary convened in April 2009 are included in Appendix A of the PP decision document.

Proposed Program

The PP was based on further section 18 analyses and consideration of the comments received during the extended comment period on the 2009 DPP. On November 8, 2011, BOEM announced the PP, which was published in the *Federal Register* and submitted, along with supporting analyses and a Five Year Draft EIS, to the governors, heads of interested Federal agencies, Congress, and other interested and affected parties, on November 10, 2011. The 90-day comment period ended on February 8, 2012, during which time BOEM received over 280,000 comments. These comments are summarized in Appendix A of this document.

Proposed Final Program

The PFP is the third and, absent important Presidential or Congressional input during the 60 day period, the last of the Secretary's three proposals and is based on further section 18 analyses and consideration of the comments received by BOEM concerning the PP. BOEM announces the PFP in the *Federal Register* and submits 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 Federal agencies. BOEM issues a Five Year Final EIS concurrently with the PFP.

Program Approval

Sixty days after the PFP is submitted to the President and the Congress, the Secretary may approve the new Five Year Program for 2012-2017.

B. Substantive Requirements

Section 18 of the Act sets forth specific principles and factors that guide Five Year Program formulation by providing the foundation for BOEM analysis that is used in the development of reasonable options for a schedule of proposed lease sales. The Secretary may select from these options indicating, as precisely as possible, the size, timing, and location of leasing activity 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 Five Year Program is to help meet the Nation's future energy needs. Part IV.A of this document 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 (AEO)*, the potential contribution of OCS oil and natural gas production to 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 oil and gas activities could have on other resource values of the OCS 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 environmentally sound operations, as well as pertinent findings of the Final EIS for the Five 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 surplus²¹ related to potentially 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 prepared for this PFP, 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 Five Year Final 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 Final 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.

²¹ 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 consumers would be willing to pay for this 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.

BOEM is supporting ongoing research to consider options and potential new approaches to defining and measuring environmental value including innovative ways to assess relative environmental sensitivity as called for in section 18 (a)(2)(G) of the Act. Findings from new research are not yet available for use in the PFP analysis, but current approaches are adequate, and may be enhanced by the use of such findings in the preparation of future Five Year Programs.

Factors for Determining Timing and Location of Leasing

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 PFP analysis and the Five Year Final EIS that address them, as appropriate.

(A) Geographical, Geological, and Ecological Characteristics

The main source of information on geographical, geological, and ecological characteristics of the OCS planning areas considered in preparing the PFP is the Final EIS for the Five 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 ESP information system (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 Five 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 and has been affected by the long-term withdrawal of and moratoria on leasing certain areas. The only existing Congressional moratorium is pursuant to GOMESA and the executive withdrawals are for the NAB, offshore Alaska through June 30, 2017; and National Marine Sanctuaries that are withdrawn indefinitely.

(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 Five Year Final 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 Final 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 PP. The discussions of size, timing, and location options in part III also include summaries of industry interest. Appendix A summarizes all comments received from oil and natural 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 – including federally approved coastal zone management programs and policies – that any state governments may have identified in responding to BOEM requests for comments on the PP. Appendix A summarizes all comments received from state governors and Federal and state government agencies.

(G) Environmental Sensitivity and Marine Productivity

Part IV.C analyzes environmental sensitivity and marine productivity for the six areas included in the PFP, following the process and format used in the Revised Program for 2007-2012, in response to the U.S. Court of Appeals for the District of Columbia Circuit’s remand decision of April 17, 2009, (*Center for Biological Diversity, et al. v. Department of the Interior*, 563 F.3d 466 (D.C. Cir. 2009)). 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. The 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.

Both approaches are valid and provide the information required by section 18 (a)(2)(G), but they each focus on different aspects of an ecosystem. 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. The same approach is used in the analysis presented in this PFP, but BOEM is also aware of the “system response” approach. In an effort to constantly improve the basis for decision-making, 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 the new research and analysis are not yet available for use in the PFP analysis, but after appropriate vetting and further consideration, will be considered for use in the preparation of future Five Year Programs.

As used in this PFP and the earlier PP, 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 Final EIS for the Five 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 Five Year Final EIS relevant to each PFP 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 among 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. The PP and this PFP document compare 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. 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

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 Five 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 current 2007-2012 program. The U.S. Court of Appeals for the District of Columbia Circuit decided all of those lawsuits. The new Five Year Program is being prepared in accordance with guidance provided in those decisions, which are cited below.

California I [California v. Watt, 688 F.2d 1290 (D.C. Cir. 1981)];

California II [California v. Watt, 712 F.2d 584 (D.C. Cir. 1983)];

NRDC [Natural Resources Defense Council], *et al. v. Hodel*, 865 F.2d 288 (D.C. Cir. 1988)]; and

CBD [Center for Biological Diversity, *et al. v. Department of the Interior*, 563 F.3d 466 (D.C. Cir. 2009)].

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

D. Analytic Approach

The analysis underlying development of the PFP for 2012-2017 considers the size, timing, and location of leasing and the provisions for assuring FMV from 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. The PP and this PFP analyses, examines and compares six selected areas in light of the criteria of section 18 of the Act. These six areas also are analyzed in the EIS for the 2012-2017 Program, prepared pursuant to NEPA to assess the effects of the PFP.

Section 18 factors require balancing by the Secretary. As part of his balancing, the Secretary focused on and applied the following guiding principles when according weight to section 18 factors and in selecting options for the size, timing, and location of areas proposed for leasing in this PFP.

- 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 or anticipated 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 decision-making in the next Five Year Program.
- Seek to accommodate the recommendations of governors of coastal states and of state and local agencies.
- Tailor a leasing strategy to specific regions in order to best achieve the dual goals of promoting prompt development of the Nation's oil and natural gas resources and ensuring that this development occurs safely and with the necessary protections for the marine, coastal and human environments. This region-specific approach accounts for such issues as 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 the use of natural resources.

Development of a new Five 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 natural gas leasing program. 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. Parts III and IV of this document discuss in detail the sources of information and the methodologies applied in the PFP analyses. Also, much information is incorporated by reference. This information is listed below.

Final EIS for the Proposed Program for 2012-2017 (expected July 2012)

Decision Document for the Proposed Program for 2012-2017 (November 2011)

Decision Document for the Revised 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

Gulf of Mexico Oil and Gas Lease Sales: 2012-2017; Western Planning Area Lease Sales 229, 233, 238, 246 and 248; Central Planning Area Lease Sales 227, 231, 235, 241, and 247; Draft Environmental Impact Statement, 2011.

Gulf of Mexico Oil and Gas Lease Sales: 2007-2012; Western Planning Area Sales 204, 207, 210, 215, and 218; Central Planning Area Sales 205, 206, 208, 213, 216, and 222; Final Environmental Impact Statement, MMS 2007-018, 2007

Gulf of Mexico OCS Oil and Gas Lease Sale 216/222; Central Planning Area; Final Supplemental Environmental Impact Statement; 2012

Gulf of Mexico OCS Oil and Gas Lease Sale 218; Western Planning Area; Final Supplemental Environmental Impact Statement, BOEMRE 2011-034, 2011

Gulf of Mexico OCS Oil and Gas Lease Sales: 2009-2012; Central Planning Area Sales 208, 213, 216, and 222; Western Planning Area Sales 210, 215, and 218; Final Supplemental Environmental Impact Statement, MMS 2008-041, 2008

Gulf of Mexico OCS Oil and Gas Lease Sale 224; Eastern Planning Area; Final Supplemental Environmental Impact Statement, MMS 2007-060, 2007

Gulf of Mexico OCS Oil and Gas Lease Sales 189 and 197; Eastern Planning Area; Final Environmental Impact Statement, MMS 2003-020, 2003

Accounting for Socioeconomic Change from Offshore Oil and Gas; Cumulative Effects on Louisiana's Parishes; 1969-2000, MMS 2006-030, 2006

Gulf of Mexico OCS Oil and Gas Lease Sale 181; Eastern Planning Area; Final Environmental Impact Statement, MMS 2001-051, 2001

Site-Specific Environmental Assessment for an FPSO Facility; Site-Specific Evaluation of Petrobras America Inc.'s Initial DOCD, N-9015; Cascade-Chinook Project, MMS 2008-008, 2008

Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 and Seismic Survey Activities in the Chukchi Sea, Final Environmental Impact Statement, MMS 2007-026, 2007

Chukchi Sea Planning Area Oil and Gas Lease Sale 193, Final Supplemental Environmental Impact Statement, OCS EIS /EA, BOEMRE 2011-041, 2011

Arctic OCS Seismic Surveys- 2006, Programmatic Environmental Impact Statement, OCS EIS/EA, MMS 2006-038, 2006

Environmental Assessment—Proposed Oil and Gas Lease Sale 202 Beaufort Sea Planning Area, MMS 2006-001, 2006

Alaska Outer Continental Shelf Beaufort Sea Planning Area Oil and Gas Lease Sales 186, 195, and 202, Final Environmental Impact Statement, OCS EIS/EA, MMS 2003-001, 2003

Geological and Geophysical Exploration for Mineral Resources on the Gulf of Mexico Outer Continental Shelf: Final Programmatic Environmental Assessment, OCS EIS/EA MMS 2004-054, 2004

U.S. Coast Guard Marine Casualty Pollution Investigations, “Oil Spill Compendium 1973-2004”

EIA Annual Energy Outlook; <http://www.eia.doe.gov/oiaf/aeo/index.html>

Undiscovered Oil and Gas Resources, Alaska Federal Offshore As of 2006

Assessment of Undiscovered Technically Recoverable Oil and Gas Resources on the Nation's Outer Continental Shelf, BOEM Fact Sheet RED-2011-01a, 2011

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

Final Report of the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, 2011

Atlantic OCS Proposed Geological and Geophysical Activities, Mid-Atlantic and South Atlantic Planning Areas, Draft Programmatic Environmental Impact Statement, BOEM 2012-005, 2012

III. PROPOSED FINAL 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. 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 previous proposals. NAB, offshore Alaska, is subject to Presidential withdrawal from disposition by leasing until after June 30, 2017. Most of the Eastern GOM planning area, including all areas east of 86°41'W longitude or 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 proposed for consideration.

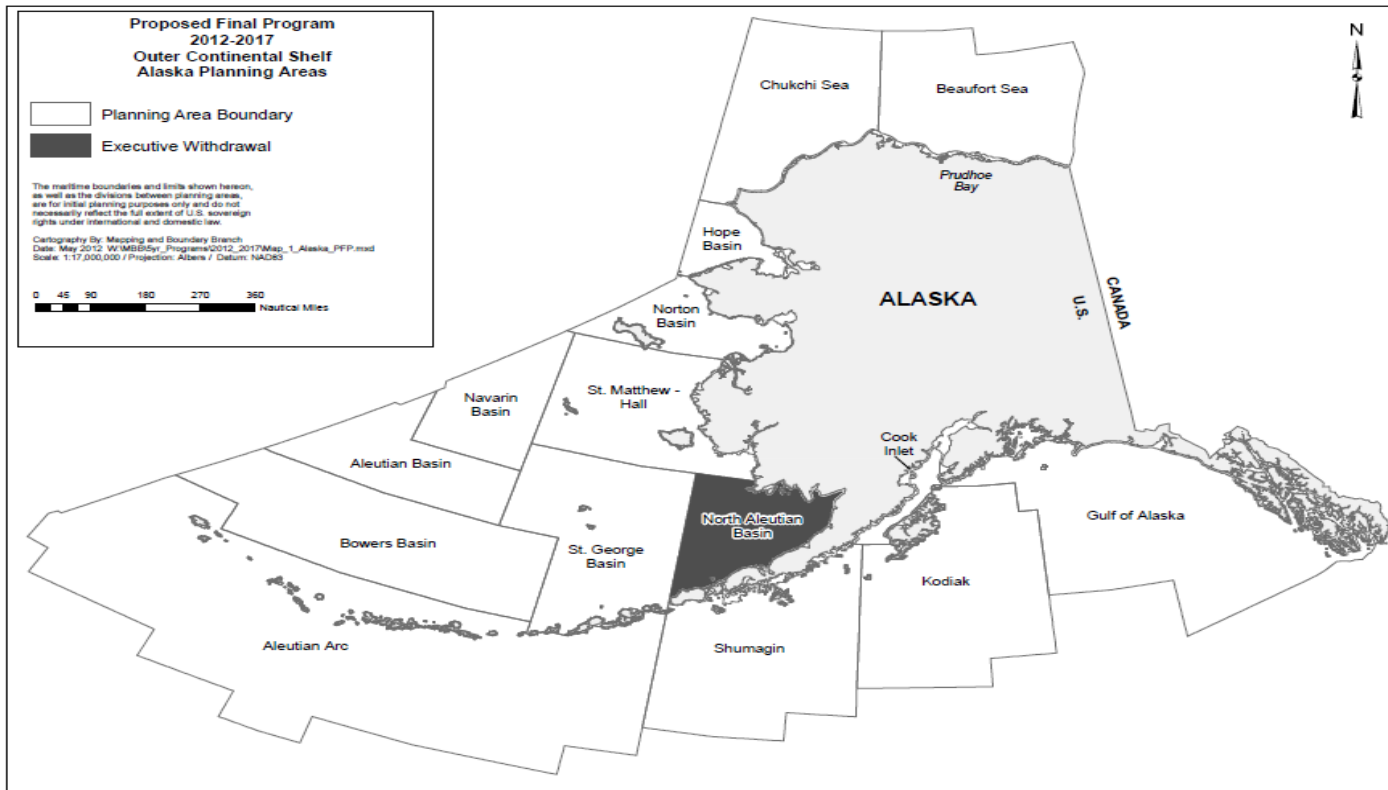
The 2009 DPP proposed for consideration the NAB (which has since become subject to Presidential withdrawal, as discussed above), as well as two areas offshore California and three areas in the Atlantic OCS. See the discussion in part I of this document concerning those six planning areas, which were not considered for leasing in the PP. Those areas, therefore, are not included in this PFP and not analyzed in this document. Under the section 18 process, the Secretary winnows the areas for detailed consideration in the PP and the PFP. This approach also 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 [sic] there is no need to fully evaluate that area.” Maps 1 and 2 show the 26 planning areas, identifying those 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 natural 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 Five 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).

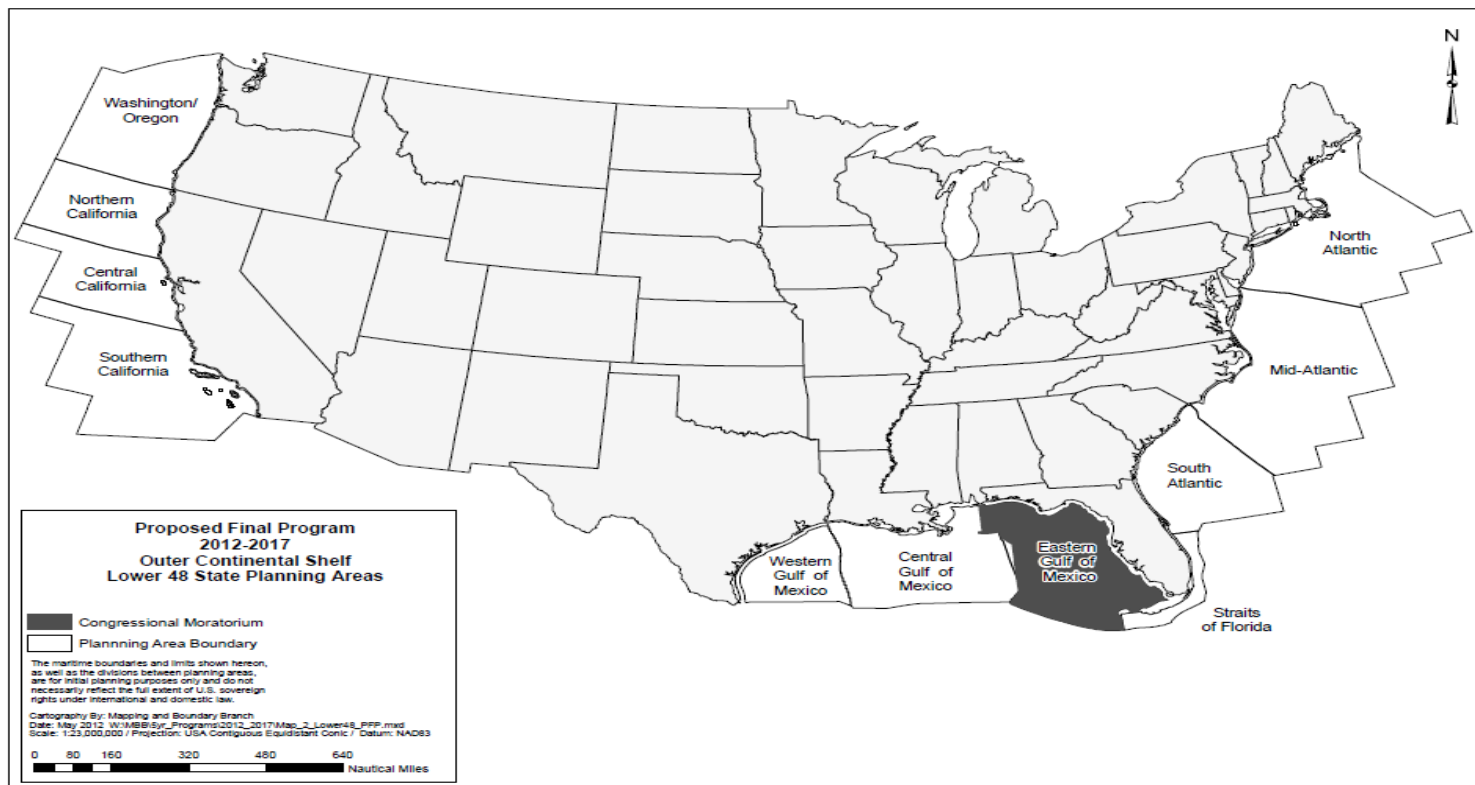
To ensure adequate oversight to limit potential environmental damage and adverse impacts on the coastal zone, the Secretary decided to continue with his decision in the PP to focus on offshore areas that currently have leases and/or exploration, some level of support from the adjacent state and local governments, and/or known or anticipated hydrocarbon presence. This decision was made for the PP and confirmed in this PFP after consideration of the various section 18 factors; such as law, goals, and policies of adjacent states, as well as the level of knowledge concerning the potential for recoverable oil and gas resources and the environmental and other relevant information needed to make informed decisions.

The removal of the Mid- and South Atlantic planning areas from the scoping process was done for a number of reasons. The potential amount and location of oil and natural gas resources in the Mid- and South Atlantic planning areas are not known, and the existing G&G information is outdated. Modern G&G data, including seismic surveys and other scientific information, is needed to evaluate the resource potential in these areas and to inform decisions about whether and where any leasing should take place. Accordingly, the Secretary is moving forward with an environmental analysis related to potential G&G studies to support the evaluation of the oil and natural gas resource potential in these areas. This NEPA work will facilitate the studies which potential bidders and the government need in order to intelligently engage in lease sale planning. Also relevant to the Secretary's decision not to include the Mid- and South Atlantic planning areas in scoping for the Draft EIS and consideration in the Five Year Program was the need to resolve conflicts, including those related to national defense. Further, as DOI moves forward in these areas with facilitating the evaluation of the resource potential and deconflicting potential oil and gas activities from other uses, so too should longer-term analysis and planning be completed for the infrastructure and resources that would be necessary to prepare for such activity.

As noted in part I, the 2009 DPP encompassed the 2010-2015 timeframe, while the PP and PFP encompass 2012-2017. For that reason, the presentation of the 2009 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 PFP area were received during the 90-day comment period on the PP, which closed on February 8, 2012. In an attempt to be more transparent as to the Secretary's consideration of comments received in making his decision, responses to noteworthy comments also are included in this part.



Map 1 – Alaska Planning Areas with restrictions



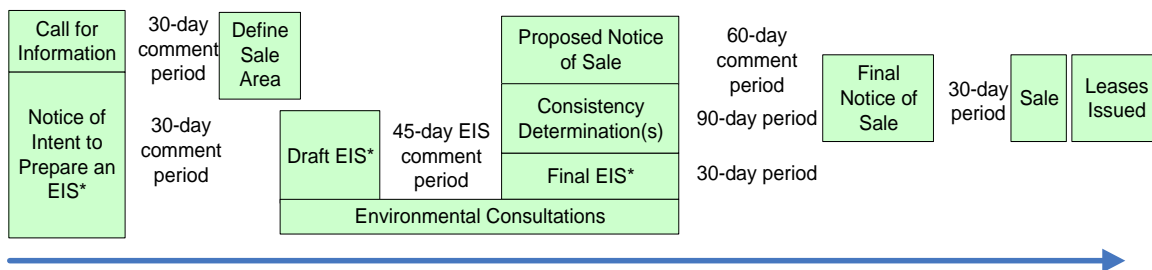
Map 2 – Lower 48 State Planning Areas with restrictions

Additional Considerations

An important element underlying the determination of the location and size of lease sales in a Five Year Program is the configuration of planning areas and program areas for leasing consideration. The OCS planning areas initially were established pursuant to the Act Amendments of 1978 and have been reconfigured several times over the past 30 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 in a Five Year Program 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 PFP options provide for scheduling lease sales in the Western, Central, and Eastern GOM planning areas and the Chukchi Sea, Beaufort Sea, and Cook Inlet planning areas offshore Alaska. Each lease sale that is scheduled in the approved Five 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 Five Year Program, and considers reasonable alternative lease sale configurations, reductions, and/or restrictions within that area. No sale area may be larger than the Five Year Program area. The prelease process leads to the final decision on the terms and conditions of each OCS lease sale. Figure 1 provides a schematic rendering of the process used for a typical lease sale in any area of the OCS. In some cases, steps may be in a different order or even repeated, based on the particular needs of the sale and area. Figure 1 is followed by a brief textual description of the process's multiple steps and decision points.

Figure 1: Lease Sale Process



- Call for Information and Nominations – Requests comments from the public on areas of special concern that should be analyzed. Invites potential bidders to nominate areas of interest within program areas identified for leasing consideration in the Five Year Program and requests information on environmental and other aspects of the program area.
- NOI to Prepare an EIS – Alerts the public that an EIS will be prepared, provides description of the proposed action and possible alternatives, and of the scoping process including any scheduled meetings for scoping of the NEPA document/EIS. Note that sometimes the NOI is published after the Area Identification step below.
- Area Identification – Identifies area for proposed action to be analyzed in NEPA/EIS document based on information gathered from the Call and the NOI (if preceding the Area Identification). Decisions at this step will be made public, particularly if there is a change to the area included in the Call and NOI.
- Draft EIS – Evaluates the potential environmental impacts of proposed action and alternatives and the potential effectiveness of mitigating measures.
- Public Review and Comment – Draft EIS is made available for public review for at least 45 days.
- Environmental Consultations – Consultations will occur with agencies such as USFWS and National Marine Fisheries Service (NMFS). This also includes Government-to-Government consultations that are of particular importance in the Alaska OCS.
- Final EIS – Incorporates responses to public comments on the Draft EIS and presents evaluation of environmental impacts analysis as updated from the Draft EIS.
- Consistency Determination – Documents Federal determination on whether the proposed sale is consistent to the maximum extent practicable with federally approved state coastal zone management plan.
- Proposed Notice of Sale – Provides information to the states and the public on the proposed area to be offered and the proposed lease terms and conditions.
- Letters to the Governors – Governors of the affected states are sent copies of the Proposed Notice for their review as required under section 19 of the Act.
- Final Notice of Sale – Published a minimum of 30 days before the sale is held. Includes date, time and location of the bid opening, blocks offered, and terms and conditions of the sale.

- Record of Decision – Records the final decision for the NEPA process regarding the selected action, alternatives, environmentally preferable alternatives and environmental mitigation, adopted or not. Published a minimum of 30 days before the sale is held.
- Sale – Sealed bids submitted by qualified bidders are opened and read publicly on the day of the sale. Bids are checked for technical and legal adequacy to determine the high bid that is then subject to further evaluation before a lease may be issued.
- Lease Issuance – Follows completion of FMV analysis and review by the Department of Justice and Federal Trade Commission.

At the program stage, size, timing, and location options are designed also to mitigate drainage to Federal oil and natural 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. At the lease sale stage, terms and conditions are designed to mitigate potential adverse effects of lease activities. Acquisition of new G&G 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 and NEPA evaluation and decision processes.

Proposed Final Program Options for Scheduling Lease Sales

This decision document offers options for scheduling lease sales for the six 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 selected comments of interested and affected parties with responses to some of the comments as discussed above 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 Final Program Options to the Final EIS Alternatives

The Five Year Final EIS analyzes eight alternatives that correspond to individual lease sale options as follows:

- Alternative 1—The Proposed Action (Option 1 for all areas; Option 2 for Eastern GOM)
- 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)

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 GOM planning area²².

Proposed Program Decision

The PP proposed annual areawide lease sales in the Western and Central GOM and two sales in the Eastern GOM of all available, unleased acreage in all three areas. The majority of the Eastern GOM and a small portion of the Central GOM are unavailable for leasing consideration until mid-2022 pursuant to GOMESA.

²² 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 five year schedule but may not be offered for further leasing consideration as long as the restriction remains in effect. The PP and this PFP do not include any area in the Eastern or Central GOM that is currently under leasing restriction.

Proposed Final Program Options

Western Gulf of Mexico

Key Comparative Results. The net benefits of anticipated production in this PFP area are estimated at about \$16.81 billion in the low-price case, \$49.57 billion in the mid-price case, and \$82.37 billion in the high-price case. This area ranks as “More Sensitive to Impact” as a component of environmental sensitivity, and 4th of 6 for marine productivity.

Selected Comments. The Louisiana Department of Natural Resources (LADNR) supports OCS leasing, but thinks that more areas should be considered for leasing than the GOM and offshore Alaska. LADNR strongly urges expanded revenue sharing, not just for new leasing in the GOM, but also to take into account historical impacts, and not just for GOM but also other areas of the OCS. DOE and DOD support the OCS program. Several environmental public interest groups opposed any OCS drilling, particularly in deep water. Others requested that no sales be held until at least 2014 to allow time for BOEM to reconsider its analysis and that there be no drilling until post-*Deepwater Horizon* recommendations have been met. Five companies in the oil and gas industry supported the PP which included this area.

Responses. The PFP focuses on areas where there are currently active leases, exploration, and/or known or anticipated hydrocarbon potential, like the GOM and offshore Alaska. This strategy makes available for development more than 75 percent of undiscovered technically recoverable oil and gas resources estimated on the OCS. This is part of the Administration’s plan to reduce dependence on imports by a third by 2025. While the Secretary appreciates the benefits that could be realized by more expansive sharing of OCS revenues, the authority and formulas for such must be provided in legislation by Congress. Additionally, DOI has made significant progress in accelerating reforms that have improved the safety and environmental protection of the OCS since the *Deepwater Horizon* event, improving both the safety of offshore drilling to reduce the risk of another loss of well control in the oceans, and the collective ability to respond to a blowout and spill.

(1) Five areawide sales starting in 2012 of all legally available, unleased acreage in the area depicted in Map 3

(2) No sale

Discussion

Option 1 (5 Sales)

Valuation. The net benefits of anticipated production in this PFP area are estimated at \$16.81 billion in the low-price case, \$49.57 billion in the mid-price case, and \$82.37 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Final EIS under Alternative 1. A summary of the Final 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 National Pollutant Discharge Elimination System (NPDES) permits and U.S. Coast Guard (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 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.

Air Quality—Routine operations are expected to result in only minor impacts to air quality. Sources of air pollutants such as nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter of up to 10 micrometers (PM₁₀), and carbon dioxide (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 National Ambient Air Quality Standards (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 to moderate. 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 a CDE-level spill, 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 a CDE-level spill. 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. Major impacts to coral reef habitats could occur if the Flower Gardens Banks are heavily oiled and high mortality occurs.

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. Existing mitigation measures should eliminate most direct impacts to coral EFH. Impacts from accidental oil spills, including a CDE-level spill, 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 a CDE-level spill, may result in 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 a CDE-level spill, could incur both short-term and potentially long-term 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 a CDE-level spill, 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 a CDE-level spill 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 a CDE-level spill, 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

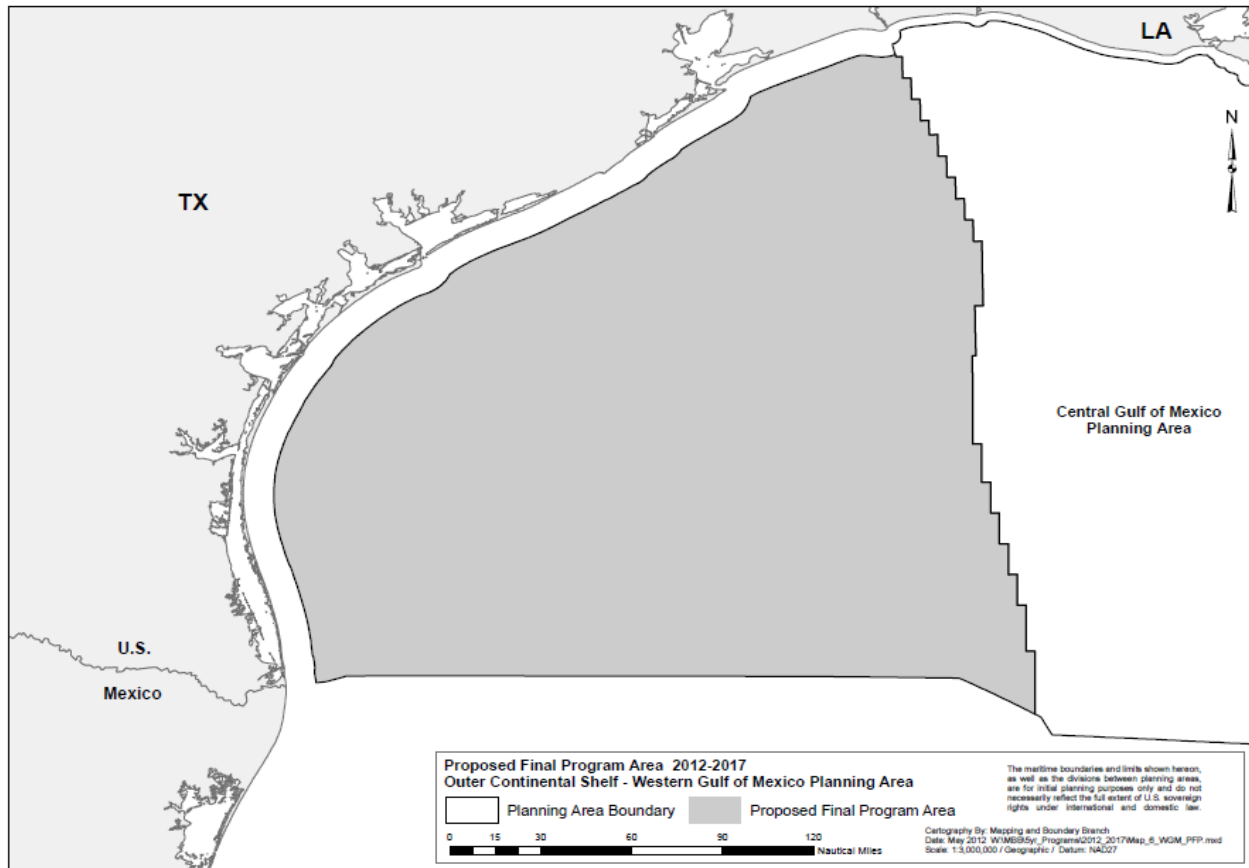
associated with potential new leases. Projected impacts from an accidental oil spill, including a CDE-level spill, would likely include stresses of the spill response on existing infrastructure, and restrictions of access to a particular area while the cleanup is being conducted. Impacts would be expected 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 a CDE-level spill, 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 a CDE-level spill, 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 a CDE-level spill which is not expected, would be minimal.

Archaeological Resources—Impacts could range from negligible to major depending on the presence of significant archaeological or historic resources in the area of potential effect. Archaeological and historic resources (especially offshore resources), may be affected by platform and pipeline construction and by dredging, which could damage or destroy affected resources. Onshore impacts (resource damage or loss; visual impacts) are possible from pipeline landfall, onshore pipeline, and road construction. Anchor drags could affect seafloor resources such as shipwrecks. Most resources are expected to be avoided.



Map 3 – 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 natural gas, among others.

Environmental Impacts. This option is analyzed in the Final EIS under Alternatives 3 and 8. A summary of the Final 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 from new leasing, although marine and coastal resources there would be exposed to effects from spills that might originate from existing leases and from 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 PFP area are estimated at about \$62.48 billion in the low-price case, \$200.16 billion in the mid-price case, and \$344.60 billion in the high-price case. This area ranks as “Most Sensitive to Impact” as a component of environmental sensitivity and 3rd of 6 for marine productivity.

Selected Comments. LADNR supports OCS leasing, but thinks that more areas should be considered for leasing than the GOM and offshore Alaska. LADNR strongly urges expanded revenue sharing, not just for new leasing in the GOM, but should take into account historical impacts, and not just for GOM but also other areas of the OCS. The Florida Department of Environmental Protection (DEP) was concerned about effects from oil and natural gas activities from all of the GOM, not just the Eastern GOM. DOE and DOD support the OCS program. Several environmental public interest groups opposed any OCS drilling, particularly in deep water. Others requested that no sales be held until at least 2014 to allow time for BOEM to reconsider its analysis and that there be no drilling until post-*Deepwater Horizon* recommendations have been met. Five companies in the oil and gas industry supported the PP which included this area.

Responses. The PFP focuses on areas where there are currently active leases, exploration, and/or known or anticipated hydrocarbon potential, like the GOM and offshore Alaska. This strategy makes available for development more than 75 percent of

undiscovered technically recoverable oil and gas resources estimated on the OCS. This is part of the Administration's plan to reduce dependence on imports by a third by 2025. While the Secretary appreciates the benefits that could be realized by more expansive sharing of OCS revenues, the authority and formulas for such must be provided in legislation by Congress. Additionally, DOI has made significant progress in accelerating reforms that have improved the safety and environmental protection of the OCS since the *Deepwater Horizon* event, improving both the safety of offshore drilling to reduce the risk of another loss of well control in the oceans, and the collective ability to respond to a blowout and spill.

(1) Five areawide sales starting in 2013 of all legally available, unleased acreage in the area depicted in Map 4.

(2) No sale

Discussion

Option 1 (5 Sales)

Valuation. The net benefits of anticipated production from the PFP area are estimated at about \$62.48 billion in the low-price case, \$200.16 billion in the mid-price case, and \$344.60 billion in the high-price case

Environmental Impacts. This option is analyzed in the Five Year Final EIS under Alternative 1. A summary of the Five Year Final 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 to moderate. 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 a CDE-level spill, 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 a CDE-level spill. 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. Major impacts to coral reef habitats could occur if the Flower Gardens Banks are heavily oiled and high mortality occurs.

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 a CDE-level spill, 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 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—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. 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. Because of their locations on inner dunes, the habitats of the beach mice are unlikely to be affected by an accidental offshore oil spill, but the occurrence of a CDE would increase the threat of extinction to these species.

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 a CDE-level spill, 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 a CDE-level spill, potentially could

incur both short-term and long-term 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 a CDE-level spill, 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 a CDE-level spill 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 a CDE-level spill, 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.

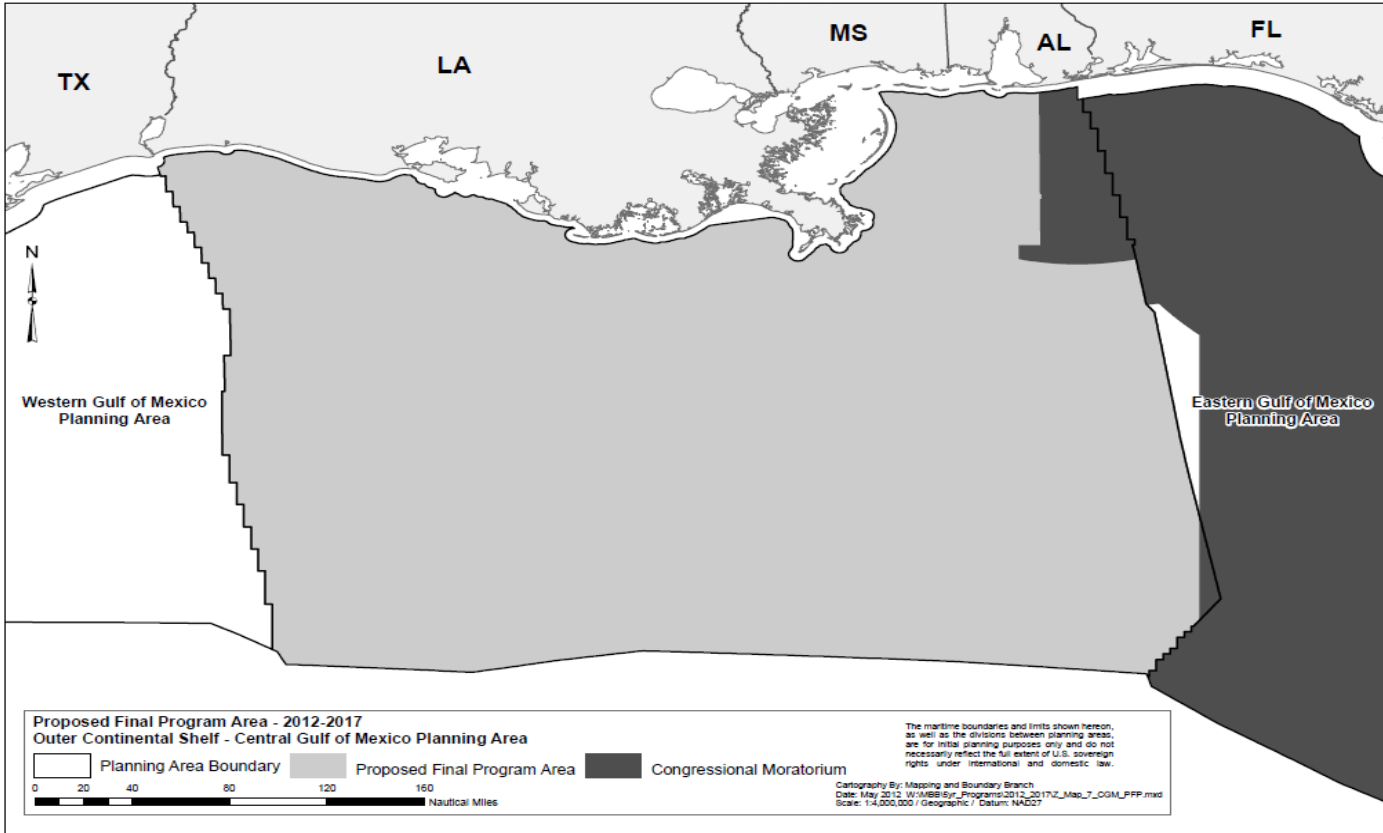
Fisheries—Routine operations would have a minor impact on individuals fishing for food, the cost of commercial fishing, or on the number of recreational fishing trips, in the region over the duration of the leasing period. Large accidental oil spills, including a CDE-level spill, may have small to medium, 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 a CDE-level spill, 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 a CDE-level spill, would be minimal.

Archaeological Resources—Impacts could range from negligible to major depending on the presence of significant archaeological or historic resources in the area of potential effect. Archaeological and historic resources (especially offshore resources), may be affected by platform and pipeline construction and by dredging, which could damage or destroy affected resources. Onshore impacts (resource damage or loss; visual impacts) are possible from pipeline landfall, onshore pipeline, and road construction. Anchor drags could affect seafloor resources such as shipwrecks. Most resources are expected to be avoided.



Map 4 – 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 natural gas, among others.

Environmental Impacts. This option is analyzed in the Five Year Final EIS under Alternatives 4 and 8. A summary of the Five Year Final 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 from new leasing, although marine and coastal resources there would be exposed to effects from spills that originated from existing leases in the Central GOM or from elsewhere including the Western and Eastern 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.²³ After exploration, however, this assessment may change. Therefore, the net benefits of anticipated production in this PFP area are estimated at about \$2.73 billion in the mid-price case and \$5.99 billion in the high-price case. The area ranks “Most Sensitive to Impact” as a component of environmental sensitivity and 2nd of 6 for marine productivity.

Selected Comments The Florida DEP was concerned about effects from oil and natural gas activities from all of the GOM, not just the Eastern Gulf. DEP requested consideration be given to long-term protection of the state’s coastal and marine resources. DOE and DOD support the OCS program. However, DOD referred to its concerns expressed in April 2010, about areas of the Eastern Gulf and requested early coordination on any sales in those areas due to ongoing military testing and training. Several environmental public interest groups opposed any OCS drilling, particularly in deep

²³ 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).

water and/or in the Eastern Gulf, due to the high risk and low net benefit. Five companies in the oil and gas industry supported the PP which included this area.

Responses. The relatively small area considered for leasing in the Eastern Gulf is that area that is available pursuant to GOMESA, more than 125 miles off the Florida coast and west of 86°41'W longitude. DOD and DOI have a long history of successfully coordinating dual use of areas of the Eastern Gulf under the 1983 Memorandum of Agreement, with early and continuing coordination being the linchpin. DOI has made significant progress in accelerating reforms that have improved the safety and environmental protection of the OCS since the *Deepwater Horizon* event, improving both the safety of offshore drilling to reduce the risk of another loss of well control in the oceans, and the collective ability to respond to a blowout and spill.

(1) Two sales in 2014 and 2016 in the program area depicted on Map 5.

(2) One sale in 2014 in the program area depicted on Map 5.

(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 PFP area are estimated at about \$2.73 billion in the mid-price case and \$5.99 billion in the high-price case.²⁴

Environmental Impacts. This option is analyzed in the Five Year Final EIS under Alternative 1. A summary of the Five Year Final 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

²⁴ 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.

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 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 a CDE-level spill 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 a CDE-level spill. 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 a CDE-level spill, 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 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—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 a CDE-level spill, 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 a CDE-level spill, potentially could incur both short-term and long-term 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 a CDE-level spill, 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 a CDE-level spill, 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 a CDE-level spill, 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.

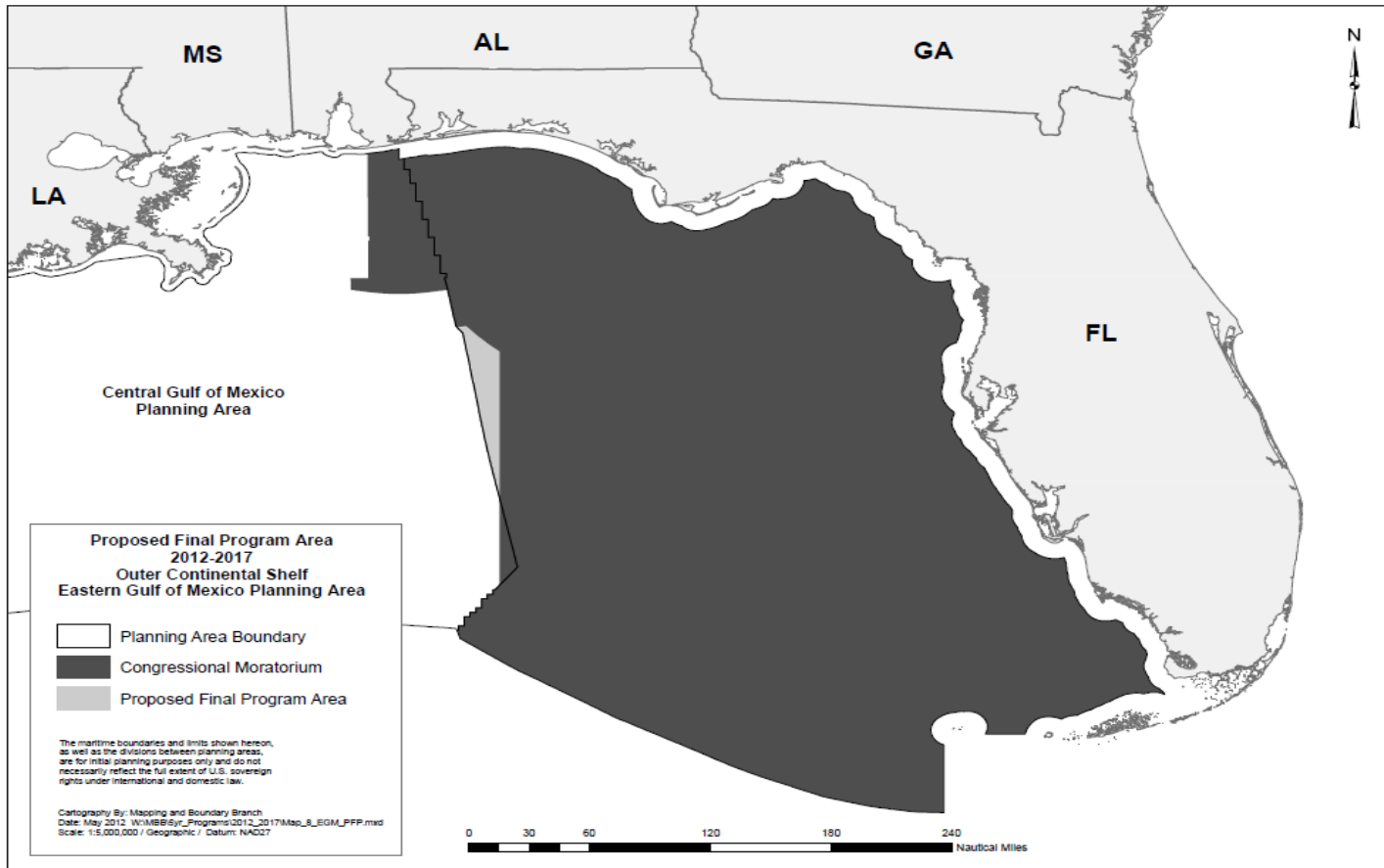
Fisheries—Routine operations would have a minor impact on fishing, the cost of commercial fishing, or on the number of recreational fishing trips, in the region over the duration of the leasing period. Large accidental oil spills, including a CDE-level spill, may have small to medium, short-term impacts 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 a CDE-level spill, 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 5 – Eastern Gulf of Mexico Program Area

Option 2 (1 Sale)

Valuation. The net benefits of anticipated production from one sale in this PFP area are estimated at about \$2.73 billion in the mid-price case and \$5.99 billion in the high-price case.²⁵ There is no production anticipated in the low-price case; therefore, net benefits are zero.

Environmental Impacts. This option is analyzed in the Final EIS under Alternative 1. A summary of the Five Year Final 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 total for the entire GOM. 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 natural gas, among others.

Environmental Impacts. This option is analyzed in the Five Year Final EIS under Alternatives 2 and 8. A summary of the Five Year Final 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 potentially expected to 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

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 Options for a description of the proposed special interest sale process.

²⁵ Current information indicates no difference in anticipated production for the Eastern GOM, whether from one sale or two sales.

Proposed Program Decision

The PP scheduled one sale each in the Beaufort and Chukchi Seas and one special interest sale in the Cook Inlet.

Proposed Final Program Options

Chukchi Sea

Key Comparative Results. The net benefits of anticipated production from this PFP area are estimated at \$8.07 billion in the low-price case, \$39.54 billion in the mid-price case, and \$161.28 billion in the high-price case. The area ranks as “Less Sensitive to Impact” as a component of environmental sensitivity and 5th of 6 for marine productivity.

Selected Comments. The State of Alaska requested that the sale in the Chukchi Sea not be delayed until late in the program as it also delays economic development, jobs, and securing energy independence. The Arctic Slope Regional Corporation expressed similar concerns. DOE and DOD support the program. The North Slope and Northwest Arctic Boroughs, the Inupiat Community of the Arctic Slope, and the Native Village of Kotzebue, prefer that the Chukchi Sea be excluded from the program. However, if there were a sale proposed, some or all of these Native entities wanted some or all of the following: more areas deferred at the five year stage, a more comprehensive and coordinated approach to filling information gaps, more realistic scenarios to address the effects of a large spill on the communities, and revenue sharing at all stages. Many environmental public interest groups expressed the same concerns. Five companies in the oil and gas industry supported the PP, which included this area.

Responses. The PFP provides for lease sales in six offshore areas, including the Chukchi Sea where there are currently active leases and where there is known or anticipated hydrocarbon potential. 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 program schedules one sale in the Chukchi Sea, deliberately set late in the program to allow time for further study and infrastructure development. In addition to the 25-mile buffer area that has been excluded from leasing in the current 2007-2012 program and throughout preparation of this program, the Secretary also has decided at this program stage to exclude from leasing a subsistence area in the northeast portion of the program area, based on current information regarding both resource potential and areas of significant subsistence use. Furthermore, as discussed in part I of this document, in an effort to increase transparency and accountability in this process, DOI is committing to enhance several aspects of the leasing program. This includes publishing a tracking table, starting in the Five Year Final EIS, which tracks the lineage and treatment of suggestions for spatial exclusions, temporal deferrals, and/or mitigation from the program stage, to the

lease sale, and then to the plans stage. The tracking table in the EIS will be accompanied by an online tracking table and interactive, web-based maps. Two deferral suggestions often mentioned were Hanna Shoal and a 60-mile coastal buffer. Both of these suggestions will be included for later consideration in the tracking table discussed in the introduction to this document.

(1) One sale in 2016 in the program area depicted in Map 6

(2) No sale

Discussion

Option 1 (1 Sale)

Valuation. The net benefits of anticipated production in the PFP area are estimated at \$8.07 billion in the low-price case, \$39.54 billion in the mid-price case, and \$161.28 billion in the high-price case

Environmental Impacts. This option is analyzed in the Five Year Final EIS under Alternative 1. A summary of the Five Year Final 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 a CDE-level spill 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. However, 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 a CDE-level spill, 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 to minor. 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. Aircraft overflights could also cause short-term disturbances to terrestrial mammals.

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 a CDE-level spill, 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. Spills occurring near or under ice could be difficult to clean and may persist in the water column and continue to affect fish for an extended period.

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 a CDE-level spill, could measurably depress invertebrate populations, especially in intertidal areas. Spills occurring under ice would result in prolonged exposure of invertebrates and lower trophic level biota. 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 a CDE-level spill reaching such areas, could negatively affect fauna and habitats, subsistence use, commercial or recreational fisheries, recreation and tourism, and other uses.

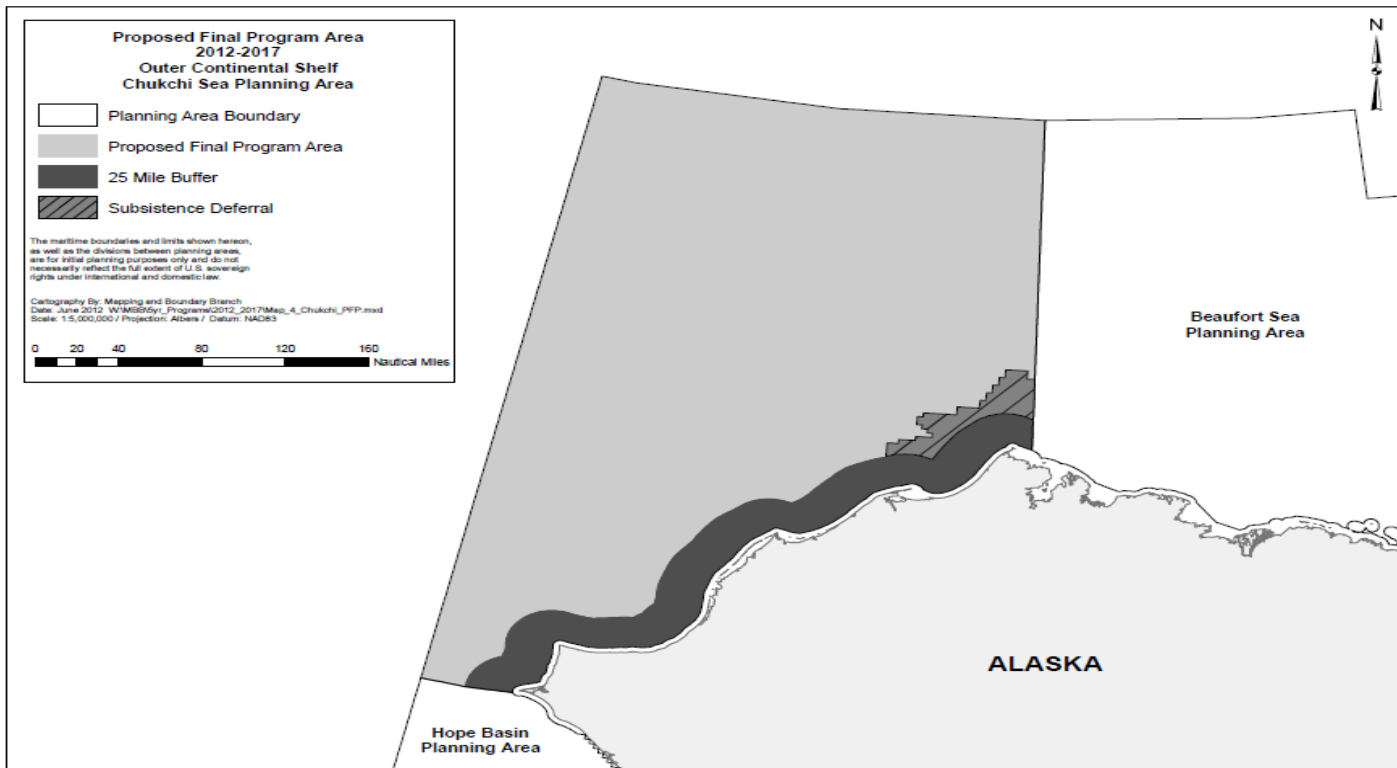
Population, Employment, and Income—Direct expenditures associated with routine operations would result in minor impacts from small increases in population, employment and income in arctic communities over the duration of the leasing period, corresponding to less than 5 percent of the baseline. Expenditures 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 a CDE-level spill, 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 a CDE-level spill, however, may result in larger impacts, especially in the Arctic where impacts to subsistence could result in major 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 a CDE-level spill, 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.



Map 6 – 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 natural gas, among others. This also could affect the long-term viability of the Trans-Alaska Pipeline System (TAPS).

Environmental Impacts. This option is analyzed in the Five Year Final EIS under Alternatives 6 and 8. A summary of the Five Year Final 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 from new leasing, although marine and coastal environmental resources there could be affected by a spill that originates from existing leases in the Chukchi Sea or from the Beaufort Sea. Energy substitutions for the forgone hydrocarbon production in the Chukchi Sea under this option could increase tanker import spill risks (including the risk of a CDE) in OCS areas along the Pacific, GOM, and Atlantic coasts that contain tanker ports and terminals.

Beaufort Sea

Key Comparative Results. The net benefits of anticipated production in this PFP area are estimated at \$1.28 billion in the low-price case, \$6.14 billion in the mid-price case, and \$25.71 billion in the high-price case. The area ranks as “More Sensitive to Impact” as a component of environmental sensitivity and 6th of 6 for marine productivity.

Selected Comments. The State of Alaska requested that the sale in the Beaufort Sea not be delayed until late in the program as it also delays economic development, jobs, and securing energy independence. The Arctic Slope Regional Corporation expressed similar concerns. DOE and DOD support the program, but DOD said it might need site-specific stipulations at the lease sale stage for radar facilities. The North Slope and Northwest Arctic Boroughs, the Inupiat Community of the Arctic Slope, and the Native Village of Kotzebue, prefer that the Beaufort Sea be excluded from the program. However, if there were sales proposed, some or all of these Native entities wanted some or all of the following: more areas deferred at the five year stage, a more comprehensive and coordinated approach to filling information gaps, more realistic scenarios to address the effects of a large spill on the communities, and revenue sharing at all stages. Many environmental public interest groups expressed the same concerns as the Native entities. Five companies in the oil and gas industry supported the PP which included this area.

Responses. The PFP provides for lease sales in six offshore areas, including the Beaufort Sea, where there are currently active leases and/or exploration and where there is known

or anticipated hydrocarbon potential. 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. This program schedules one sale in the Beaufort Sea, deliberately set late in the program to allow time for further study and infrastructure development. As discussed in part I of this document, in an effort to increase transparency and accountability in this process, DOI is committing to enhance several aspects of the leasing program. This includes publishing a tracking table, starting in the Five Year Final EIS, which tracks the lineage and treatment of suggestions for spatial exclusions, temporal deferrals, and/or mitigation from the program stage, to the lease sale, and then to the plans stage. The tracking table in the EIS will be accompanied by an online tracking table and interactive, web-based maps. Such suggestions, for example, as the request for additional whaling deferral areas such as Cross Island will be included for further consideration in the tracking table discussed in the introduction to this document.

(3) One sale in 2017 in the program area depicted in Map 7

(4) No sale

Discussion

Option 1 (1 Sale)

Valuation. The net benefits of anticipated production in the PFP area are estimated at \$1.28 billion in the low-price case, \$6.14 billion in the mid-price case, and \$25.71 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Final EIS under Alternative 1. A summary of the Final 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 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 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 a 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. Major impacts to hard-bottom kelp habitat could occur if these areas were heavily oiled and high mortality occurs. 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 EFH and managed species. Accidental releases of oil could result in moderate and long-term impacts. Impacts from accidental oil spills, including a CDE-level spill, 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 a CDE-level spill, 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 to minor. 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. Aircraft overflights could also cause short-term disturbances to terrestrial mammals.

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 a CDE-level spill, 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. Spills occurring near or under ice could be difficult to clean up and may persist in the water column and continue to affect fish for an extended period.

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 a CDE-level spill, could measurably depress invertebrate populations, especially in intertidal areas. Spills occurring under ice would result in prolonged exposure of invertebrates and lower trophic level biota. 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 a CDE-level spill, reaching these areas could negatively affect fauna and habitats, subsistence use, commercial or recreational fisheries, recreation and tourism, and other uses.

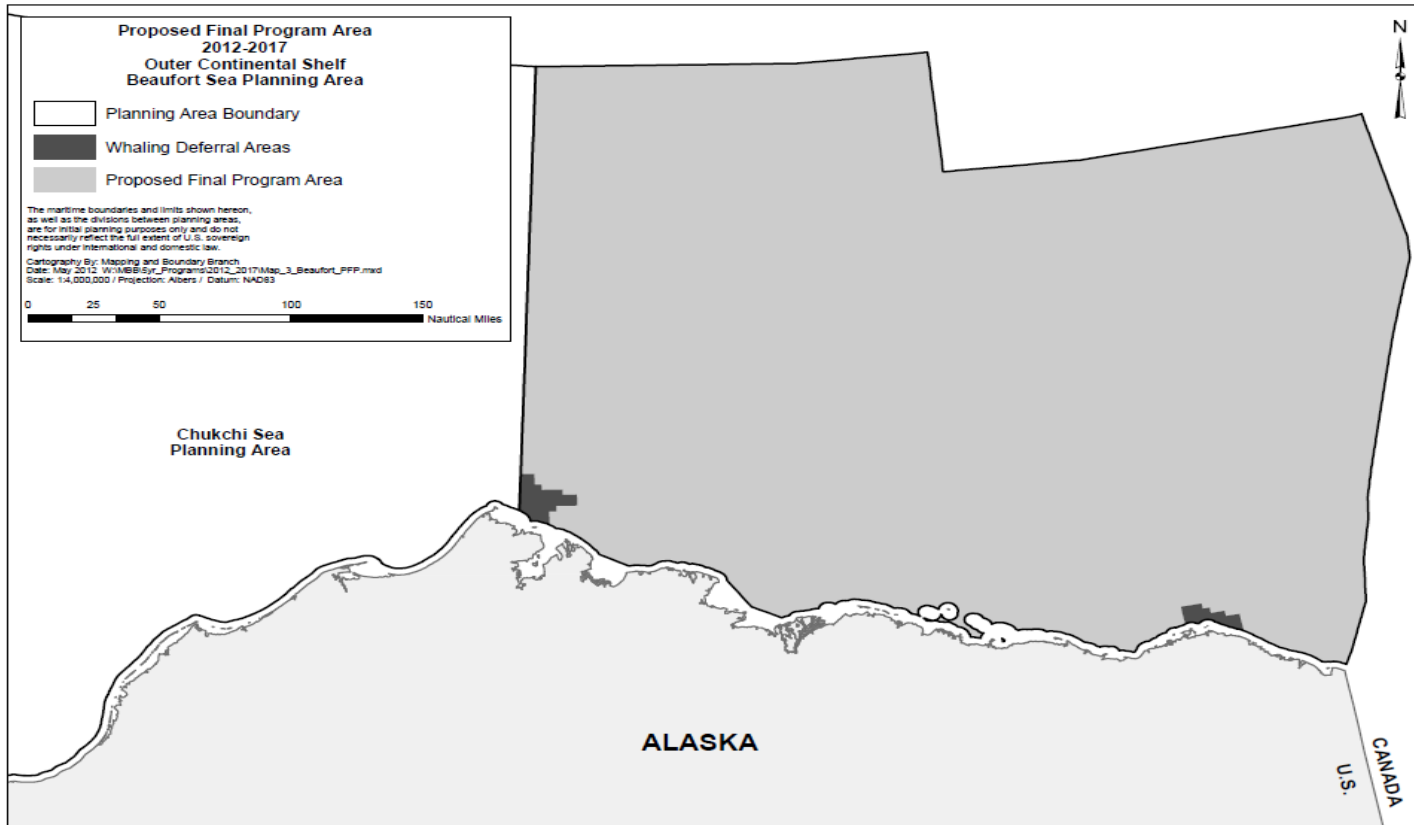
Population, Employment, and Income—Direct expenditures associated with routine operations would result in minor impacts from small increases in population, employment and income in Arctic communities over the duration of the leasing period, corresponding to less than 5 percent of the baseline. Expenditures 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 a CDE-level spill, 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 a CDE-level spill; however, may result in larger impacts, especially in the Arctic where impacts to subsistence could result in major 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 a CDE-level spill, 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.



Map 7 – 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 natural gas, among others. This also could affect the long-term viability of TAPS.

Environmental Impacts. This option is analyzed in the Final EIS under Alternatives 5 and 8. A summary of the Final 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 from new leasing, although marine and coastal environmental resources there could be affected by a spill that originates from existing leases in the Beaufort Sea or from the Chukchi Sea. Energy substitutions for the foregone hydrocarbon production in the Beaufort Sea under this option could increase tanker import spill risks (including that of a catastrophic discharge event) 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 PFP area are estimated at \$1.99 billion in the low-price case, \$4.17 billion in the mid-price case, and \$13.98 billion in the high-price case. The area ranks as “Less Sensitive to Impact” as a component of environmental sensitivity and 1st of 6 for marine productivity.

Selected Comments. While many commenters were either in favor of or opposed to the OCS program as a whole, there was little said about leasing in Cook Inlet. DOD requested caution to avoid submarine communications cables. Five companies in the oil and gas industry supported the PP which included this area.

Responses. The Cook Inlet is included as a special interest sale. The March 27, 2012, Request for Interest resulted in a sufficient expression of interest with respect to the Cook Inlet planning area. In light of responses to the Request, BOEM decided to proceed with the pre-sale process for the Cook Inlet and to place the date for a potential lease sale in 2016 to allow time to complete the necessary steps under the Act, develop additional resource and environmental information, and conduct analysis under NEPA.

(1) **One special interest sale in 2016 in the program area depicted in Map 8**

(2) No sale

Discussion

Option 1 (1 Sale)

Valuation. The net benefits of anticipated production for this PFP area are estimated \$1.99 billion in the low-price case, \$4.17 billion in the mid-price case, and \$13.98 billion in the high-price case.

Environmental Impacts. This option is analyzed in the Final EIS under Alternative 1. A summary of the Final 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 NO₂, SO₂, and PM₁₀ from any routine activities associated with the proposed Five Year Program activities in the Cook Inlet would be within the applicable maximum allowable increases. The concentrations of NO₂, SO₂, PM₁₀, and 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.

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 beyond the survey boundary.

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 a 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 a CDE-level spill, 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, but the effects would likely be short-term and not 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. 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—Construction and normal operations of a potential new onshore pipeline landfall could result in 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 benthic-pelagic 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.

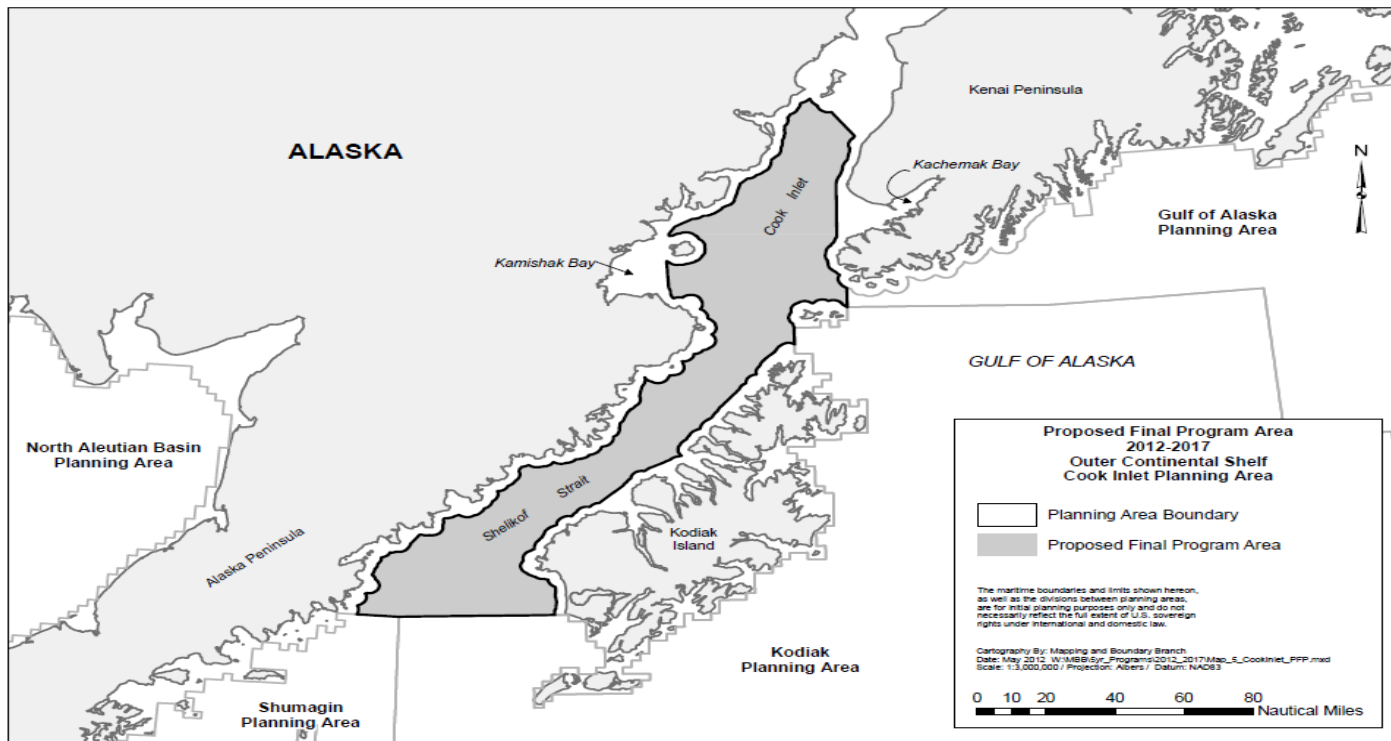
Land Use and Existing Infrastructure—Routine operations from the proposed action would have a low impact on the land use and infrastructure of the affected areas of the Cook Inlet. Accidents from the anticipated low level of activity also are expected to have minimal impact on land use and infrastructure.

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 the 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.



Map 8 – 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 natural gas, among others.

Environmental Impacts. This option is analyzed in the Final EIS under Alternatives 7 and 8. A summary of the Final 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; however, there is oil and natural gas activity in state waters. 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.

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 FMV determination, made at the time of lease issuance, 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 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. Also, this value is based on certain assumptions such as expected oil and natural gas prices at the time of sale and not actual prices in the future when a discovery is made.

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 2009 DPP) using the parameters in place for then-recent sales, subject to sale-by-sale reconsideration, and to continue use of the current, two-phased bid adequacy process, subject to revision as appropriate.

Proposed Program Decision

The PP decision was the same as the 2009 DPP, but provided more analysis of the various terms and how sale-by-sale changes in those terms might affect FMV.

Proposed Final 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 Five 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 in a lease sale covered by the program is whether to include the entire proposed area for sale at the scheduled time or instead, to withhold some or all of the area until a later program. The value of the OCS resources can be optimized by identifying the most favorable time to sell leases. Because OCS leases have fixed initial lease periods, as long as exploration and development is expected to be privately profitable, lessees will explore and develop within that initial period. The Act calls for limited initial periods to serve several purposes, e.g., to accelerate revenue, reduce speculation, and others. However, the trade-off involved is that sometimes it would be better for the operator to wait longer to explore and develop but it cannot do so – for example, if the price of oil or natural gas seems to be trending down but might recover later. Thus, it is conceivable that greater benefits could be realized in certain cases by waiting longer to lease in the first place. An analogy can be made with bid adequacy, which is another FMV process. For many years, the accepted procedure for bid adequacy determination has included a delay analysis to estimate whether an individual lease that was bid on might attract a higher bid if withheld and reoffered in a subsequent sale. Expanding that concept to the level of the Five Year Program 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 defined for present purposes as the oil and gas price above which immediate exploration of at least one undiscovered prospect as identified by resource assessment is

the most profitable option. This definition is explained further below.

The government's concession to the lessee is a conveyance of offshore oil and natural gas exploration and development rights for a limited initial lease period, 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 uncertain 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 stage 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 deep water, 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 8 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 BOEM's 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 also is associated with forecasts of future oil and natural gas prices. In general, a resource holder has some flexibility in conducting exploration or development activities, and the value of the resource is likely to be greater when it is optimally managed. In the case of a Federal lease, however, the lessee is constrained by the initial period limit. The government is not constrained by the limit and it can enhance value by optimal timing of the lease offering. 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 Five 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 suitable for exploration and possible development is not based solely on a program area's aggregate resource estimates. Instead, it focuses more broadly on identifying a hurdle price below which immediate exploration for 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 ready for leasing, in conjunction with modification in sale configuration

consistent with other program goals, because there likely exists at least one field whose resource endowment and underlying economic value are consistent with inclusion in the program's schedule. This approach reflects the insight that only as resource knowledge increases through exploration will BOEM learn more about the entire suite of available resources in order to make sound decisions about the composition of program areas along with the fiscal terms that should be included in specific future sales, as well as about which program areas to include in subsequent Five Year Programs.

The lease sale design stage involves among other things, deciding whether to hold or delay a sale that is included in a Five 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 rather than the earlier program formulation 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 Five Year Program stage, BOEM subjected the assessment of undiscovered fields in each program area to an appropriate economic analysis to determine an area "hurdle" weighted average (i.e., barrels of oil equivalent (BOE)) price. The hurdle price is equated with the price below which delaying exploration for the largest potential undiscovered field in the sale area is more valuable than immediate exploration.²⁶ Given that, at the hurdle price, immediate exploration for that prospect is optimal, the initial period is not a constraint, and full value may be realized by leasing now. By this means, the economic screen indicates whether the option value from waiting might exceed the expected value from offering any of the area in this Five Year Program. Thus, these hurdle prices will provide the decision-maker information on whether there are at least some undiscovered field sizes which are likely to exist within the program area that are favorable to being leased now, assuming the market price is at or above the level of the hurdle price. This approach has the advantage of including areas in the Five 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 Five Year Program stage and avoids having to prematurely forecast future prices, cost levels, resource endowments and the state of technology.

For this PFP, BOEM calculated the hurdle prices for two sample water depths in the Central GOM, and for the Chukchi and Beaufort Seas and Cook Inlet, offshore Alaska. The largest undiscovered field size deemed likely to be present in each area was selected for use in conjunction with cost estimates appropriate for the water depths and field sizes. These factors were inputted to an in-house dynamic programming model called WEB2

²⁶ All else being equal, the largest field tends to have the highest net value per equivalent barrel of resources, making it the least likely field to benefit from a delay in being offered for lease.

(When Exploration Begins, version 2). The first column in Table 1 shows the input field sizes for each area.

More specifically, the likely largest undiscovered field was identified using estimates of the 2011 Assessment.²⁷ In general, the Assessment addresses undiscovered resources in a framework of field size and probability. The field size framework is provided by the USGS field size classes, which enables grouping fields. For example, there might be 2 fields in a range of 2 - 4 million BOE (MMBOE); 3 fields in the next class covering 4 - 6 MMBOE; and so on. There will be one “largest field” class which typically has a lone field in it, and no class of a larger size has any fields. It is that largest field size (assumed to be the middle of the class-size range) that was the basis for the hurdle price analysis. The reason for focusing on just the largest field is that the decision criterion using the hurdle price is intended to avoid the risk of withholding, on economic grounds, an area that might have at least one field that ought to be developed immediately.

Regarding probability, the 2011 Assessment provides estimates of field counts at various levels of uncertainty. There are fewer fields estimated at a low level of uncertainty and more at a high level of uncertainty. Besides the percentiles, the 2011 Assessment also gives estimates at a mean level of uncertainty. This concept is defined in the 2011 Assessment documentation, and it means roughly a middle level of uncertainty. The hurdle price analysis used estimates at the mean probability, an accepted and unbiased statistical approach in the presence of uncertainty.

Cost inputs for the WEB2 model came from the commercial FieldPlan modeling system and from data collected by BOEM for the socio-economic analysis of the Five Year Program (MAG-PLAN). The initial lease period limits and other fiscal terms are assumed to continue at current settings. The price model in WEB2 represents the range of possible future prices by a specific algorithm that models a so-called mean-reverting stochastic process. That means that the change in price from one time to the next is random and the probability of a step up or down reflects a tendency for movement toward the mean level. The start price for the price process is a single number representing the known current price when the lease is initiated. To find the hurdle price, the model is run for various start prices, until a start price that implies immediate exploration is found and no lower start price does so. The hurdle price is equated to that start price.

The lease operator was modeled as having flexibility to time the investment in exploration and separately, any investment in development. Each such decision is based on the contrast of the expected current value of the project with exploring or developing versus waiting. The operator must, of course, make any decision to explore or develop before the initial period limit. If it would be optimal to wait until the end, the operator must decide then to act or let the lease expire. Because WEB2 includes a random price diffusion process and accounts for the operator’s options to explore or wait and/or develop a discovery or wait, it can be called a “real options” model.

²⁷ <http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Gulf-OCS-Region-Activities/2011-Atlantic-Outer-Continental-Shelf-Assessment.aspx>

Table 1 shows the assumptions made about area natural gas-oil ratios for determining the hurdle prices along with the oil and natural gas portions that ratio implies. WEB2 then estimates the BOE price shown in column 5 below, for which delaying exploration of an undiscovered field of the size shown in column 1 is more valuable than immediate exploration. The last two columns convert the BOE price to equivalent oil and natural gas prices using the natural gas-oil ratio typical of the area and a natural gas-to-oil value ratio that combines their thermal and market values. On a thermal basis, 5.62 mcf of natural gas provides the same heat content as a barrel of oil. On a market basis, this analysis has used oil-natural gas price pairs with a 40-percent economic value of natural gas relative to oil. For instance with the mid-price case, oil at \$110/ bbl is 14.05 times the natural gas price of \$7.83/mcf meaning natural gas sells at only $(5.62/14.05)$ 0.4 times its relative heat content value.

In the deepwater Central GOM for example, the natural gas-oil ratio means a BOE consists of 72 percent oil and 28 percent natural gas. Since both oil and natural gas will be sold but natural gas is only 40 percent as valuable as oil, the oil price equivalent of the \$13 per BOE hurdle price is determined by dividing it by the 0.722 oil split plus 40 percent of the 0.278 natural gas split to arrive at \$15.60/bbl. At the market price ratio of 14.05, the corresponding natural gas price is \$1.11/mcf. As long as oil and natural gas prices are at least this high, WEB2 evaluation indicates that a minimum of one undiscovered field in this area is ready for immediate exploration. As oil is more valuable than natural gas, the hurdle oil price is lower in the deepwater Central GOM than in the shallow water even though the costs are greater and the largest field size is smaller. The high natural gas-oil ratio in the shallow water Central GOM means this sample field would likely be classified as a natural gas field. Because the hurdle price for these two water depths in the Central GOM are safely below all three program price cases as well as the current market price, BOEM considers these results to be representative of the other GOM program areas. Due to doubts about Arctic natural gas reaching a market, the hurdle price for the Chukchi and Beaufort Seas was determined using only the oil portion of BOE that will be sold. Cost assumptions were for a development that will be able to handle both the oil and natural gas volumes, but the natural gas is treated like produced water and not transported to market to be sold. For both the Chukchi and Beaufort Seas, BOE hurdle price is then only the oil price for this optimal timing analysis. But with higher prices as analyzed in the net benefits analysis in part IV of this document, the scenario natural gas price exceeds its transport cost, so natural gas will be produced and sold eventually under the program.

Table 1: Hurdle Prices

	Largest Undiscovered Field (MMBOE)	Natural Gas-Oil Ratio	Oil part of Field BOE	Natural Gas part of Field BOE	Hurdle Price		
					BOE	Oil Per BBL	Natural Gas per mcf
Shallow Water Central GOM (200 meters)	740	13.98	28.7%	71.3%	\$10	\$17.48	\$1.24
Deepwater Central GOM (1200 meters)	670	2.16	72.2%	27.8%	\$13	\$15.60	\$1.11
Cook Inlet	175	1.19	82.5%	17.5%	\$34	\$37.98	\$2.70
Chukchi Sea	733 (only oil)				\$27	\$27	*
Beaufort Sea	444 (only oil)				\$37	\$37	*

*The natural gas transportation cost exceeds the prorata natural gas hurdle price, meaning oil would have to subsidize the sale of natural gas. Instead, the natural gas share of BOE likely would be reinjected.

This analysis indicates that in the Central GOM, current oil price is about six times, and in Alaska two times, the amount needed to justify holding a sale purely on the basis of the hurdle price criterion. 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 then-current prices to these hurdle prices. If prices have dropped below these hurdle 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 Five 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. This allows the more specific decisions to be made when uncertainty is reduced. The hurdle price analysis is another element helping ensure the OCS is being managed to generate the public’s FMV for OCS resources.

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, similar to those 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 an AWL Study evaluating alternative leasing schemes and received the final report in 2010.²⁸

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 2²⁹ 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 tax³⁰ 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%
State Revenue Sharing (uncapped)	2%	+10%

This long-term comparison presumes the same leasing framework will continue to be used over each of ten future Five 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 Five 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.

²⁸ *Policies to Affect the Pace of Leasing and Revenues in the Gulf of Mexico*, December 2010, BOEMRE 2011-014, available at boem.gov. http://www.boemre.gov/econ/PDFs/ExternalStudies/2011_014/Part2.pdf

²⁹ This table is extracted from the more extensive table in Ibid, pages 159-164.

³⁰ The effective tax rate in this study is assumed to be one-half the nominal tax rate.

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 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 versus 31 percent less long term, wells drilled 4 versus 16 percent less long term, and discoveries 3 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 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 Five Year Program alone.

In summary, the study findings suggest 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 Five 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.

For the GOM, where there is extensive infrastructure to support the oil and natural gas industry as well as a long history of exploration and development, BOEM believes it is advantageous to use the relatively flexible AWL model, while employing other tools, like minimum bid requirements, to help direct activity towards blocks that are considered to be the most valuable and economically mature. Setting a meaningful minimum bid level allows the auction market to determine which blocks are perceived to have the lowest values, so that the leasing program could make these blocks available in future sales. Improved technology would lower exploration and production costs and perhaps reduce drilling risks on these blocks. The block values would increase and they could be reoffered for sale at a more favorable time for society.

BOEM can set relatively high minimum bid levels to limit the resulting leasing to those blocks which the market judges to be 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, this 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, without actually knowing before a sale which blocks fall into each category. This strategy is consistent with the goal of maximizing the economic value of OCS resources to the Nation.

Rather than adjusting the size of the sale from the outset, BOEM will use the minimum bid (in conjunction with other fiscal terms) 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 later in this document.

Nonetheless, BOEM is exploring options for a more focused approach to leasing than AWL in certain instances as discussed in part I of this document. In particular, offshore Alaska, the Chukchi Sea and Beaufort Sea 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.

While BOEM has determined that it is appropriate to continue areawide leasing in the GOM, as described above, BOEM will not be conducting areawide leasing in the Arctic, consistent with rigorous internal analysis as well as a number of outside recommendations to develop alternative leasing approaches for Arctic areas.³¹ Rather, potential sales are deliberately set late in the five year program schedule to allow for further analysis and information-gathering. These would be geographically targeted in scope, in order to achieve an appropriate balance between making resources available while limiting conflicts with environmentally sensitive areas and subsistence use by making certain determinations from the outset about which blocks within the planning areas are most suitable for leasing

Sale Terms

³¹ Outside groups that have recommended adopting alternatives to areawide leasing for frontier areas like the Arctic include the USGS and the National Commission on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling.

(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 deals with the sale terms to be offered, largely the fiscal terms and duration of the initial period of the lease. The fiscal terms include an upfront minimum bid level, annual rental payments and royalties. All of the financial obligations (bonus payments, rentals and royalties) reflect the value of the lessor's (i.e., Federal government) property interest in the leased minerals and are fiscal components of FMV. 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, recently completed a contract with IHS-CERA for a study entitled "Comparative Assessment of the Federal Oil and Gas Fiscal Systems."³² The study compared other countries' petroleum extraction fiscal systems and terms to the U.S. Federal system. Once that study is fully assessed, the results and findings should be helpful in informing future decisions about whether and how to revise applicable fiscal terms to best 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. The minimum bid in the GOM for water depths of 400 meters or deeper was recently increased from \$37.50 to \$100 per acre starting with Western GOM Sale 218 held in December 2011. 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.

³² <http://www.boem.gov/Oil-and-Gas-Energy-Program/Energy-Economics/Fair-Market-Value/Fair-Return-Report.aspx>

Rentals

During the initial period of a lease and before 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 period 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 last four sales (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 before the end of the initial lease period, 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 goes into production. Royalty rates can have a significant impact on bidder interest and are a key fiscal parameter in the calculation of the underlying economic value for a block. Considered in combination with increased resource prices, perceived improvements in discovery and extraction technology, especially in deep water, and the competitive market for OCS acreage, BOEM raised GOM deepwater royalty rates for new leases from 12.5 to 16.67 percent in 2007, then to 18.75 percent in 2008. GOM shallow water royalties for new leases increased from 16.67 to 18.75 percent in 2008. Currently, all COM royalty rates are 18.75 percent. Alaska sales have utilized a 12.5 percent royalty rate for the past 30 years.

Initial Period of the Lease

In cases where a high bid meets the FMV requirements, the lease rights are issued to the lessee for a limited term called the initial period. 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 sufficient time to commence development.

BOEM recently changed the lease terms in the deepwater GOM to account for improvements in deepwater technology and the decreased time necessary for exploration and infrastructure development. Using shorter initial lease periods for shallower areas helps to encourage timely development by providing a built-in incentive for drilling. Current GOM initial lease periods 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. Former leases in Cook Inlet had a 5-year initial period. In other areas, initial periods are 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.

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 allows 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 currently in the regulations in Title 30 of the Code of Federal Regulations at 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 economic 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. However, these gains would likely be offset by the need for extensive administrative resources to audit and verify the measure of profits. Similarly, work commitment bids could be beneficial in identifying which bidder has the most optimistic view of geologic prospects. However, this system encourages 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. All the tested systems maintained the cash bonus bid, but varied the contingency variable with use of a sliding scale royalty which varied depending on the rate of production, a fixed net profit share, and a 12.5 and 33 percent royalty rate. These systems were not found to enhance program performance compared to the then-prevalent 16.67 percent fixed royalty rate system in shallow water. Among other things, they did not increase participation by small companies; were significantly more complex to administer; distorted bids, which made it more difficult to identify the high bid; and often were not beneficial to the taxpayer. As a result, BOEM has chosen to use the cash-bonus bidding system subject primarily to a mid-range 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: Following a lease sale, the high bids on each block are evaluated to determine whether they satisfy the FMV requirements for acceptance. The bid adequacy process in use since 1983 evaluates high bids in two phases. The first phase assesses bid adequacy and relative block value by applying long-standing rules and procedures to determine whether acceptance of the high bids is consistent with the objective of ensuring receipt of FMV. The assessments involve consideration of such factors 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 BOEM's assessment of the block's geologic and economic viability. If not accepted during this first phase, high bids are evaluated in a second phase using detailed analytical assessment procedures to generate an independent evaluation of each remaining block's value. This procedure is employed in conjunction with the

distribution of the losing bids on each block and with an adjustment for the delay cost, if any, from not selling the block in the current sale to determine each block's ultimate reservation "price". This price cannot be lower than the minimum bid 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 some combination of block-specific bidding factors and detailed block-specific resource evaluation factors to ensure that FMV is received for each OCS lease issued. 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 operation of the U.S. economy. In recent years, American consumers spent well over a trillion dollars a year on energy, more than 8 percent of gross domestic product (GDP). As noted in its report “Annual Energy Review 2010”³³, the Energy Information Administration (EIA) recognizes the United States as a world leader in total energy consumption and that it imports almost 30 quadrillion British thermal units (Btu) of energy each year to satisfy almost 100 quadrillion Btu of total consumption in transportation, industrial, commercial, and residential sectors. Although the United States is a leading producer of coal, natural gas, and oil, growing demand for energy in developing countries, especially China and India, means that competition for limited energy sources may become more intense. EIA predicts costs for imported energy will increase in real terms over the coming decades. To address these issues, the United States needs to pursue investments in renewable energy technologies and existing domestic energy production throughout the United States, both onshore and on 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 natural gas leasing and permitting and production activities, along with the extended life of oil and natural gas projects, dictate that the analysis of energy needs look at long term projections beyond the end of the five-year schedule of sales in the program. The energy needs analysis conducted here relies heavily on EIA energy forecasts. These forecasts are carried out to 2035, so this contextual analysis uses this shorter period rather than the 40 to 50 years used for other analyses in this document.

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

³³ EIA, Annual Energy Review 2011; <http://www.eia.gov/totalenergy/data/annual/>

Forecast of National Energy Needs

Domestic energy security and dependence on unreliable sources of oil imports are key topics in the national energy debate, aggravated by a challenging international political climate, increasing competition for resources, energy supply instability, and price volatility. EIA's *AEO 2012* forecasts changes in domestic energy production, energy imports, and energy consumption over 25 years from 2010-2035.³⁴ While there are many factors that simultaneously affect such forecasts, the primary engine behind the projected changes in domestic production-consumption gaps and import requirements are assumptions about economic growth. The average annual GDP growth rate for the U.S. economy projected in *AEO 2012* is 2.6 percent. Although the decreasing ratio of energy expenditures to GDP over time from 7.1 percent in 2012 to 4.4 percent in 2035 reflects an extended economic recovery period and declines in energy intensity, uncertain supplies could contribute to tight petroleum markets, which could raise oil prices sufficiently to cause the energy expenditure rate to creep back up, constraining economic growth.

In 2010, the United States accounted for approximately 21 percent of the world's oil and 22 percent of the world's natural gas consumption.³⁵ EIA and the International Energy Agency (IEA) project the quantity of energy demand in the United States and in the world will increase 12 percent and 33 percent³⁶ in the coming decades as a result of economic growth in the United States and in developing economies. Depending on economic access to non-Organization of Petroleum Exporting Countries (OPEC) resources and resulting OPEC price behavior, world crude oil price estimates for 2035 range from \$55 to nearly \$200 per barrel (expressed in 2010 dollars). New production from domestic areas such as the GOM and Alaska OCS would help meet the continued demand for energy and help retain the diversity of supply, helping to mitigate the effects of disruptions on imports and cushioning the consequences of hurricanes and other disruptive forces on parts of the GOM as well as on refining and processing operations.

Oil and Natural Gas Production Estimates

Petroleum and natural gas supply nearly 63 percent of the Nation's energy needs. EIA forecasts that net U.S. demand for oil and natural gas will increase over the next two decades. EIA projections, shown in Table 5 below, indicate that while the *share* of energy obtained from oil and natural gas decreases slightly, the *amount* of energy obtained from oil and gas increases between 2012 and 2035.³⁷ Accordingly, the Nation is projected to continue to rely heavily on oil and natural gas to meet its energy needs, even as alternative sources of energy supply an increasing share of our energy.

³⁴ This analysis uses estimates for energy projections based on the reference case in the *AEO 2012* Early Release. The following estimates will vary somewhat from those included in the complete *AEO* that will be released later in 2012.

³⁵ BP Statistical Review 2011;

<http://www.bp.com/sectionbodycopy.do?categoryId+75008contentId+7068481>

³⁶ IEA, World Energy Outlook 2012; <http://www.worldenergyoutlook.org>

³⁷ The AEO's reference case is a policy neutral forecast based on the most likely trajectories for primary energy prices, technology adoption, and global economic growth. It incorporates only existing laws, rules and regulations, taking into account the effective start and end date of each.

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

	2012	2015	2020	2025	2030	2035
Liquid Fuels and Other Petroleum	36.11 (37.3%)	36.89 (37.8%)	37.15 (36.8%)	37.04 (36.0%)	37.31 (35.4%)	38.00 (35.2%)
Natural Gas	25.67 (26.5%)	25.99 (26.6%)	26.13 (25.9%)	25.80 (25.1%)	26.49 (25.2%)	27.11 (25.1%)
Other	35.02 (36.2%)	34.78 (35.6%)	37.65 (37.3%)	40.09 (38.9%)	14.49 (39.4%)	42.86 (39.7%)
Total	96.80	97.66	100.93	102.93	105.29	107.97

Source: EIA *Annual Energy Outlook 2012* (Reference Case) 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 2012 to 2035.³⁸ It shows projected offshore crude oil production in the GOM increasing from 1.5 million barrels (MMbbl) per day in 2012 to 1.97 MMbbl in 2020, or a little less than half a percent annually. From 2020 to 2030, production would decrease to 1.55 MMbbl but would return to 1.64 MMbbl by 2035 as new large development projects are started over time. Over this period, GOM production accounts for approximately 25 percent of U.S. domestic oil production.

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

	2012	2015	2020	2025	2030	2035
Gulf of Mexico OCS	1.50 (25.5%)	1.72 (27.5%)	1.97 (29.3%)	1.62 (25.2%)	1.55 (24.3%)	1.64 (26.8%)
Other	4.38 (74.5%)	4.54 (72.5%)	4.76 (70.7%)	4.80 (74.7%)	4.82 (75.7%)	4.48 (73.2%)
Total	5.88	6.26	6.73	6.42	6.37	6.12

Source: EIA *Annual Energy Outlook 2012* (Reference Case) Note: Numbers in parentheses are percentages of total. Totals may not sum to column totals due to independent rounding. EIA does not publish Alaska OCS numbers separately.

Overall, total U.S. offshore and onshore crude oil production would increase from 5.88 MMbbl per day in 2012 to 6.12 MMbbl per day in 2035. Production would be higher in the later years of the forecast when real prices are predicted to be higher. The higher

³⁸ 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.

levels of production would stem mainly from increased onshore oil production, predominately from the application of recent technology advances in the development of tight oil resources,³⁹ and the slowing of Alaska’s oil production decline by the development of offshore projects. Even with the 5 percent increase in production, imported oil will continue to account for a very large share of domestic consumption. While EIA projections show a decrease in imports of approximately one half percent per year between 2012 and 2035, coupled with a slight increase in domestic production over current levels, imports still would supply nearly 40 percent of the liquid fuel used in the United States. Projected increases in domestic production, refinery gains, ethanol and biodiesel, and liquids from gas, coal, and biodiesel all contribute to the overall gain in domestic liquid fuels production by 2035.

Table 7 summarizes EIA’s forecast of U.S. natural gas production from 2012 to 2035. The projected large increases in domestic natural gas production come from the abundance of discovered and undiscovered shale gas resources in the United States and increased exploration and development of these resources. The combination of two technologies, horizontal drilling and hydraulic fracturing, has made it economic to produce shale gas at today’s prices. These discoveries and technologies have resulted in a large expansion of domestic supplies, holding down natural gas prices even as oil prices have risen. Shale gas 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. EIA expects another threefold increase by 2035.

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

	2012	2015	2020	2025	2030	2035
Gulf of Mexico	2.12 (9.0%)	2.11 (8.91)	2.63 (10.43%)	2.38 (9.15%)	2.51 (9.37%)	2.60 (9.34%)
Other	21.55 (91.0%)	21.56 (91.09%)	22.58 (89.57%)	23.62 (90.85%)	24.28 (90.63%)	25.24 (90.66%)
Total	23.67	23.67	25.21	26.0	26.79	27.84

Source: EIA *Annual Energy Outlook 2012* (Reference Case) Note: Numbers in parentheses are percentages of total. Totals may not sum to column totals due to independent rounding. EIA does not publish Alaska OCS numbers separately.

Much of the growth in natural gas production comes from shale plays with high concentrations of natural gas liquids and crude oil, which have a higher value in energy equivalent terms than dry natural gas. EIA anticipates the United States will become a net exporter of liquefied natural gas (LNG) by 2016, exporting as much as 0.74 tcf by 2035. U.S. net pipeline imports of natural gas, primarily from Canada and Mexico, are expected to decline by 15 percent from 2012 to 2035, while pipeline gas exports to Mexico would grow by over 400 percent over the same period. This conversion from net

³⁹ There are very recent indications that increases in tight oil production, fueled by advances in technology, may be greater than anticipated. However, it is too early to determine whether long-term trends may be affected.

importer to exporter reflects reserve depletion in foreign countries, a growing demand from other markets outside of the United States, and an abundant natural gas supply and accompanying low prices in the United States.

The *AEO 2012* shows annual offshore natural gas production for the GOM increasing from 2.12 tcf to 2.60 tcf over the period studied, representing an increase of a little less than 1 percent annually. Unlike onshore production, EIA predicts GOM natural gas production will decrease slightly in the intermediate term since many undiscovered offshore fields are uneconomic at the natural gas prices projected over the next few years. Total offshore natural gas production fluctuates between 2.0 and 2.8 tcf per year over the period studied as new large projects directed towards liquids development are started over time. While GOM natural gas production thus contributes a small percentage of the Nation's natural gas supplies over the next two decades, it remains an important and stable source of domestic natural gas.

EIA expects the Nation to rely on more oil and natural gas to meet its yearly energy demands over the next 20 years, even as alternative sources of energy supply an increasing share of energy. Estimates by USGS and BOEM indicate the majority of the Nation's remaining oil and natural gas resources lie on Federal OCS and onshore lands. Therefore, continued oil and natural gas leasing activity in the GOM, the primary OCS region currently available for energy production and development activities, is clearly in the national interest. Outside the GOM, the Alaska OCS holds promise and lease sales are proposed in the Chukchi Sea, Beaufort Sea, and Cook Inlet program areas. Production from other OCS areas also could help meet the country's energy needs. However, after the *Deepwater Horizon* event and in line with recently implemented regulations to minimize the possibility of such events in the future, the Secretary's weighing of section 18 factors results in a cautious approach toward leasing in new areas and is reflected in a decision for this upcoming Five Year Program that focuses on activities in the GOM and in selected areas of the Alaska OCS.

Meeting Energy Needs

Contribution of OCS Oil

EIA expects the quantity of petroleum consumed in the United States to grow from 19.04 MMbbl per day in 2012 to 20.08 MMbbl per day in 2035, an average annual increase of about 0.2 percent. This growth would be led by the industrial sector, which would increase from around 20 percent of U.S. petroleum consumption in 2012 to over 22 percent in 2035. The transportation sector will continue to account for the vast majority of petroleum consumption, with projections showing that the transportation sector is expected to consume nearly 75 percent of petroleum in 2035, a small increase compared to 73 percent today, owing to modest projected economic and employment growth, which puts downward pressure on vehicle miles traveled.

From a national energy and economic security standpoint,⁴⁰ OCS production is an important part of U.S. efforts to maintain domestic oil supplies to meet domestic demand and as a means to reduce exposure to the unpredictability and price volatility of some foreign oil sources. In 2012, offshore oil will account for more than 27 percent of domestic oil production. The GOM is the second largest supplier of crude oil for the U.S. market after Canada, and ahead of Saudi Arabia. From 2000 to 2010, deepwater production of oil from the GOM increased by 70 percent,⁴¹ from 270 MMbbl per year to over 461 MMbbl per year, due mostly to the development of very large fields with high flow rates located in over 1,000 feet of water. The increase in deepwater production served to mitigate the decline in other categories of domestic production over the same 10-year period and mitigate its economic effects. This trend should continue, due to high levels of leasing activity in GOM deep water.

According to EIA, imports of crude oil account for 47 percent of domestic liquid fuel demand in 2012 but will decline to 37 percent of demand in 2035. In 2011, crude oil imports decreased to their lowest level since 1999, down 12 percent from their peak in 2005. Even with recent decreases in oil imports, their contribution to the U.S. balance of payments deficit has been significant and has represented a growing percentage of the U.S. balance of payments.⁴² From 2006 to 2012, the percent of the monthly U.S. goods and services trade deficit attributed to petroleum products increased from 34.8 percent in January 2006 to over 56 percent in the beginning of 2012.⁴³ Estimates by the Bureau of Economic Analysis (BEA) of annual petroleum and petroleum product imports, show the export of nearly half a trillion dollars in 2011 from the United States to other countries.⁴⁴

Although the decline in the U.S. balance of trade from 2001 to 2011 was largely due to increased world oil prices, the contribution of a weakening U.S. dollar was also a factor, given that oil prices are denominated in dollars.⁴⁵ As Chart 1 indicates, given a weaker dollar, oil prices have risen more rapidly in U.S. dollars than in euros.

⁴⁰While 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 discourage temporary supply disruptions or threats thereof, and consuming domestic supplies limits the amount of dollars sent overseas, reducing the balance of payments deficit.

⁴¹ BOEM; <http://www.gomr.boemre.gov/homepg/offshore/deepwatr/summary.asp>

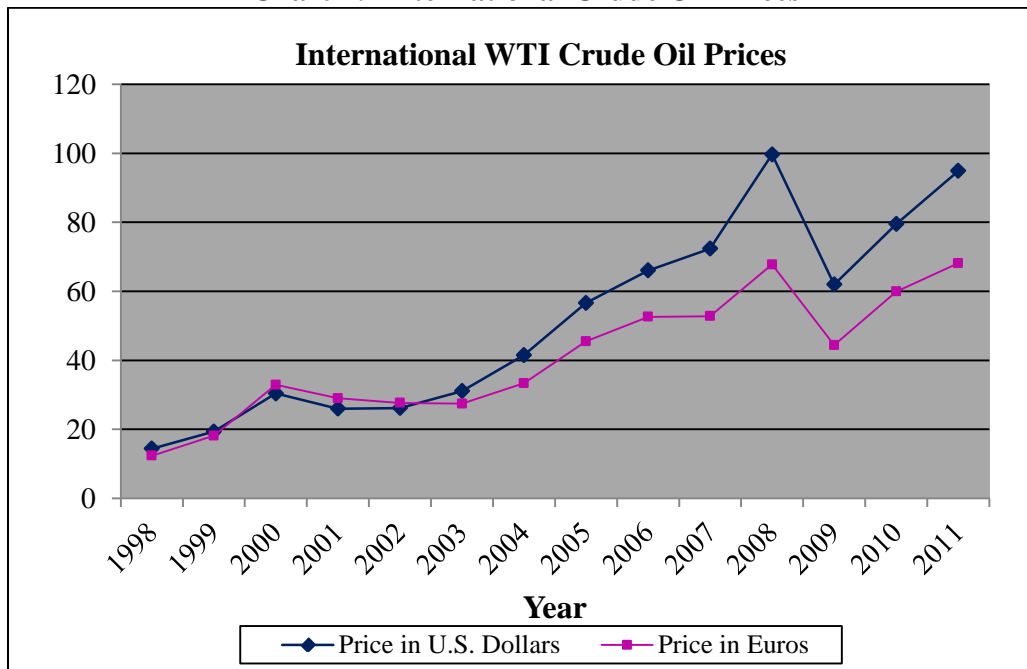
⁴² BEA, 2012 (Table 2a); <http://www.bea.gov/iTable/iTable.cfm?ReqID=6&step=1>

⁴³ United States Census Bureau; <http://www.census.gov/foreign-trade/statistics/graphs/PetroleumImports.html>

⁴⁴ BEA, 2012 (Table 2a); <http://www.bea.gov/iTable/iTable.cfm?ReqID=6&step=1>

⁴⁵ 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.

Chart 1: International Crude Oil Prices



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 overall U.S. import costs. The dollar amount spent on oil imports for the first 8 months of 2008 surpassed the amount spent in all of 2007. Although average prices dropped over 40 percent from 2008 to 2009, by 2011 world oil prices had risen sharply and EIA price projections over the next two decades estimate over \$130 dollars per barrel of oil in 2010 dollars. Increased world oil prices and increases in crude oil consumption by economies such as those of China and India, could have serious effects on the U.S. economy. Domestic production of oil, and to a lesser extent natural gas, from the OCS reduces the amount of oil that must be imported from abroad, thereby lessening the risk to the U.S. economy posed by supply disruptions.

Contribution of OCS Natural Gas

Natural gas consumption has risen significantly over the last decade as new gas-fired generation plants have been built and placed into service. The increase in domestic demand, as well as plans for LNG exports, raise concerns that the volumes of natural gas available from traditional sources—involving both domestic production and imports from Canada and Mexico—might not be able to keep pace with growing U.S. use. However, significant increases of domestic natural gas production from large shale gas plays and production areas with high concentrations of natural gas liquids and crude oil alleviate these concerns.⁴⁶ According to the *AEO 2012*, natural gas production in the

⁴⁶ The presence of oil and natural gas liquids, which can fetch higher prices in today's markets, provides incentive to pursue these plays even in the face of low natural gas prices.

United States from shale gas resources has increased considerably to meet growing demand and will continue to do so in the future. USGS estimates the United States has over 482 tcf of unproved technically recoverable resources of shale gas; leading EIA to project the United States will become a net exporter of natural gas by 2021.

In 2010, the Federal OCS supplied about 10 percent⁴⁷ of annual domestic natural gas production and EIA estimates 12 tcf in proven reserves of natural gas in the GOM. Over the projected time period, EIA forecasts offshore natural gas production in the GOM to fluctuate between 2.0 and 2.8 tcf per year as new large projects directed toward liquids development start and replace depletion of other offshore fields. By 2035, OCS production will still account for roughly 10 percent of total domestic dry natural gas production. 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.

Regional Energy Considerations

Table 8 shows proportional petroleum and natural gas production and consumption by region in the United States in 2010. The table also indicates each region's total energy consumption as a percentage of total U.S. energy consumption (2009 figures). One noticeable theme is that the East and West Coasts and Midwest consume 75 percent of the oil and natural gas used in the United States but supply only about 25 percent of domestic oil and natural gas production.

The Federal GOM region has by far the most resource potential of the four OCS regions, and it is located such that it can supply oil and gas to the Nation's top three consuming Petroleum Administration for Defense Districts (PADD),⁴⁸ the East Coast, the Gulf Coast, and the Midwest.

The production percentages provide a rough approximation of the distribution of known oil and natural gas resources among the country's PADDs. Of the six PADDs (with Alaska as a separate district), the East Coast has the highest consumption but by far the lowest production of oil. Its natural gas production, while not the lowest, is well below levels in the top three onshore PADDs and the Federal GOM. In BOEM's 2011 Assessment, the North Atlantic is the 9th highest-ranked planning area for overall resource potential and is 7th for natural gas potential. The Mid-Atlantic is in the top 7-8th overall and the top 5-6th for natural gas, depending on the price case. The South Atlantic is about 15th overall, but like the other Atlantic planning areas, higher for natural gas

⁴⁷ DOI, Office of Natural Resources, 2011; <http://www.boemre.gov/stats/PDFs/AnnualPercentage1954-2010.pdf>

⁴⁸ For this analysis, PADD V is split into the Lower 48 Pacific and Alaska, given how different Alaska's production-consumption relationship is from the remainder of PADD V. It also creates a one-to-one relationship between coastal PADDs and the four OCS regions. Hawaii does not have oil or gas production, and its energy consumption would not contribute appreciably to Table 8. For the composition of each PADD, see the Table 8 notes.

potential. Oil production in the Lower 48 Pacific coastal states represents about a third of its oil consumption, but its natural gas production is closer to a tenth of consumption. The three planning areas off California are among the top ten OCS areas for resource potential, with the Southern California planning area falling behind only the GOM and Arctic planning areas. All three are more oil prone but have important potential for natural gas as well.

Regional production–consumption gaps, proximity to production areas, and existing transportation constraints can affect regional prices for petroleum and natural gas products. For example, gasoline prices in the Rocky Mountain area were lower than the national average for much of 2011. This was due to relatively low crude oil input costs to refineries in a region that is fairly self-sufficient in meeting its demand for gasoline and other petroleum products. In contrast to the eastern half of the United States, refineries within the Rockies supply most of the regional demand. In terms of natural gas, geographic price differences for U.S. natural gas can reflect transportation and/or transmission constraints between regional markets. Sudden geographic price differences that manifest during regional demand disturbances can be indicative of transportation and/or transmission constraints in a given market.

Table 8: Petroleum and Natural Gas Production and Consumption by Region in 2010

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	0.38%	4.74%	29.25%	27.67%	31.26%
Midwest	12.31%	11.38%	25.43%	25.95%	29.31%
Gulf Coast	29.46%	50.04%	26.70%	25.96%	20.57%
Federal OCS, GOM	27.69%	10.49%	0.00%	0.46%**	0.00%
Rocky Mountain	6.55%	19.59%	3.48%	4.29%	3.86%
Lower 48 Pacific	10.50%	1.14%	15.14%	14.27%	14.33%
Alaska	11.76%	1.64%	0.21%***	1.40%	0.67%
Federal OCS, Pacific	1.06%	0.19%	0.00%	0.00%	0.00%
Federal OCS, Alaska	0.30%	0.78%	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.

***2009 Data. 2010 State Energy Totals not available at time of document.

Sources:

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

OCS Oil Production - <http://www.boemre.gov/stats/OCSproduction.htm>

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

OCS Gas Production - <http://www.boemre.gov/stats/OCSproduction.htm>

Oil Consumption - http://www.eia.gov/dnav/pet/pet_cons_psup_dc_r50_mbbl_a.htm

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

2010, million Btu per barrel (5.8)

Natural gas conversion

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

2010, Btu per cubic foot (1,025)

In the United States, almost half of the total inter-PADD petroleum product movements by pipeline, tanker, or barge in 2011 were from the Gulf Coast (PADD 3), an area with significant refining capacity, to the East Coast (PADD 1), a major population center. For crude oil, nearly two-thirds (341,576 Mbbl per year) of inter-PADD movements by pipeline, tanker, or barge were movements from Gulf Coast (PADD 3) to the Midwest (PADD 2). These volumes include crude oil produced in the GOM and imports to the Gulf Coast region that move inland to refineries in the Midwest. As pipeline receipts of Canadian oil sands crude oil and increased production from North Dakota's Bakken formation have bolstered Midwest crude oil supplies in recent years, the volume of crude oil moving by pipeline from the Gulf Coast to the Midwest has steadily declined. This increase in crude oil to the Midwest from sources other than the GOM has reduced its need for crude oil supplies from the Gulf Coast. Still, overall the vast majority of the inter-regional crude oil pipeline movements occur among the states of the Midwest, Gulf Coast and Rocky Mountain PADDs, with very little crude oil pipeline activity into or out of the East and West Coasts.

Alternatives to the Contribution of OCS Oil and Natural Gas

In the Five Year EIS, the term No Action Alternative (NAA)⁴⁹ refers to the No Sale Option for all program areas. In the NAA, no new OCS leasing would take place for at least 5 years and domestic oil and natural gas production would be reduced appreciably since replacements for depleting offshore fields would be delayed for at least that long. If no OCS oil and gas lease sales were held during the period covered by the new Five Year Program, energy markets would find substitutes to satisfy most of the demand that would

⁴⁹ See additional discussion in Net Economic Value section, below.

have been met by production resulting from the oil and natural gas resources made available by the additional lease sales to be held under the program. In an environment of strong worldwide demand for oil and natural gas, a domestic supply cut equivalent to the production anticipated to result from a new Five Year Program would lead to a slight increase in world oil prices and a relatively larger increase in U.S. natural gas prices. All other things being equal, this would lead to a market response providing increases in imported oil and natural gas and greater production of domestic onshore oil and natural gas, coal, and other energy substitutes. It would lead to a small reduction in the total amount of natural gas consumed in the United States, with oil consumption rising slightly.⁵⁰ Most of the foregone production would be replaced by other sources. The net result in the United States would be a slight reduction in oil and natural gas consumed, a substantial increase in oil imports, and added supplies provided by onshore hydrocarbon resources.

BOEM uses its *Market Simulation Model (MarketSim)* to estimate the amount and percentage of substitutes the economy would adopt should a particular program area not be offered for lease. *MarketSim* is based on authoritative and publicly available estimates of price elasticities of supply and demand and substitution effects. Elasticity measures the sensitivity of consumers or producers to changes in product price.

Table 9 demonstrates how energy markets would compensate in the event the NAA were implemented. Under the mid-price scenario of \$110 per barrel and \$7.38 per mcf, 68 percent of the oil and natural gas production foregone from this program would be replaced by greater imports, 16 percent by increased onshore production, 5 percent by a switch to coal, 3 percent by increased electricity from other sources, 2 percent by a switch to other energy sources, and 6 percent by a reduction in consumption.⁵¹ Without the expected production from the Five Year Program, 10 billion BOE (BBOE) over 40 to 50 years would be deferred and offset by increased supplies from other energy sources. These energy sources would increase as follows: oil and natural gas imports by 6.8 BBOE (equal to current U.S. imports for almost 1.5 years), onshore oil and natural gas production by 1.6 BBOE (equal to almost half a year of current onshore production), and other energy sources by 1.0 BBOE. Consumption of oil and natural gas would be expected to decline by 0.6 BBOE (equal to less than 2 months of current U.S. oil and gas consumption) spread over the next 40 to 50 years.

⁵⁰ This increase in oil consumption reflects the fact that oil and natural gas are substitutes within the industrial sector and, to a lesser extent, the residential and commercial sectors. The loss of a given amount of OCS production is likely to result in greater increases in natural gas prices than in oil prices, because the price of oil is largely decided in the world market while the price of natural gas is largely set in smaller regional markets. Therefore, as natural gas prices increase under the NAA compared to the exploration and development (E&D) scenarios due to reduced OCS production, consumption of substitutes, including oil, increases. The increase in oil prices under the NAA may cause some offsetting substitution in the opposite direction, from oil to natural gas, but the impact of increased natural gas prices is the more dominant of the two effects.

⁵¹ Total does not sum to 100 percent due to independent rounding and conversion to equivalent units of energy (e.g., Btu to BOE).

Table 9: Results of No Action Alternative (No New Program)

Energy Sector	Quantity (BBOE) over 40 years	Percent of OCS Production Replaced
Onshore Production	1.6	16
Onshore Oil	0.1	1
Onshore Natural Gas	1.5	15
Imports	6.8	68
Oil Imports	5.9	60
Natural Gas Imports	0.9	9
Coal	0.5	5
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 its 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 by regional supply. Therefore, in the absence of production from a new Five Year Program, U.S. natural gas prices would increase proportionally more than oil prices. Based on *Marketsim* results, this would result in substitution away from natural gas and toward oil and other energy sources.

The distribution of reduced consumption and switching to alternative sources by sector depends largely on the amount of consumption and relative price elasticities of demand across the sectors. The transportation and industrial sectors accounted for almost 95 percent of U.S. oil consumption (approximately 72 and 23 percent of oil respectively) in 2010. Residential and commercial consumption accounted for the residual 5 percent. Other forms of energy cannot readily substitute for most of the oil and natural gas consumed in the transportation and industrial sectors in the near term. In the U.S. transportation sector, a decline in oil consumption would likely be the result of a reduction in miles traveled and/or the purchase of more fuel efficient vehicles. In addition to the modest price increase associated with these scenarios, the cost of developing an alternative 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 hybrid, plug-in hybrid, and electric vehicles.

A detailed discussion of the model and alternative sources of energy in the context of the PFP for 2012-2017 appears in *Energy Alternatives and the Environment* (BOEM 2012-021), which can be found with other program documents at <http://www.boem.gov>.

Replacement Energy Sources

Many renewable energy sources will contribute to the future of the United States with an increasing emphasis on sources with reduced CO₂ emissions-reducing sources. In February 2009, with the passage of the American Recovery and Reinvestment Act (ARRA), the President pledged over \$90 billion to support a wide range of clean energy programs. For example, ARRA has funded \$2.4 billion for battery and electric drive component manufacturing, and for electric drive demonstration and infrastructure. These investments already are transforming the advanced vehicle batteries industry in the United States.⁵² In the long run, the electrification of the transportation sector will enable the use of electricity generated from renewable energy sources in place of petroleum fuels. Investments in the grid included \$4.5 billion for Smart Grid investments, demonstration projects, and capacity building. The Section 1603 renewable energy grant program⁵³, another example of an ARRA investment, has been an essential tool in deploying renewable energy resources in the United States over the past 2 years, successfully increasing U.S. manufacturing and redirecting investments into renewable energy projects. As of the first three months of 2012, over \$12 billion had been paid to eligible participants.⁵⁴ This and other investments are intended to ensure that electricity generation from non-hydro renewable sources doubles by 2012 from 2008 levels of 126 billion kilowatt hours (74 MBOE). 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.

On a national scale, non-hydro renewable sources supplied about 7 percent of all the energy consumed domestically in 2010. This share is expected to reach 10 percent in the mid-2020s and grow to 13 percent by the mid-2030s, according to *AEO 2012* (Early Release). In 2010 and 2011, DOI approved 27 renewable energy projects on public lands, including 16 commercial-scale solar energy initiatives, 4 wind projects, and 7 geothermal plants. 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. BOEM has the authority to (1) grant leases, easements or rights-of-way for renewable energy-related uses on the OCS and (2) 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. Secretary Salazar's "Smart from the Start" offshore wind program is intended to identify high-

⁵²http://www1.eere.energy.gov/vehiclesandfuels/pdfs/merit_review_2011/electrochemical_storage/es098_johnson_2011_o.pdf

⁵³U.S. Department of the Treasury, 2011; <http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx> The 1603 program offers renewable energy project developers cash payments in lieu of investment tax credits (ITC). The value of the awards is equivalent to 30% of the project's total eligible cost basis in most cases.

⁵⁴U.S. Department of the Treasury, 2011; <http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx>

potential, low-conflict areas on the Atlantic OCS, near large population centers, where BOEM will consider offshore wind leasing as early as the end of 2012.

The alternative energy technologies expected to be deployed on the OCS should 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. BOEM is actively working with coastal states to share information on potential wind energy leasing sites. Federal or state governments might use taxes, subsidies, or other tools to incentivize a different mix of energy substitutes. These efforts could help offset the failure of the market to reflect all the externalities associated with the use of fossil fuels. These policies also could promote investments in renewable energy technologies that may not be cost-competitive at current historically low natural gas prices, but show promise for future competitiveness under longer-term energy price forecasts. Such policies could include renewable energy portfolio standards for electricity generation portfolios.

Despite the increased contributions from alternative and renewable energy sources that can be expected over the coming decades, it is important to note three points in relation to the decisions at hand. First, natural gas and oil will remain important contributors to the energy mix throughout the foreseeable future. Despite advances in alternative-fuel vehicles, transportation remains predominately dependent on petroleum, with most of the remaining fuel supplied by natural gas, and it accounts for about 72 percent of demand for liquid fuels. According to the *AEO* reference case, these shares and consumption levels are unlikely to change appreciably by 2035, although the forecast does indicate that dependence on petroleum would fall by about 5 percentage points, in favor of increased consumption of other liquid fuels. Until renewable energy sources can supply a much larger share of the Nation's energy, clean-burning natural gas likely will continue to be a favored fuel, especially for electricity generation, where it can be used to respond to the rapid fluctuations in demand that are inherent in electricity markets. Second, the focus of this document is the decision process for the next Five Year Program, as specified by section 18 of the Act. Therefore, the analyses that follow are focused on providing information that may help the Secretary decide among the options available to him through the section 18 process. Third, given the importance of increasing the share of renewable energy in fueling the Nation's economy, most realistic alternatives available to build renewable energy production will be advanced regardless of any Five Year Program decisions, as evidenced by Secretary Salazar's energy-related decisions to date. For example, he has not delayed or denied any renewable energy projects under his authority because of the availability of fossil fuels that could be used instead. Further, even if renewable fuels advance much faster than anticipated, OCS oil and natural gas production foregone because of a Five Year Program decision would be replaced by fuels that would most easily substitute for the same uses in the same geographic areas, and in many cases conversion to renewable fuels would require major changes and investments in alternate energy infrastructure.

Conclusion

Despite the promise of new sources of energy, America's reliance on oil and natural gas is likely to change only gradually in the near future. Additional reductions in oil dependence should come from increases in efficiency, which include Corporate Average Fuel Economy ("CAFÉ") Standards intended to improve the fuel economy of cars and light trucks with the goal of doubling efficiency by Model Year 2025. However, even increased vehicle fuel efficiency is predicted only to prevent an increase in consumption of petroleum products for transportation. 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. Notwithstanding a national energy policy focus on increasing conservation and efficiency to help reduce demand for fossil fuels (i.e., oil, natural gas, and coal), production of oil and natural gas, as well as eventually 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 potentially to avoid price volatility. 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 natural gas-bearing regions that best meet the Nation's energy needs. The OCS, and in particular the GOM and the Alaskan Arctic, offer ample oil and natural gas resources for the future. Over the next 25 years, offshore production is expected to account for roughly 32 percent of total domestic crude oil production and 10 percent of total domestic natural gas production. Without the program, significant increases in imported oil and onshore production of oil and natural gas would be needed to sustain the Nation's growing energy requirements because renewable energy sources and conservation will not achieve the scale necessary to materially dent import reliance.

The size, timing, and location of lease sales in the PFP 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 PFP is designed to maximize the potential of the Central and Western GOM, which have both the highest economically recoverable resource potential of available areas and by far the most developed infrastructure. In the intermediate term, the PFP 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 Five 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 Final EIS for the Five Year Program for 2012-2017 has been prepared for the Secretary's consideration and to accompany this document. Preparation of the EIS began with publication of an NOI 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. The Draft EIS was published with a 60-day comment period on November 10, 2011, (76 FR 70156) and analyzed six areas proposed for leasing along with seven alternatives. The Final EIS accompanies this document for the Secretary's consideration. 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, listed in part II of this document.

C. Comparative Analysis of OCS Planning Areas

This section presents the analyses that compare the volume, size and social value of anticipated production from the various program areas included in the PFP decision. The analyses address the section 18 criteria that can be quantified as well as some that cannot. The domestic benefits and costs of proposed OCS activities are enumerated, as well as the costs of providing energy substitutes avoided by implementing the program. Other factors such as environmental sensitivity and marine productivity of the areas proposed for leasing consideration 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. The Final EIS, published concurrently with this document, contains a more extensive description of potential environmental impacts from the Five Year Program.

1. Net Benefits Analysis

At the draft proposed, proposed, and proposed final program stages in the five year program preparation process, BOEM conducts a benefit-cost analysis of the social value from anticipated production of oil and natural gas resources expected 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 activities. The analysis also includes estimates of the environmental and social costs associated with those activities that would occur when obtaining replacement energy from other sources should the No Sale Option be selected in any program area.

While society continues to receive the benefits from previously leased OCS resources, policies relating to their treatment are not subject to this PFP decision. Accordingly, this analysis only considers the net benefits from proposed new leasing. Further, the net benefits analysis includes information designed to help with decisions about the size, timing and location of future Federal lease sales on the OCS, so this analysis only covers energy activities under BOEM's jurisdiction.

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 III of the 2009 DPP document, led to the selection of the six program areas and the timing of OCS lease sales in the PP.

The 2011 PP document moved from the relative ranking of all unleased, undiscovered economically recoverable resources in the 26 planning areas to the value of anticipated production from each program area for the program proposal and for each of the broad program alternatives described in the EIS. (See Valuation of Program Alternatives in this section.) This analysis is expanded and updated here to provide valuation for the Secretary, with estimated net benefits by planning area from anticipated production under each of the three resource price cases listed in Table 10. The PFP was updated

significantly from the PP analysis.⁵⁵ Note that for the purpose of this analysis, each of the price cases is conceptually germane beginning only when new production commences from the six-area program. Prior to that time, stipulated prices of oil and natural gas have no effect on the calculations. Both the PP and this analysis add to the 2009 DPP analysis by including the net domestic consumer surplus⁵⁶ that arises with new leasing. Summing the production value and the difference between environmental, social and net domestic consumer surplus benefits and losses from exploring each program area instead of the most likely energy substitute provides the net benefits shown in Table 16.

Figure 2 summarizes the components of BOEM’s net benefits analysis. Additional information on the methodology and economic assumptions can be found in the *Economic Analysis Methodology for the Five Year OCS Oil and Gas Leasing Program for 2012-2017*, (BOEM 2012-022).

Figure 2: Components of Net Benefits Analysis

Anticipated Production from 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 <i>less</i> Environmental and Social Costs of Energy Substitutes (Resulting from the No Sale Option)	=	Net Social Value (NSV)
NSV	+	Consumer Surplus Benefits <i>less</i> Lost Domestic Producer Surplus Benefits	=	Net Benefits

The net benefits analysis reflects several values derived from economic activity as well as the various costs associated with generating that economic value. The net economic value (NEV) calculation described below looks at changes in economic activity that can

⁵⁵ See *Economic Analysis Methodology* (BOEM 2012-022) for more information on changes since the PP.

⁵⁶ Consumer surplus, a standard term in economics, represents the difference between the amount that consumers would be willing to pay and the actual price of goods and services they purchase. In this context, an action or event that lowers the price of oil and natural gas will increase consumer surplus by the change in price summed over the quantity purchased at the original price, plus an increment reflecting the sum of consumer surplus benefits from purchasing additional quantity at the lower price. Typically, the gains from the added consumer surplus would be substantially reduced by the losses from a decrease in producer surplus, i.e., the decrease in economic value to producers receiving a lower product price, leaving a relatively small residual net societal benefit. However, since this is focused on net benefits to domestic consumers and producers, the producer surplus offset affects only the portion of domestic consumption that is produced domestically. Hence, there is no producer surplus decline to offset that portion of consumer surplus gain on the aggregate amount of imported oil and natural gas. The result is that in this case the net consumer benefits, primarily representing pecuniary gains from reduced market price of imported oil and gas, are substantial for the program as a whole.

be measured in several forms, e.g. net value reflected as the sum of commercial income, tax receipts, royalties, and other government revenues. Net social value (NSV) is measured as NEV less the difference between the social costs of the program option and of the No Sale Option.

Another perspective on social value involves comparison of 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 appropriate when considering impacts from the local or regional perspective and is used in the equitable sharing of developmental benefits and environmental risks analysis in section C.4 below. The net benefits analysis in this section 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.

Gross Revenue

The net benefits analysis begins with the calculation of the gross revenue from the production of OCS oil and natural gas anticipated as a result of the Five Year Program. Gross revenue equals 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 years,⁵⁷ over which time oil prices could fluctuate dramatically. Historical oil price volatility has shown that unanticipated market and political events, new technologies, weather, geopolitical unrest, or economic changes can cause energy price paths to deviate considerably from even the most respected forecasts.⁵⁸ Moreover, use of a trend forecast or fluctuating prices in the analysis would make it difficult to separate out the effects of assumed price changes and their timing from the resource and cost differences in program areas on the measures of net benefits. For these reasons, the PFP analysis includes resource and net benefit estimates evaluated at each of the three level sets of real price scenarios shown in Table 10. These price scenarios are consistent with the ones analyzed in BOEM's 2011 Assessment.⁵⁹ Having three different sets of flat price cases also allows the decision-maker to more clearly identify the extent to which net benefits vary under a wide range of general price levels, independent of other input assumptions such as the timing of activities. A real discount rate of 3 percent is used in the PFP analysis to aggregate 40 to 50 years of effects at a society-wide rate of time preference.

⁵⁷ 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.

⁵⁸ The widespread application of technology to extract abundant tight natural gas has recently reduced domestic natural gas prices, causing at least a temporary decoupling of oil and natural gas prices.

⁵⁹ 2011 Assessment. RED-2011-01a.

Table 10: Price Scenarios

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

BOEM has chosen to retain the same price scenarios used previously in the PP decision document. Given the major changes in energy-equivalent prices for natural gas and oil in recent years, the ratio of the price of natural gas to oil for the same heat content (Btu) equivalency factor was reduced for the PP decision document from that used previously and in the 2009 DPP decision document. That factor, which was 0.90 in 2005, was decreased to 0.60 for the 2009 DPP decision document, and has been further reduced to 0.40 for the 2011 Assessment and the PP and PFP analyses. For example, an oil price of \$60 per bbl in the 2009 DPP decision document was associated with a gas price of \$6.41 per mcf, while the same oil price is associated with a natural gas price of \$4.27 per mcf in the 2011 and 2012 program documents.

Since these oil and natural gas prices were determined for the 2011 Assessment and for the Five Year Program net benefits analyses, the natural gas price has fallen below the 0.40 ratio, but BOEM has chosen to retain the 0.40 ratio between oil and natural gas prices. Low natural gas prices primarily are due to new technology which has increased shale gas production and to the continued drilling in shale plays with high concentrations of natural gas liquids and crude oil, which have higher energy content than dry natural gas.⁶⁰ The low prices are likely unsustainable over the 40-year period covered by the net benefits analysis as market forces cause prices to increase back to equilibrium. On the supply side, producers will switch their attention to more oil-prone prospects which will create a future upward pressure on natural gas prices via reduced supply. Similarly, environmental concerns about hydraulic fracturing (fracking) fluids may put pressure on the industry to scale back or even cease the use of fracking technologies to unlock natural gas from shale. Because natural gas is relatively less expensive, demand will go up over time, gradually causing the price to rise as infrastructure develops to allow for the use of natural gas in electricity, transportation, etc., and as capacity develops to export natural gas via LNG. Therefore, BOEM has retained the same price scenarios used in the PP analysis for this decision.

Estimates of Hydrocarbon Resources and Anticipated Production

Resource estimates from the 2011 Assessment provide the foundation for this evaluation of program areas. The 2011 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

⁶⁰ 2012 AEO Early Release, http://www.eia.gov/forecasts/aeo/er/early_production.cfm

where there is little 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 from previous assessments for 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.

Furthermore, estimates of UERR expected to be available for lease as of the start of the program 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 2011 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 program and 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 the PFP. The cumulative case in the Final EIS uses the full UERR for the collective effect of current and future activities resulting from all past, present, and future five year programs.

In the GOM, anticipated production expected to result from sales in this PFP was based on historical sale-specific field discovery volumes, production and drilling activity, leasing trends, and BOEM's most recent 10-year GOM production forecast.⁶¹ UERR estimates from BOEM's 2011 Assessment provide the upper-limit constraint of the production estimates. 2011 Assessment data also was used to segregate anticipated production into water-depth categories by applying geologic play-specific resource estimates as well as a distribution of available acreage. A significant decline in leasing and drilling activity in the shallow water of the Western GOM since 2007 resulted in a sizeable reduction relative to past formulations of the anticipated production volumes in this area. The anticipated production estimates for the Eastern GOM also incorporated new area-specific, subsurface G&G data interpretation.

⁶¹ U.S. Department of Interior, Minerals Management Service, Gulf of Mexico Region. 2009. Gulf of Mexico Oil and Gas Production Forecast: 2009-2018. May, <<http://www.gomr.boemre.gov/PDFs/2009/2009-012.pdf>>.

In Alaska, many factors influence the development of exploration, development and anticipated production scenarios related to the program. In the Alaskan Arctic, oil is the priority commodity of interest due to its higher market value and the existing TAPS. Accordingly, the scenarios for the Chukchi and Beaufort Seas assume that large oil fields will be developed first. Natural gas production is likely to be delayed until oil pools are depleted and even then only if a new large-volume transportation system pipeline is built. Natural gas is assumed to be utilized as both fuel for facilities and for reservoir pressure maintenance through injection to extract more oil. An exception occurs in Cook Inlet which 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 Cook Inlet.

In part due to the differences between mature areas and frontier areas in information and historical data, estimates for GOM areas are subject to a smaller range of uncertainty compared to those for Alaska OCS areas, especially for the Arctic areas. The estimates for the GOM are based on years of experience, while those for the Chukchi and Beaufort 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 11 shows the anticipated production for each program area.

Table 11: Production Estimates at Different Prices*

	Oil (billion barrels)			Natural Gas (trillion cubic feet)			BBOE (billion barrels of oil equivalent)		
	Low Price	Mid-Price	High Price	Low Price	Mid-Price	High Price	Low Price	Mid-Price	High Price
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 calculates the NEV from resources expected to be leased and produced from sales in the 2012-2017 Program. 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. NEV estimates for each program area use the same schedules of exploration, development, and production activities that are used in the environmental and social cost analysis and in the Final EIS. The Federal government, as lessor, collects most of 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. NEV can be equated to the sum of the present values of royalties, rents, bonuses, taxes, and after-tax profits. Based on the calculated government share and general estimates of foreign shareholder proportions in foreign companies, only 95 percent of the estimate of NEV is used to measure the domestic piece of NEV from a program area.⁶² Table 12 shows the domestic NEV estimates.

In the low-price case, discovery of sufficient resources to justify production is not expected for the Eastern GOM. If companies bid successfully on blocks in the Eastern GOM, the government receives the bonus bid and rental revenue. This is a transfer payment that would not affect NEV. Successful exploration and production could lead to positive NEV, but the more likely result of exploration in the low-price case would seem to be dry holes. Without production, companies do not make profit and NEV for the Eastern GOM would be negative. In both the mid- and high-price scenarios, production and positive NEV are predicted. Because no sales can be added to an approved five year program, the two-sale option for the Eastern GOM ensures that sales can be held if prices remain at current levels or rise even higher. If prices were to fall drastically toward the level of the low-price case, the Secretary could reconsider holding both Eastern GOM sales.

⁶² This adjustment is discussed in more detail in the *Economic Analysis Methodology* paper.

Table 12: Net Economic Value

	Net Economic Value* (\$ billions)		
	Low Price	Mid-Price	High Price
Central GOM	36.66	153.59	287.16
Western GOM	10.31	38.73	69.56
Eastern GOM (2 Sales)	**	2.30	5.32
Chukchi Sea	5.02	31.06	135.37
Beaufort Sea	0.14	3.68	16.57
Cook Inlet	1.56	3.71	12.30

All values are discounted at a real discount rate of 3 percent.

*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 NSV from offering a program area. NSV equals the NEV less the present value of *net* environmental and social costs anticipated from the program area. Environmental and social costs arise from air emissions, oil spills, visual and ecological disturbance, and preemption of other land uses during the exploration, development, production, and transportation of OCS oil and natural gas resources. Such costs also would arise in the absence of the new OCS activity, with added production from replacement fuel sources that the economy will demand in any event. In order to calculate the *net* environmental and social costs, such costs are estimated under both the PFP and the No Sale Option and the difference assigned to each program area. Table 13 presents the estimates for the environmental and social costs associated with the development of resources in the OCS program areas from sales in this program and the environmental and social costs of the No Sale Option.⁶³

Selection of the No Sale Option in all of the program areas is equivalent to the NAA that is analyzed in the Final EIS. Choice of the No Sale Option in any or all of the program areas means no new leasing would take place in those area(s) for at least 5 years and domestic oil and natural gas supply would be reduced. This supply reduction would

⁶³Table 3 of the *Economic Analysis Methodology* paper shows the split of environmental costs and social costs for the Central GOM mid-price case. Environmental costs make up approximately 96 percent of total program costs and 99 percent of total costs for the No Sale Option.

cause only a small change in hydrocarbon prices so there would be very little decrease in the quantity of oil and natural gas demanded.⁶⁴ Instead, increased imports and domestic onshore production as well as fuel switching would ensue to meet continuing domestic demand for oil and natural gas products.

BOEM uses its *MarketSim* to determine the substitutions for offshore oil and natural gas development if one or more areas are excluded from the program.⁶⁵ Overall, the model indicates that if the No Sale Option were selected in each program area, there would be a 23-percent reduction in OCS production of oil and natural gas over the next 40 to 50 years. Of this, 60 percent would be replaced by increased oil imports, 9 percent by increased natural gas imports; 1 percent by increased onshore oil production; 15 percent by increased onshore natural gas production; 5 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.⁶⁶ The replacements proportions may vary slightly depending on the relative amount of oil and natural gas.

BOEM uses an updated version of its Offshore Environmental Cost Model (OECM) to estimate both the environmental and social costs that would result from OCS activities and those costs that would result from selecting the No Sale Option in each program area.⁶⁷ This estimate uses the levels of OCS activity from the exploration and development (E&D) scenarios employed in NEV and the Final EIS as well as the energy market substitutions from the *MarketSim* to calculate environmental and social costs.⁶⁸ OECM computes⁶⁹ environmental costs (ecology and air quality) and social costs

⁶⁴Though the change in oil and natural gas prices is small, since these pecuniary gains are derived from each unit of domestic consumption, consumer surplus is still quite large. For more information on the calculation of consumer surplus, see the *Economic Analysis Methodology* paper.

⁶⁵ Industrial Economics, Inc. 2012a. Consumer Surplus and Energy Substitutes for OCS Oil and Gas Production: The Revised Market Simulation Model. U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2012-024.

⁶⁶ Total does not sum to 100 due to independent rounding and conversion to equivalent units of energy, e.g. Btu to BOE.

⁶⁷ Industrial Economics, Inc.; Applied Science Associates, Inc.; Northern Economics; and Dr. Nicholas Z. Muller. 2012b. Forecasting Environmental and Social Externalities Associated with OCS Oil and Gas Development: The Revised Offshore Environmental Cost Model (OECM). U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2012-025.

⁶⁸ *MarketSim* does not include estimates of changes in production from existing OCS leases in response to the selection of the No Sale Option for one or more program areas. While this may be considered for future versions of the model, any such OCS response effect would depend on numerous factors, such as whether the decision was for one or multiple areas, the specific areas to which it applied, companies' beliefs as to whether the decision implied the direction for future programs, and changes in the relative attractiveness of opportunities elsewhere for investment as decisions were made. Industry could pursue strategies that create short-term and long-term effects with offsetting results. Therefore, it is not even certain that the OCS response effect would result in higher production over the period of analysis.

⁶⁹ 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. These emissions calculations are in Table 7 of the *Economic Analysis Methodology* paper.

(recreation, property values, subsistence harvests, and commercial fishing, in addition to costs from activities associated with exploration, development, production, and transportation that might occur with new OCS production and its most likely replacement. 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. Replacement energy sources generate such costs from the added risk of oil spills and additional air emissions with increased tanker imports as well as with additional air emissions resulting from increased onshore production of oil, natural gas, and other energy sources such as coal.

The model is not designed to represent impacts from catastrophic oil spill events or impacts on unique resources such as endangered species. The reasoning behind this omission of catastrophic oil spills is explained in the section in this document entitled Possibility of Catastrophic Well Blowout or Oil Spill. A discussion of the resources that could potentially be affected as a result of a catastrophic spill on the OCS is included in the supporting paper, *Inventory of Environmental and Social Resource Categories Along the U.S. Coast* (BOEM 2012-003). Note that OECM-based analysis also omits several factors that would disproportionately raise the environmental and social costs of the No Sale Option including the environmental and social costs resulting from the substitution of coal for natural gas in electricity generation and from a reduction in land and water conservation efforts from loss in OCS funding that would attend the No Sale Option.

As shown in Table 13, for every program area, the environmental and social costs of relying on the substitute sources of energy under the No Sale option are equal to or greater than these costs from producing area resources under the Five Year Program. Higher air emission-related costs account for almost all the difference between the environmental and social costs for the likely energy market substitutes and these costs under the program. When OCS natural gas is not available, replacements come from onshore production, which occurs nearer domestic population centers. When OCS oil is replaced, it is mostly replaced with added imports which increase air emissions and heighten the risk of nearshore tanker spills along U.S. coastal areas receiving the imported oil.⁷⁰ Both circumstances mean air emissions and oil spills have a greater impact on health and property values per unit of production than do air emissions and oil spills many miles offshore.

This analysis attributes environmental and social costs that would occur without new leasing to the subject program area.⁷¹ Among other things, this approach allows for

⁷⁰ Note that in the net benefits analysis, half of the oil produced in Alaska is expected to be transported by tanker to the continental United States. The air emission and oil spill impacts of this tankering are included in the program costs of OECM.

⁷¹ 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 transparent way to represent the domestic benefits and costs likely to result from approving each individual program area options rather than indivisible packages of options. To do otherwise would result in there being no clear link between the cause of the adverse effects (e.g., less OCS production in a specific program area) and the adverse effects themselves. For example, foregoing all proposed sales in all program areas would lead to additional environmental and social costs from increased tanker traffic along the Mid-Atlantic. However, in a simple

consistent treatment of program area benefits and costs, and thereby provides a meaningful framework for the Secretary to make sound program area decisions. In practice, the resulting costs would actually be felt in areas that would receive the increased imports and host the extra domestic natural gas production. Instead, the costs of the energy substitutes are allocated in proportion to the amount of production expected from each area in the E&D scenarios.

A feature of this allocation choice merits comment. Increased onshore production replaces most of the natural gas lost under the No Sale Option while added imports replace most of the oil lost. Since environmental and social costs from development tend to be higher per unit with natural gas replacement sources than with oil replacement sources,⁷² the No Sale Option in natural gas-prone program areas generates higher environmental and social costs than in more oil-prone areas.

Table 13 reports the program environmental and social costs, those costs of the energy market substitutes supplied as a result of No Sale Option selections, and the net costs for new OCS leasing and production. A more detailed explanation of BOEM's OECM and *MarketSim* methodology can be found in the *Economic Analysis Methodology* paper as well as the documentation for those models.⁷³

table showing costs by locality, it would be impossible to demonstrate how size, timing, and location decisions for each program area could contribute to the reduction of costs that would otherwise accrue to the Mid-Atlantic coast.

⁷² This is due primarily to differences in degradation of air quality, because of both the emission rates for different sources and the locations of those sources. Per-unit, emissions of unhealthy air pollutants are greater from onshore natural gas production than from offshore natural gas production. Dilution rates are lower because those emissions are on land, often near population centers, rather than on the open sea. While this is true also for onshore oil production, most foregone OCS oil would be replaced instead by imports, with *all* of the production activity and associated environmental and social costs occurring outside the United States and thus excluded from this national-perspective analysis. While supertankers bringing imported oil to the United States do emit significant levels of pollutants, most of this occurs in foreign ports or outside U.S. waters, so the related costs likewise are excluded from the analysis.

⁷³ Industrial Economics, Inc. 2012a. and Industrial Economics, Inc.; Applied Science Associates, Inc.; Northern Economics; and Dr. Nicholas Z. Muller. 2012b.

Table 13: Environmental and Social Costs*

Environmental and Social Costs									
	Program			No Sale Option**			Net		
	(\$ billions)								
	Low Price	Mid-Price	High Price	Low Price	Mid-Price	High Price	Low Price	Mid-Price	High Price
Central GOM	3.47	5.94	6.94	10.08	17.43	20.26	-6.61	-11.49	-13.32
Western GOM	1.27	1.89	2.13	2.73	4.42	4.76	-1.45	-2.53	-2.63
Eastern GOM (2 Sale)	***	0.06	0.07	***	0.11	0.17	***	-0.05	-0.10
Chukchi Sea	0.04	0.08	0.15	0.24	0.43	1.03	-0.20	-0.36	-0.89
Beaufort Sea	0.02	0.02	0.03	0.05	0.58	2.30	-0.03	-0.56	-2.27
Cook Inlet	0.01	0.01	0.02	0.03	0.07	0.10	-0.02	-0.07	-0.09

All values are discounted at a real discount rate of 3 percent.

* 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 substitutes”) to meet the demand that would have been satisfied with OCS oil and natural gas production anticipated from the proposed sale(s) for that area. These energy market substitutes also would 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.

Possibility of Catastrophic Well Blowout or Oil Spill

The net benefits analysis does not include estimates of every possible environmental and social cost or benefit. One cost not included in the analysis is the cost of a catastrophic oil spill.⁷⁴ Some risks are, by their nature, difficult or impossible to value in monetary terms while others could be monetized but for a lack of relevant information. Estimating the costs of a potential catastrophic discharge of oil into the marine and coastal environment presents difficulties with both information availability and monetization of adverse effects. The estimated impacts of a catastrophic spill are not included in the net benefits analysis but rather are discussed separately in the *Economic Analysis Methodology* paper.

A catastrophic spill has the potential to damage many categories of resources and the impact on these categories could vary greatly depending on the size, timing, and location of a spill. Hence, any attempt to quantify a spill based on one set of assumptions may be more misleading than informative. The wide and unpredictable nature of the many factors that determine the severity of a large oil spill's impact make efforts to quantify expected costs far less reliable than other measures developed in the net benefits analysis. Any future large spill could have wildly different characteristics as to location, season, oil properties, etc., resulting in vastly different costs. The geographic, geologic, and climatological conditions under which an incident occurs could lead to widely different impacts. Due to the range of possible circumstances, the costs are not solely a function of the quantity of oil released. Therefore, relying on the very limited historical record of catastrophic discharges attributable to offshore oil and natural gas projects will not produce reliable cost estimates comparable to others in the net benefits analysis.⁷⁵

In addition to the difficulty in calculating the cost of the potential impacts of a catastrophic spill, there are similar difficulties in calculating the risk of a spill. A catastrophic spill is possible but not expected from this program. Calculating its

⁷⁴ Because it is from a national perspective, the net benefits analysis does not consider the risks assumed by, or imposed on other countries, in the case of transit corridors, if the decision is to not develop domestic energy resources. The risks and consequences of a catastrophic accident could be far worse in or near countries with looser regulations and/or a lower ability to respond after it occurs.

⁷⁵ Despite the absence of sufficient data needed to evaluate all aspects of the distribution of large spill sizes and frequencies, along with their likely economic consequences, there is no question that the presence of a catastrophic discharge of oil, whether resulting from OCS production or from the transportation of imported oil because of a decision not to lease, could greatly alter the net benefits of leasing. Hence, the Secretary will carefully consider the potential risks posed by each PFP option and by any of the No Sale Options, based on the available data and information. Proceeding with the proposed sales increases the risk of a catastrophic discharge of oil into the ocean by a smaller percentage. A decision to restrict production of domestic offshore resources raises the risk of accidents in the production and transportation of the energy sources that would substitute for OCS production, such as increased imports of oil and increased production of onshore oil and natural gas, coal, and nuclear power. However, the Secretary, BOEM, and BSEE, the agency that exists primarily to prevent such accidents and/or to minimize the effects of any accidents, do have the ability to promote safeguards through the intelligent design and rigorous enforcement of regulations intended to reduce accidents and prevent the succession of failures of response mechanisms necessary for a blowout or other event which may lead to loss of life and/or a major release of oil into the ocean.

probability is complicated by the fact that empirical evidence only provides a single useful data point with respect to Federal offshore activities. During the last 30 years, there has been only one such accident due to OCS oil and natural gas activities, the *Deepwater Horizon* event. While the *Exxon Valdez* accident in 1989 was not related to OCS activities, it provides the only other modern data point for events of national significance. Since the *Deepwater Horizon* event, DOI has initiated a major series of reforms aimed at preventing future oil spills. These reforms have further reduced the risk of a catastrophic spill, although the actual extent of this improvement is difficult to determine.⁷⁶ See the discussion in part I of this document and Section IV.A of the Final EIS.

The rarity and unpredictable nature of the many factors that determine the severity of a large oil spill's impact make efforts to quantify expected costs far less meaningful than the other measures developed by the OECM and *MarketSim* analyses. There is no question that a large extended discharge of oil resulting from OCS production could cause a catastrophic event which would greatly alter the estimate of the net benefits of leasing. Because of the extreme rarity of that event, there is only one data point over the last 30 years or 6 programs, leading to a miniscule statistical likelihood. Reducing such an effect to an expected value, as is done for the other more routine factors evaluated in the net benefits analysis, would obscure the consequence of a discrete event like a catastrophic spill, should it actually occur. Hence, the possible risks and impacts of a catastrophic spill are assessed outside the net benefits analysis. The risks and conditional estimates for such an event are dealt with in a separate assessment in the *Economic Analysis Methodology* paper.

In addition to the efforts in the *Economic Analysis Methodology* paper to provide some very rough quantitative estimates of the potential impacts that might result from a very unlikely, but possible, catastrophic release of oil, BOEM has provided the *Inventory* paper.⁷⁷ This paper describes the resources and activities that could be affected by a catastrophic spill event in or near each program area whether from OCS oil and natural gas activities resulting from the proposed sales or from tankering of imported oil to U.S. ports to replace foregone OCS production should the sales not be held. While it is unlikely that even a catastrophic spill would destroy all or even most of the value of the resources and activities described, the *Inventory* paper provides information on the

⁷⁶ Improvements in the various containment and response capabilities each independently reduce the likelihood of a catastrophic spill. For example, most well blowouts are contained very quickly after they occur. A properly-operating BOP can stop the flow almost immediately. One response of the oil and natural gas industry to the *Deepwater Horizon* event has been development of cap-and-contain systems that would control a blowout such as the one that occurred. Beyond that, improved response readiness lowers the risk that significant quantities of oil would reach vulnerable resources. The industry has made major strides, largely adopting the recommendations of the Presidential Commission appointed to investigate the causes of the *Deepwater Horizon* event. Included among recent improvements are enhanced training and auditing of procedures, designed to reduce the human-factor risks that are a major causal factor in most accidents with catastrophic consequences.

⁷⁷ This paper is an expansion of what appeared in the PP document as Appendix B, which contained information for the Central GOM only. This *Inventory* paper provides information for the resources and activities in and near all six PFP areas.

different kinds of effects that might occur in or near one program area rather than in another.

Net Benefits

Total net benefits equal NSV plus the net domestic consumer surplus generated by each of the program areas. In economic theory, consumer surplus is the difference between the maximum amount consumers would be willing to pay for a service or product and the amount they actually have to pay in the market. Similarly, producer surplus is the difference between the actual amount that producers receive in the market and the minimum amount they would be willing to accept. New OCS oil and natural gas production increases the supply of oil and natural gas which slightly lowers the price consumers pay and the price producers receive. The domestic portion of the change in both of these surpluses is accounted for in this analysis.

MarketSim calculates the change in domestic consumer surplus occurring due to the increase in OCS oil and natural gas production under this program. This model also determines the domestic loss in producer surplus, conceptually equal to lost producer profits, on the remaining amount of domestic production and on energy sources that are displaced by the new OCS production of oil and natural gas. The difference between the gains in consumer surplus and the losses in domestic producer surplus represents the change in net consumer surplus. In the case of oil, the change in net consumer surplus derives mostly from the lower price of imported oil and natural gas attributable to the added OCS production.⁷⁸

Though most of the natural gas sold in the United States is produced domestically, the net domestic consumer surplus gain from new OCS gas production still is significant because of the substantial equilibrium-price reduction it imposes on the import share of total domestic natural gas consumption, given that the price for natural gas is based on a national rather than a world price. In contrast, new OCS oil leads to a modestly lower price spread over the large volume of imported oil that is consumed domestically. Taken together, these changes result in a substantial 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* paper.

The sum of NSV and net domestic consumer surplus benefits constitutes the total measurable net benefits associated with the program area resources. These net benefits for each program area provide a comprehensive and consistent basis for comparing OCS program areas and program options. Table 14 shows the estimates for the components of the net benefit analysis for each of the program areas for each of the three price cases.

⁷⁸ The traditional “welfare gain” portion of consumer surplus, i.e., the non-pecuniary portion, is much less than 1 percent of the entire change in consumer surplus. For more detailed information on the calculation of consumer surplus, see the *Economic Analysis Methodology* paper.

Table 14: Net Benefits*

	Net Social Value			Net Domestic Consumer Surplus			Net Benefits		
	(\$ billions)								
	Low Price	Mid-Price	High Price	Low Price	Mid-Price	High Price	Low Price	Mid-Price	High Price
Central GOM	43.27	165.08	300.48	19.37	35.14	44.52	62.64	200.23	344.99
Western GOM	11.77	41.26	72.19	5.08	8.32	10.28	16.85	49.59	82.47
Eastern GOM (2 Sale)	**	2.35	5.42	**	0.37	0.58	**	2.73	6.00
Chukchi Sea	5.22	31.41	136.25	2.66	7.54	25.00	7.88	38.95	161.26
Beaufort Sea	0.18	4.25	18.84	1.03	1.51	5.54	1.20	5.75	24.38
Cook Inlet	1.58	3.77	12.39	0.57	0.59	1.39	2.15	4.37	13.78

All values are discounted at a real discount rate of 3 percent.

* 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 combines the anticipated production and the various net benefit components in one place, arranged from the highest valued to the lowest valued area, by OCS region, under the mid-price case. The low- and high-price cases yield the same ranking, with one exception. Under the low-price case, the net benefits for the Beaufort Sea are lower than those for Cook Inlet.

Leasing any of the program areas is estimated to result in meaningful additional domestic production and net economic and societal benefits, with the exception of the Eastern GOM in the low-price case. NEV accounts for the bulk of the net social benefits from about 60 percent in the low-price case to over 80 percent in the high-price case. The net domestic consumer surplus gains represent almost 15 percent of the net social benefits in the high-price case and more than 30 percent in the low-price case.

Given the relatively small proportional increase in worldwide energy production associated with the Five Year Program, i.e., an increase of about 0.4 percent over the next 40 years, it is somewhat surprising that the magnitude of net consumer surplus gains to the Nation is so meaningful. However, it can be demonstrated that in the case of oil, which generates almost 70 percent of the net consumer surplus gains, the required proportional oil price change needed to support these gains, also is about 0.4 percent. These findings imply an underlying oil price elasticity of demand of about unity, which is both plausible over the long run and consistent with the range of oil price elasticities of demand reported in *MarketSim* documentation.⁷⁹

Another result worth noting is the significant contribution of natural gas production to net consumer surplus gains. The added natural gas is responsible for generating about 30 percent of the net consumer surplus gains from the Five Year Program, even though only 15 percent of natural gas is assumed to be represented by imports. Unlike the case of oil, the added OCS production of natural gas is projected to have a much more robust effect on domestic natural gas prices, i.e., around 5 percent, much larger proportionally than the 0.4 percent effect on the world price of oil from the added OCS oil production.

A small but important component of the net benefits, especially in GOM areas, is the environmental and social costs avoided by producing from the OCS, rather than from the energy substitutes. These societal costs of *not* approving one or more proposed lease sales are largely due to the environmental and social costs associated with the most likely substitutes. These include increased oil imports and onshore oil and natural gas production, which generate additional air emissions in port and onshore, often in Clean Air Act non-attainment areas, and raise the risk of oil spills from tankers.

There is one option in the PFP that relates to the number of sales in a specific program area. That option is to hold only one sale in the Eastern GOM rather than two sales.

⁷⁹ Industrial Economics, Inc. 2012a.

Anticipated production is the same between the two options, but there is slightly more activity and exploration in the two-sale option. The two-sale option provides flexibility within the next 5 years if prices remain at current levels or rise even higher, if new technologies emerge, or new discoveries are made in the area. Since there is less activity in the one-sale case, environmental and social costs of the program are expected to be slightly lower. The net benefits results in Table 15 reflect the two-sale Eastern GOM option.

Table 15: Summary of Net Benefits Analysis*

		Oil (BBO)	Natural 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	36.66	3.47	10.08	-6.61	43.27	19.37	62.64
	Mid	3.77	16.41	6.69	153.59	5.94	17.43	-11.49	165.08	35.14	200.23
	High	4.34	19.07	7.73	287.16	6.94	20.26	-13.32	300.48	44.52	344.99
Western GOM	Low	0.56	2.63	1.03	10.31	1.27	2.73	-1.45	11.77	5.08	16.85
	Mid	0.86	4.07	1.58	38.73	1.89	4.42	-2.53	41.26	8.32	49.59
	High	0.97	4.59	1.79	69.56	2.13	4.76	-2.63	72.19	10.28	82.47
Eastern GOM	Low	0.00	0.00	0.00	*	*	*	*	*	*	*
	Mid	0.05	0.11	0.07	2.30	0.06	0.11	-0.05	2.35	0.37	2.73
	High	0.07	0.16	0.10	5.32	0.07	0.17	-0.10	5.42	0.58	6.00
Chukchi Sea	Low	0.50	0.00	0.50	5.02	0.04	0.24	-0.20	5.22	2.66	7.88
	Mid	1.00	2.50	1.44	31.06	0.08	0.43	-0.36	31.41	7.54	38.95
	High	2.15	8.00	3.57	135.37	0.15	1.03	-0.89	136.25	25.00	161.26
Beaufort Sea	Low	0.20	0.00	0.20	0.14	0.02	0.05	-0.03	0.18	1.03	1.20
	Mid	0.20	0.50	0.29	3.68	0.02	0.58	-0.56	4.25	1.51	5.75
	High	0.40	2.20	0.79	16.57	0.03	2.30	-2.27	18.84	5.54	24.38
Cook Inlet	Low	0.10	0.00	0.10	1.56	0.01	0.03	-0.02	1.58	0.57	2.15
	Mid	0.10	0.04	0.11	3.71	0.01	0.07	-0.07	3.77	0.59	4.37
	High	0.20	0.68	0.32	12.30	0.02	0.10	-0.09	12.39	1.39	13.78

All values are discounted at a real discount rate of 3 percent.

* 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

While Table 15 shows the estimates of the components of the net benefit analysis for each program area in the PFP, Table 16 compares the total estimated net benefits for the same options as those that comprise the alternatives analyzed in the Final EIS. The net benefits shown for each alternative excludes one of the six program areas and assumes that all of the other areas remain in the program. Given that program options reflect gains relative to the NAA, the net benefits of the NAA in the Final EIS are the negative of those for the program and are not displayed here. See “Relationship of Proposed Final Program Options to the Final EIS Alternatives” in part III of this document for a fuller description of the program options included in each alternative.

With the exception noted with Table 15 of the Beaufort Sea and Cook Inlet swapping places in the low-price case, the ranking of program options is unaffected by the oil and natural gas prices considered. At the beginning of 2012, the market price of oil was close to the assumed oil price in the mid-price case, while the market price of natural gas was close to the natural gas price in the low-price case. Thus, alternating between either the absolute or the relative current product market prices and those sets assumed in the analysis should have little if any effect on the relative importance of the options being considered.

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

[All figures in the table are discounted at a real rate of 3 percent and in billions of 2012 dollars]

EIS Alternative	Price Case*	Net Economic Value	Environmental and Social Costs	Net Social Value	Net Consumer Surplus	Net Benefits
\$ billions						
1: Proposed Action	Low	53.70	-8.31	62.01	28.72	90.73
	Mid	233.08	-15.06	248.13	53.48	301.61
	High	526.27	-19.29	545.57	87.30	632.87
2: Exclude Eastern GOM	Low	53.70	-8.31	62.01	28.72	90.73
	Mid	230.78	-15.00	245.78	53.11	298.89
	High	520.95	-19.20	540.15	86.73	626.88
3: Exclude Western GOM	Low	43.39	-6.86	50.24	23.63	73.88
	Mid	194.34	-12.53	206.87	45.16	252.03
	High	456.72	-16.66	473.38	77.03	550.41
4: Exclude Central GOM	Low	17.04	-1.70	18.74	9.34	28.09
	Mid	79.48	-3.57	83.05	18.34	101.39
	High	239.12	-5.97	245.09	42.79	287.88
5: Exclude Beaufort Sea	Low	53.56	-8.28	61.84	27.69	89.52
	Mid	229.39	-14.50	243.89	51.97	295.86
	High	509.71	-17.02	526.73	81.77	608.50
6: Exclude Chukchi Sea	Low	48.68	-8.11	56.79	26.06	82.84
	Mid	202.02	-14.70	216.72	45.94	262.66
	High	390.91	-18.40	409.31	62.30	471.61
7: Exclude Cook Inlet	Low	52.14	-8.29	60.43	28.15	88.58
	Mid	229.37	-14.99	244.36	52.89	297.25
	High	513.97	-19.21	533.18	85.91	619.09

* 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.

2. 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. This approach provides the analysis and information required by section 18(a)(2)(G). But with the advent of new technology and new scientific research, BOEM is evaluating adding a resilience component to the relative sensitivity analysis. While either of the approaches used alone provide valid and adequate 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. BOEM continues to support the 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 BOEM's research will be made available to DOI and public stakeholders as soon as it is available. Comments and concerns submitted on the analysis in the PP are being considered in the ongoing research for the new study and are not addressed in this document.

Therefore, as used in this PFP, 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."

As in the PP, 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 six 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 six PFP 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 Sensitivity¹

<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>

¹ 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.”⁸⁰ 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 effects 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 stipulations, regulations, and laws to minimize impacts and protect marine resources. Monitoring and mitigation measures would be developed through consultation and coordination with the NMFS and the USFWS as required by the

⁸⁰ 43 U.S.C. §1344(a)(2)(G); *Watt I*, 668 F.2d 1290, 1320 (D.C. Cir. 1981); *Watt II*, 712 F.2d 584, 596 (D.C. Cir. 1983); *Center for Biological Diversity v. U.S. Department of the Interior*, 563 F.3d 466, 488 (D.C. Cir. 2009).

ESA, Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), and MMPA. Biological opinions arising from these consultations identify Reasonable and Prudent Measures, Terms and Conditions, and/or Conservation Recommendations that can then be applied as lease stipulations.⁸¹

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 EISs designed to estimate potential risks from proposed oil and natural 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 Five Year Final EIS, prepared in conjunction with 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.

⁸¹ 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 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. 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 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 Five 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. BOEM expects that its future analyses of the relative environmental sensitivity on the OCS, including the ongoing research noted in the introduction to this section, are most likely to 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 Five Year Final EIS.

3. Ecological Components

The relative environmental sensitivity ranking of OCS program areas by various ecological components 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 Central GOM Western GOM Beaufort Sea Cook Inlet Chukchi Sea	Eastern GOM Beaufort Sea Central GOM Western GOM Chukchi Sea Cook Inlet	Central GOM Eastern GOM Western GOM Cook Inlet Chukchi Sea Beaufort Sea	Cook Inlet Eastern GOM Central GOM Western GOM Chukchi Sea Beaufort Sea

¹ Most sensitive areas are at the top of the columns, less at the bottom. In 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 rereleased 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 r-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.⁸²

High scores at or near a score of 9.0 occur adjacent to the full Eastern and Central GOM 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 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.

⁸² 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.

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 (U.S. Department of Commerce (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	Chukchi and Beaufort Seas
Marine Sanctuary	Cordell Bank	Central California

*Some of component examples are areas that are not included in this PFP, 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 meters 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/year	Substantial sea and landfast ice for < 6 months/year	Discontinuous or scattered ice for < 4 months/year
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 typically are 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 also could 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 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 (U.S. DOI, 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 reduced substantially 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 transferable to this 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 (U.S. DOI, MMS). 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. There may be 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 above, 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 three of the six OCS program areas, Central and Eastern GOM and Cook Inlet. According to 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 with individual threatened species assigned a value of 5 and individual endangered species 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 or out-of- 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 above) 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, such as sea otters, known to be highly susceptible to oil spills, were assigned a value of 10. In this analysis, Arctic species with limited access to open ice-free water also were 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 also may 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, and/or to find prey/mates were assigned a value of 1. Species that use sound for navigation, underwater communication, and/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, and/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 then were 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, therefore, are not found in all OCS program areas. However, all sea turtles are listed as either endangered or threatened under ESA. 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., an OCS program area that is outside the normal range but 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 decision-making 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 also may 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:

$$Presence \times (Status + Oil \ Sensitivity + Sound \ Sensitivity)$$

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 considered individually first 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 GOM	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 was considered as a separate factor in previous 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 seagrasses. 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 normally are expressed in terms of chlorophyll-a, or the amount of carbon fixed during photosynthesis per square meter of ocean surface per unit of time.

Phytoplankton can occupy all surface waters of an OCS program area and fix carbon, as long as sufficient light and nutrients are available. Farther from shore, fewer nutrients, primarily of terrestrial origin, are available for use by phytoplankton. 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.

As discussed earlier in this section, BOEM continues to evaluate 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/year	Acres (Millions)	Areal Averaged Production (Metric tons/acre/year)
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 Five Year Final EIS.

This section provides an assessment of climate change effects on the relative environmental sensitivity of OCS program areas during the life of the Five 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 until approximately 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.

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 generally are more reliable when applied to a large area than a smaller area. Currently, it is difficult to model temperature changes and the processes that temperature changes spawn, at smaller than continental scales (IPCC). 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. IPCC 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. However, it 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. A recent report 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 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). The rate of warming for the past 50 years has been almost double the rate for the past 100 years ($0.13^{\circ}\text{C}/\text{decade}$). IPCC projections suggest about a 0.8°C increase in temperature during the 40 year life of the Five Year Program.

Atmospheric warming has not been spatially uniform. In particular, Arctic temperatures have increased about twice as much as those in lower latitudes. 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 partially is the result of the ice-albedo effect. This 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).

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). Effects of warming temperatures already have been seen in the form of a 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 likely will be relatively more affected. IPCC concludes that the Arctic is likely (>66 percent likelihood) especially to be affected by climate change because of the impacts of high rates of projected warming on natural systems.

The most affected OCS program areas include the Chukchi and Beaufort Seas.

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). 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. IPCC 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.

The most affected OCS program areas include the Chukchi and Beaufort Seas.

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. IPCC considers it likely (>66 percent likelihood) that the Arctic sea-ice biome will be especially affected by climate change because of sensitivity to warming.

The most affected OCS program areas include the Chukchi and Beaudort 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*). IPCC recognizes warm water corals as a resource that is likely (>66 percent likelihood) to be particularly affected by climate warming.

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

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.*). 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). 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.

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

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 project a rise in sea level from 8 to 24 inches by 2100 (IPCC). 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.*). 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.

The 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.*).

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.*). 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 pre-industrial atmospheric CO₂ concentrations (Kleypas *et al.* (2006)). Potentially affected marine organisms include warm and cold water corals, mollusks and calcareous phytoplankton.

IPCC 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 not attribute an effect of acidification to relative environmental sensitivity based on the absence of observed effects of acidification on ecological resources (IPCC), 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 expose 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 greater in relation to 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 greater in relation to 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		
Chukchi Sea	Sea-Ice biome; species composition; permafrost thawing	High
Beaufort 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 above, 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 resulted directly 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 above, 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. 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., Chukchi and Beaufort 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 above, 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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3. Industry Interest

BOEM received comments from 11 energy companies and oil and natural gas trade groups and membership organizations in response to the November 2011 PP. Every commenter supported leasing in the PP areas. However, the overarching concern was the lack of access to other areas, particularly more of the Eastern GOM and the Atlantic.

Five exploration and development companies submitted comments in response to the PP.⁸³ There was little or no differentiation between the areas so all six areas are considered to have industry interest from five companies.

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

⁸³ Two subsidiaries of the same parent company submitted similar comments separately.

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 five 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 program areas in the PFP.

Methodology

The equitable sharing analysis uses a regional economic-impact approach rather than the national 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 Five 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 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 described below is used.

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 five 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

Five Year Program necessarily results in both a concentration of 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 natural 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.

The immediate environmental risks of OCS oil and natural gas activities also are borne primarily by producing regions and nearby onshore areas, whether these risks are from reasonably foreseeable effects or from a low probability/high consequence accident. 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 Final EIS for the Five Year Program describes in great detail the potential risks and impacts of oil and natural gas activity on the marine, coastal, and human environment. Further, BOEM has included an initial effort to extrapolate possible costs from unlikely, but plausible, catastrophic spill events in the *Economic Analysis Methodology* paper and has published the *Inventory* paper, which provides a separate inventory of activities and resources in and near each program area that could be affected by routine operations and/or a catastrophic spill event. The *Inventory* paper can be used to help weigh the potential risks faced in and near producing regions.

Economic Impact, Employment, and Social Benefits near OCS Activities

As in previous Five Year Programs, this analysis examines the distribution of developmental benefits among coastal regions⁸⁴ near program areas proposed for OCS lease sales as well as to the rest of the United States. The regions examined in this analysis are:

- Alaska;
- Other Pacific states;

⁸⁴ This analysis uses regional groupings that are very similar to the PADDs, 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 United States. 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 PFP 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.

- Alabama, Mississippi, Louisiana, and Texas;
- Florida; and
- Rest of the United States

Positive economic and fiscal effects from routine activities as a result of the program include employment, labor income, corporate and employee income taxes, and property taxes related to both offshore and onshore infrastructure. BOEM used its recently updated regional economic impact models, collectively called MAG-PLAN, to estimate the relative economic effects on each of these regions that might result under the Five Year Final EIS alternatives. MAG-PLAN estimates reflect the fact that OCS oil and natural 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. MAG-PLAN also estimates spending in the rest of the world, but those estimates are not used in this analysis.

The analysis has determined that the PFP would have its greatest economic effect in the states adjacent to, and/or near the Central and Western GOM. The states of Alabama, Mississippi, Louisiana and Texas would receive most of the employment and personal income directly generated by activities anticipated to result from the PFP, as well as a huge share of the employment and income generated by vendors, suppliers and employee households. In addition, as required by GOMESA, these four states, 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 2016 throughout the GOM program areas thereafter, subject to a \$500 million per year cap (\$375 million to above states and \$125 million to the Land and Water Conservation Fund (LWCF)) through 2055 in the additional areas (see “OCS Impact Assistance and Revenue Sharing Benefits,” below). Also, as required by section 8(g) of the Act, a 27-percent share of all Federal OCS revenues, i.e., 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 as much as 5-to-10 percent of the expected employment and labor income benefits generated by activities resulting from the PFP. The *per capita* share of these developmental benefits is greater for Alaska with its smaller population than for the states along the GOM coast. 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 Five 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. Another benefit would be providing sufficient oil production to maintain the TAPS. There is concern that without production from new OCS leases 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 natural 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, facilitating revenues from both new OCS production and continuing projects on state lands.

Florida is estimated to receive much less than 5 percent of the expected employment and labor income benefits generated by activities resulting from the PFP. 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 costs⁸⁵ 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 natural gas industry which can have significant social consequences, as well as the costs of developing or improving infrastructure to meet demands for more housing, road construction and repair, etc., as the result of increased support activities and population. The same increases in activities and population provide increased tax and other revenues, but the revenues tend to lag behind costs when there are major increases in activity levels. 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 environmental impacts have resulted in coastal wetland losses. BOEM has addressed these environmental impacts in the Five Year Final EIS. BOEM has also responded to Louisiana's request to study alternatives to OCS areawide leasing that might mitigate the boom and bust cycles of energy development. One step taken in part to address these concerns has been to raise the minimum bid to \$100 per acre for deepwater blocks in the GOM as a way of increasing bids and slowing somewhat the pace of leasing. 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 this document in the part III discussion on Fair Market Value.

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 natural gas development activities on the OCS. A more visible and recent example occurred in the wake of the *Deepwater Horizon* event, when BP agreed to provide \$20 billion to a fund that can be used for natural resource damages, state and

⁸⁵ For a discussion of the *Offshore Environmental and Social Cost Model*, see part IV.C, Comparative Analysis of OCS Planning Areas.

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. These financial costs were borne by geographically dispersed sources from around the country and the world, in this case. 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 and infusion of spending. 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, nor does the spread of financial risk negate the reality of localized risks, which are described in detail in the Five Year Final EIS.

Although safeguards for both OCS activities and tankers have improved considerably in recent years,⁸⁶ the results of BOEM’s analysis of the energy substitutes show that without the Five 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 Coast 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 PFP 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 air 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.

⁸⁶ After the *Deepwater Horizon* event, DOI implemented important new regulations to reduce the risk of such accidents and the possibility that they would result in major releases of oil. Industry took numerous actions as well, implementing most of the recommendations of the Presidential Commission appointed to investigate the event and find ways to remedy weaknesses in safeguards.

Effects of Program Options on Equitable Sharing

An analysis of the program options shows similar patterns of sharing of economic activities. Excluding the Eastern GOM program area from the program 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. Selecting the No Sale Option for the other program areas 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 option would affect the local population, whether in terms of reduced benefits and risks (excluding the Western and Central GOM) or in terms of foregone benefits and risks avoided (excluding the Chukchi Sea, Beaufort Sea, and Cook Inlet). For example, selecting the No Sale Option for the Central GOM would shift some of the benefits to onshore energy businesses, onshore worker families, and communities where both workers spend their money and pay taxes. It would shift some of the environmental risk to the areas where onshore energy activities would increase and to coastal areas along tanker routes. However, a reasonably large proportion of the additional onshore oil and natural gas (not coal, etc.) activity would presumably be in the affected states, and a large proportion of additional imports would likely arrive in GOM ports. Selecting the No Sale Options for the Chukchi or Beaufort Seas would shift much greater per capita benefits to other geographic areas, not only from coastal communities but also from the rest of Alaska, where there would be even greater employment from the proposed sales. Lack of new production for TAPS could result in closure and a major loss of revenues for the state and its citizens. On the other hand, there also would be a major shift of environmental risk to other areas, proportionately more so than would result from a No Sale decision for a GOM area. Almost all environmental risk would be shifted to other areas, because increased oil imports would not go to Alaska ports, and most of the increased onshore energy production would presumably occur elsewhere as well.

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, which, according to MAG-PLAN estimates, 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 natural 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 OCS revenue benefits are disbursed annually through

General Fund appropriations for various national functions, as well as through the Historic Preservation Fund and the LWCF.

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.

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 unprofitable OCS oil and natural gas investments 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 mentioned above. Payments for remediation, restoration, or lost profits are costs to the Nation's economy, due to the necessary diversion of resources from other, "productive" activities, and transfer payments that provide the entities impacted by an event compensation for damage or losses. Fines and any other payments that are not approximations of lost value are transfer payments (merely a transfer of money from one entity to another) and do not affect NEV.

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, programs that provide OCS revenues to the coastal producing states include:

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. GOMESA, which provides the States of Alabama, Mississippi, Louisiana, and Texas, a 37.5 percent share and LWCF a 12.5 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 (\$375 million to above states and \$125 million to LWCF). 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 could pass legislation to do so.

Summary and Conclusion

The general findings and conclusions of previous five 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 Atlantic⁸⁷ and Pacific OCS regions from Five Year Programs from 1992 to 2007 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 PFP 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 Five Year Programs. The Southern California planning area, which has been excluded from Five 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 those distributed pursuant to 8(g) 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 implementation of new lease stipulations and operating regulations remain available to reduce the risks borne by the affected areas.

Given the GOMESA moratorium in most of the Eastern GOM and a small portion of the Central GOM within 100 miles of Florida, as well as the exclusion the Atlantic and Pacific OCS regions from leasing in this PFP, 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

⁸⁷ While there was a small Mid-Atlantic program area in the Five Year Program for 2007-2012, the Mid-Atlantic sale was cancelled pursuant to the pre-sale process. However, in March 2012, BOEM published a Draft EIS for G&G activities in the Mid- and South Atlantic planning areas, covering seismic and other offshore surveys, to lay the groundwork for possible Atlantic sales in future programs. The Final G&G EIS is scheduled for completion later in 2012 or early 2013.

that could affect or be affected by oil and natural 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 (HAPC) [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 (LNG) (GOM); and
- Non-energy Marine Mineral Activities (GOM)

The information presented below summarizes detailed regional descriptions of the environment that are included in the Five Year Program 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.

Gulf of Mexico Region

Commercial Fishing: GOM fisheries are very important to the economies of adjacent coastal states. 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). 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 meter (328 foot) isobath, extending from the 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: 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 DOD 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.

Non-energy 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.

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, 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 Chukchi Sea and Beaufort Sea areas, essential habitat has been established for all five salmon species. The Stefansson Sound Boulder Patch in the Beaufort Sea is a designated 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 Chukchi Sea and Beaufort 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 Five Year Final EIS description of areas of special concern.

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

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

D. Laws, Goals, and Policies of Affected States

BOEM asked the governors of affected states to identify laws, goals, and policies of their states as relevant matters for consideration in the PFP. No specific identification was provided for any of the program areas included in this 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 Five 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 relevant economic estimates. In order to provide the Secretary full and appropriate information for the PFP 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 3 Atlantic planning areas, 2 of the planning areas

offshore California and NAB, offshore Alaska, in addition to the 6 areas that were included in the PP.

In deciding to reduce the number of planning areas included in the PP and retain those areas in this PFP, 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, which concerned the 2007-2012 Program, 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 then-2010-2015 program. That augmented environmental sensitivity analysis was utilized in developing the PP and consequently, this PFP, and is incorporated herein by reference.

Based on the incorporated consideration of the section 18(a)(2) factors, including the augmented environmental sensitivity analysis, the Secretary 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 PFP.

- 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 oil and natural gas activity and/or 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 decision-making in subsequent Five Year Programs;
- 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 PFP includes the six areas that were included in the PP. In accordance with the Act, the Secretary may not add areas or sales that were not included in the prior proposal without redoing the section 18 process. Therefore, the 15 sales in 6 areas that were included in the PP are the maximum that the Secretary may consider at this stage.

With respect to the Atlantic planning areas, in comments on the 2009 DPP, the States of Delaware and New Jersey, adjacent to the Mid-Atlantic and North Atlantic planning areas, respectfully voiced their opposition to oil and natural gas activities off their coasts and pointed to state policies and initiatives to move to renewable energy sources. Although the States of South Carolina and Georgia voiced support for leasing at the 2009 DPP stage and the Commonwealth of Virginia strongly objected to the area off its coast being deleted from the PP, the potential amount and location of oil and natural gas resources in the Mid- and South Atlantic planning areas are limited. Seismic surveys in these areas were recorded in the 1980's. There have been significant advances in techniques and analysis since then. New seismic data is needed to much more accurately define where hydrocarbon resources may be. Accordingly, the Secretary is not including these two areas in this Five Year Program. Instead, he is moving forward with an environmental analysis for potential G&G studies to support conventional and renewable energy planning, and 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 expressed 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 Five Year Program, the Western and portions of the Central and Eastern GOM that are not under Congressional moratorium or otherwise unavailable. In their comments on the PP, both industry and the State of Louisiana reiterated their support for including GOM program areas for leasing consideration. However, they and various non-energy industry commenters expressed their disappointment that more areas of the OCS were not included. The State of Florida expressed its concern that activities anywhere in the GOM could impact its coastline.

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. In light of both the significant resource potential that exists in the Alaskan Arctic and the substantial environmental challenges and the social and ecological concerns that are

present as well, BOEM's regionally tailored strategy for any future offshore oil and natural gas leasing in the Arctic is markedly different from the traditional areawide leasing model applied in the GOM, in which all unleased acreage in the area is typically offered for sale, with the exception of limited areas that may be set aside for exclusion. DOI also intends to utilize the pre-sale process to focus the areas to be offered in the Arctic to those with greatest resource potential and the least potential for impacts on other resources and uses of the areas. While the Five Year Program areas include the majority of the two Arctic planning areas, it is anticipated that the area that will be ultimately offered in a lease sale will be reduced as appropriate. The State of Alaska supported leasing activity in the Arctic but is concerned that delaying the sales will not help the state and national economy. There is strong industry interest in oil and natural gas activity based on known seismic data and existing production from the state/Federal unit in the Beaufort Sea 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 evident in the historically high level of bidding in Chukchi Sea Sale 193. Pending final approvals, exploration activity could occur in these areas as early as the summer of 2012. 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.

The Cook Inlet is included as a special interest sale. An initial Request for Interest was published on March 27, 2012. Comments received have resulted in sufficient interest to warrant BOEM's decision to proceed with the next steps in the pre-lease process. The sale date has been moved to 2016 to allow time to complete the necessary steps to a sale.

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 again has decided to include six planning areas, or parts thereof, in the PFP—the Western and available parts of the Central and Eastern GOM; and the Cook Inlet, and the Chukchi and Beaufort Seas, offshore Alaska.

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 Five 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 F.2d 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 F.2d 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 F.2d 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 F.2d 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 Final EIS prepared for the Five 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 2011 PP, 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 to this document.

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 PP are summarized in Appendix A. Those that correspond more specifically to program options are summarized in part III of this document, along with responses to selected comments and recommendations.

Conclusions

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 PFP, 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 Five Year Final EIS for the 2007-2012 Program, 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 comparing the consequences of certain energy substitutes⁸⁸ to a regular and dependable leasing program on the OCS. At the same time, this PFP 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 this Five Year 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. Therefore, this value 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 and BSEE, 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. Part III.B of this document discusses in greater detail the pre- and post-sale measures taken to assure receipt of FMV for OCS leases as required by section 18(a)(4) of the Act.

The Five 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.

⁸⁸ 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.

Optimal Timing

Part III.B of this document, Fair Market Value Options, includes the approach that 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 right, 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 that focuses on the GOM, 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. 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 initial periods 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 natural 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 Chukchi and Beaufort Seas to encourage timely exploration and development or earlier relinquishment. The length of the initial lease period 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 increased 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 Five 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. 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 Five 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.

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 reoffered 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 reoffered in a subsequent sale. Moreover, rejection of a high bid under the existing BOEM bid adequacy procedures consistently has 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 from 1984 through 2010, BOEM rejected total high bids of \$597 million on blocks that were reoffered and then 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 was awarded, the information tends to be either new or reprocessed geophysical data unavailable at the time of sale, or new subsurface well data acquired as a result of drilling on a nearby lease that may indicate the possibility of material hydrocarbon deposits on the subject lease. Since it is quite common for exploration companies to acquire new or reprocessed geophysical data on leases after award but prior to exploratory drilling, these look-back studies identify a well that has been drilled to a target that is not coincident with the target that was sometimes evaluated pre-sale.

Conclusion

BOEM evaluates market conditions, available resources, bidding patterns, and the status of production on OCS acreage when establishing terms and conditions for each lease sale. 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.

G. Appropriations and Staffing Estimates

Section 18(b) of the Act requires that the leasing program include estimates of the appropriations and staff needed to obtain information for preparing the program, to analyze and interpret data and information, to conduct environmental studies and prepare EISs, and to supervise operations pursuant to the leases that will be issued.

Table 31 presents the appropriations and staffing estimates associated with the PFP for 2012-2017.

TABLE 31: Appropriations and Staffing Estimates (by Fiscal Year)

[Funding estimates are in thousands of dollars; staffing estimates are in full-time equivalent positions.]

Activities	FY 2013		FY 2014		FY 2015		FY 2016		FY 2017	
	Funds	Staff	Funds	Staff	Funds	Staff	Funds	Staff	Funds	Staff
1	\$17,190,000	98	\$17,493,800	98	\$17,803,676	98	\$18,119,750	98	\$18,442,145	98
2	\$8,990,000	58	\$9,169,800	58	\$9,353,196	58	\$9,540,260	58	\$9,731,065	58
3	\$28,600,000	120	\$28,972,000	120	\$29,351,440	120	\$29,738,469	120	\$30,133,238	120
4	\$1,550,000	10	\$3,320,100	21	\$5,160,384	32	\$7,072,951	43	\$9,059,957	54

- (1) Resource Information [section 18(b)(1)]
- (2) Exploration Data and Other Information [section 18(b)(2)]
- (3) Environmental Studies and EIS Preparation [section 18(b)(3)]
- (4) Supervise Operations [section 18(b)(4)]

Appendix A

Summary of Comments to November 20, 2011, *Federal Register* Notice Concerning the Proposed Five Year OCS Oil and Gas Leasing Program for 2012-2017

Introduction

Section 18 of the Act, 43 U.S.C. 1344, requires DOI to prepare a five year OCS oil and gas leasing program. As an intermediate step in the preparation of the Five Year Program for 2012-2017, BOEM issued a *Federal Register* Notice soliciting comments on the Proposed Program. This appendix is a summary of comments received in response to that notice. Submittals have been condensed to express summaries of all ideas and recommendations received by category. Commenter categories are listed below along with the number of comments received in that category. The Summary of Comments by commenter category follows.

Number of Comments by Category

Governors, State-level Elected Officials, and State Agencies	9
Local Governments, Tribes, and Alaska Native Corporations	5
Members of Congress and Federal Agencies	12
Environmental and Other Public Interest Organizations	18
Oil and Gas Companies and Associations and Related Industry	14
Non-Energy Industry Businesses, Associations and Groups	13
General Public	280,118
Total	280,189

Summary of Comments

Governors, State-level Elected Officials, and State Agencies

Alaska Department of Natural Resources states that the State remains a strong proponent of timely decision-making and development of the OCS. The State requests that the Beaufort and Chukchi Seas sales not be delayed until as late in the program as it delays economic development and jobs and securing energy independence. The State objects to the moratoria in Bristol Bay. The historical basis for earlier moratoria was a vessel spill 22 years ago. Federal and state laws are more rigorous now. Also, to correspond with the OCS lease sale that had been scheduled in that area, the State instituted an onshore leasing program that is now fruitless. The State provided specific technical comments on the PP as well as comments on the three technical documents.

Alaska State Representative urges BOEM to move forward with the program but is discouraged by the permitting delays and regulatory uncertainty. A robust 2012-2017 program must ensure that lessees have the capacity to explore and develop in a timely manner.

Florida Department of Environmental Protection says that the State remains concerned about effects of oil and gas activities in the GOM and requests that consideration be given to long-term protection of Florida's sensitive coastal and marine resources. *Deepwater Horizon* showed that accidental spills can affect Florida's resources. Safety and environmental protection must be paramount.

Louisiana Department of Natural Resources states that the State supports exploration and development throughout the OCS, not just the GOM and Alaska, to meet domestic energy demand and safeguard energy and economic security. While favoring OCS leasing, the State points out that it has been impacted over time without commensurate mitigation. BOEM must compensate the State by addressing cumulative and secondary impacts. Revenue sharing should take into account historical impacts, not just new production as under GOMESA. Revenue sharing with coastal states that facilitate drilling off their coasts benefits all and some states might reconsider their opposition.

North Carolina State Senator is disappointed that the Atlantic leasing areas are absent from the program as technically and economically recoverable resources have been identified and industry interest is evident. The last Atlantic lease was offshore North Carolina and companies have applied for G&G permits in the Atlantic. The economy depends on the millions of jobs generated directly and indirectly by offshore energy production, including agribusiness, the State's Number 1 industry.

Virginia Governor wrote two letters requesting reconsideration of the decision not to include the Mid-Atlantic, specifically offshore Virginia, from the 2012-2017 program. The decision ignores the support from Virginia's citizens and state and Federal leadership, the potential for jobs and billions in revenue, and the Administration's support as recently as March 2010. There have been great advances since *Deepwater Horizon* to be confident in safe and responsible energy development. He also states that development can occur without interference with other important activities and is working with DOD and others to protect national security operations as has been done in the Gulf, and important commercial activities.

Virginia Department of Mines, Minerals, and Energy asks Interior to reconsider the decision to exclude Virginia. Sale 220 was included in the 2007-2012 program and no conditions have changed to justify the omission. Including the sale could create thousands of jobs, expand the coastal economy, and develop critical domestic energy resources.

Virginia State Delegate expresses his disappointment that the program did not include areas of the Atlantic, Pacific, and most of the Eastern GOM.

Southern States Energy Board, represented by the Governors of Oklahoma and Virginia, states that the proposed plan limits the Nation's ability to respond to growing demand and economic threats. It does not meet the section 18 requirement of a schedule to best meet

the Nation's energy needs. The Board urges reconsideration of the exclusion of the Eastern Gulf and the Mid- and South Atlantic.

Local Governments, Tribes, and Alaska Native Corporations

Arctic Slope Regional Corporation is concerned that cutting back on the number of lease sales and pushing the timing of the sales to the end of the five year period in the Beaufort and Chukchi Seas, is erecting unnecessary barriers to the development of domestic energy resources. The Corporation believes BOEM did not adequately consider the economic impact of reducing the number of lease sales scheduled for Alaska OCS, citing the PP societal costs, Table 8 model, and economic analysis in the PP. It urges BOEM to consider revising the PP consistent with the framework in the 2009 DPP, with respect to development of oil and gas resources in Alaska OCS.

Inupiat Community of the Arctic Slope wants the Beaufort and Chukchi Seas excluded from the 2012-17 program. The Community feels the PP does not address catastrophic effects of a large spill on communities. Additionally, if there is a sale, they want BOEM to include deferral areas to protect subsistence activities such as bowhead whale hunting, have more serious consideration provided for air and water pollution, and conduct an environmental justice analysis. They feel the potential damage to the environment and subsistence culture far outweigh the potential benefits of additional lease sales.

Native Village of Kotzebue is concerned that the PP has not addressed the need of Federal agencies (especially USCG and NOAA) to have sufficient resources to oversee lease activity in the frontier area of the Chukchi Sea, the challenges on oil spill response along the coast of the Chukchi Sea, and a discussion of lessons learned from *Deepwater Horizon*. The Village requests that BOEM consider narrowing the areal focus in known sensitive areas, important migratory corridors and important subsistence use areas, including larger deferral areas between leases and shore. While noting it appears a *fait accompli* that the Chukchi Sea will be included in the program, the Village hopes the Secretary and BOEM recognize their decisions are the main line of defense against undue harm caused by carrying out an active Arctic OCS development program.

North Slope Borough restates their opposition to offshore oil and gas leasing and operations in Arctic waters. The Borough prefers that BOEM exclude the Beaufort and Chukchi Seas. If leasing continues, they request that BOEM change their approach in each planning stage. Additionally, they would like BOEM to add deferral areas in the Beaufort Sea in the area adjacent to the Nuiqsut subsistence whaling base of Cross Island, along with excluding the eastern, central, and western areas of the Beaufort Sea that are essential to subsistence whaling. The Borough wants the coastal buffer in Chukchi Sea expanded to 60 miles and a deferral area added around Hannah Shoal. They cite NMFS's reasoning on this subject. They request BOEM attempt to achieve a balance between risks and benefits, implement a mitigation system that requires lessees to gather targeted data over multiple years in a specific area and implement realistic oil spill response demonstrations, if not in the five year, these should be considered in specific arctic lease sales.

Northwest Arctic Borough does not believe it is appropriate to include the Chukchi and Beaufort Seas in the five year leasing program. They are concerned about the disproportionate economic, environmental, social and cultural risks. There is a need for a comprehensive and coordinated approach to filling critical information gaps for the Arctic offshore areas as well as institution of revenue sharing for all phases of oil and gas development, and for oil and gas operators be subject to best pollution control technology. There is a need for realistic scenarios for the potential distribution of oil from large spill, adequate USCG presence in the Arctic and marine pilots to be licensed by the state on vessels. They request concurrent comment periods with EIS and PP.

Members of Congress and Federal Agencies

Alaska and Louisiana Senators express support for new and expanded access to the OCS, including offshore Virginia. Significant regulatory action taken by DOI and actions taken by industry to restore confidence mean it is time to move forward with access to new areas.

Louisiana Senator comments that the PP falls short of the section 18 requirement that a schedule “best meet national energy needs for the five year period following its approval...” He questions how eliminating acreage in the Atlantic, Eastern GOM, Southern California, and North Aleutian Basin, Alaska, and going from about 5 sales per year as in the 2009 DPP to 2.5 meet this requirement. This program is a barrier to new jobs and ignores the Nation’s energy and economic needs.

Virginia Senators strongly support inclusion of the areas off the coast of Virginia and want to revise the map of the Mid-Atlantic to more accurately reflect Virginia’s resources. Development of OCS resources with revenue sharing with states would attract jobs, boost domestic energy production, and provide funding for state priorities.

8 Virginia Representatives convey their disappointment that Virginia is not included. They comment that it ignores the legal requirement to consider the “laws, goals, and policies of affected states...,” describe the history of Virginia’s support for leasing off the coast, and state that it will now be years before the thousands of jobs and economic contribution from activity.

64 Representatives from 20 states support the decision for no development in the Atlantic and Pacific, but they are concerned about additional leasing in the Arctic. They question excluding the Atlantic for lack of infrastructure and spill preparedness but not the Arctic. They list five things needed before including the Arctic—prioritize protections for important areas using adequate science; adopt new regulations on spill response and planning standards; develop and have adequate response plans, methods and equipment by companies and Federal agencies; implement a scientific plan with recommendations from USGS report; and test and prove effectiveness of equipment in Arctic conditions

182 Representatives from 41 states express strong support for consideration of new and expanded areas to bring jobs, energy and revenue to the Treasury. This is the first program since the Presidential and Congressional moratoria were lifted in 2008, in anticipation of new access after three-quarters of the OCS had been off limits for 30 years. Given the regulatory changes and actions by industry since *Deepwater Horizon*, it is time to move ahead with new access to American resources rather than continuing overreliance of foreign sources of energy.

Department of Energy commented that the PP is consistent with the Administration's *Blueprint for a Secure Energy Future*. DOE supports DOI's proposal to continue the annual offering of all acreage in the Central and Western GOM, as well as the proposal to pursue leasing on the OCS in Alaska. DOE recommends that DOI include projections of technology advancement in its consideration of the technical, economic and environmental feasibility of producing OCS resources during the program's duration.

Department of Defense's assessment of GOM program areas is unchanged from its previous assessment in April 2010. However, DOD requests early coordination on any lease sale due to ongoing testing and training in those areas. In the Beaufort Sea, DOD may request site specific stipulations for lease blocks in the vicinity of three air defense radar sites: Point Barrow, Olkitok and Barter Island. For Cook Inlet, DOD requests careful consideration to avoid commercial submarine communications cables.

National Oceanic and Atmospheric Administration supports deferring sales in the Chukchi and Beaufort Seas until late in the program to provide a chance for further scientific study and assessment and looks forward to working with BOEM on the research that will support future decision-making. NOAA believes that recognition of sensitive and protected marine habitats (specifically Hanna Shoal in the Chukchi Sea) should be considered at the five year program stage rather than waiting until the lease sale stage. Furthermore, they have endorsed deferral of blocks in the Chukchi within 60 miles of the coast at the program stage. NOAA believes that early decisions on deferral areas would not only help protect sensitive environments and species, but would help industry by setting clear expectations about where exploration and development can occur and would allow them to focus their resources. NOAA does not believe that it is clear if rules were considered to require corporations to have plans in place for environmental cleanup in case of an oil spill cannot be contained. Even with new safeguards, there is always a chance that capping or other containment will not be successful. Therefore, environmental and health concerns should be developed as part of the worst case scenario.

Departments of State and Transportation and DOI's National Park Service reviewed the document and had no comments.

Environmental and Other Public Interest Organizations

Alaska Eskimo Whaling Commission says that the Five Year Program must comply with the MMPA's provisions to protect Alaska subsistence activities, including a complete

revision or deletion of the modeling performed for subsistence. BOEM must ensure no immitigable impacts will occur. Currently, it is not a measure of replacement cost, but relocation cost. It ignores the social costs of relocating communities. OECM fails to account for costs to subsistence activities. There is a need to update and revise the environmental sensitivity analysis for the Arctic, especially regarding marine mammals and marine productivity as the analysis fails to include several Arctic species. Additional deferral areas and additional time to identify specific deferral areas to protect subsistence are needed. They propose deferral areas 20 miles east of Cross Island in the Beaufort Sea and increasing the 25-mile buffer in the Chukchi Sea. Ecosystem-based planning is needed to address conflicts between offshore oil and gas and subsistence uses. There is a need to work more closely with Alaska Native organizations.

Alaska Wilderness League, Alaska's Big Village Network, Center for Biological Diversity, Center for Water Advocacy, Defenders of Wildlife, Eyak Preservation Council, National Resources Defense Council, Northern Alaska Environmental Center, Pacific Environment, Republicans for Environmental Protection, Sierra Club, The Wilderness Society, and the World Wildlife Fund U.S. Arctic Field Program believe BOEM should improve interagency coordination of analysis and permitting of oil and gas projects and leasing should be based on science-based decision-making. Require that Shell obtain the proper permits from the U.S. Environmental Protection Agency prior to drilling in the Arctic and require it demonstrate it can clean up a worst-case spill in bad weather. The Godafoss spill in Norway demonstrates that oil cleanup in Arctic waters is not yet feasible. Address comments received from local Arctic communities in the EIS document, such as deferrals for Nuiqsut hunters. Include an alternative for "no arctic leasing" in the EIS. Fill in data gaps contained in EIS for marine mammals, fish, and birds. Implement recommendations contained in post-Macondo reports. Include effects of leasing on climate change and ocean acidification. Improve modeling of economic costs of leasing and alternatives.

Alaska Wilderness League, Eyak Preservation Council, Center for Biological Diversity, Northern Alaska Environmental Center, Defenders of Wildlife, Resisting Environmental Destruction on Indigenous Lands, Natural Resources Defense Council, The Wilderness Society, Pacific Environment, Ocean Conservation Research, Sierra Club, and the World Wildlife Fund U.S. Arctic Field Program ask BOEM to postpone all further Arctic lease sales, not just scale them back. This is based on the extreme sensitivity of the Arctic environment, inadequate scientific data, and inadequate spill response capability. No oil and gas activities should be permitted in the Arctic until the United States undertakes a careful examination of the *Deepwater Horizon* disaster; gathers missing scientific data regarding wildlife and ecosystems; proves that oil spill response technology can work in the Arctic; puts in place a comprehensive plan and infrastructure to respond to a well blowout or other large spill; and actually implements the recommendations in the post-Macondo reports. The PP moves forward with leasing in the Arctic despite large information gaps; failure to consider indirect, synergistic, interrelated, and cumulative impacts; inaccuracies in weighing environmental values; opaque reasoning on assumptions made; oil spill modeling that fails to consider the likelihood of oil reaching the species on their most important habitats; erroneous assumption of uniform

distribution of environmental sensitivity risks; failure to consider an ecosystem's ability to recover from an impact in the environmental sensitivity analysis; and failure to incorporate a discussion of the impacts of an onshore pipeline and other terrestrial operations on wildlife, habitat, and people. BOEM should include more middle-ground alternatives in the PP, as listed alternatives focus too heavily on leasing extremes. Net Public Benefits analysis is flawed because the public-benefit side is dominated by private industry profits, private benefits should not be included; and both sides of the analysis overlook true social and environmental values of the "no action" alternative and the devastating externalities of leasing in the Arctic. PP balancing was too heavily weighted on one or two factors with no effective balancing discussion.

Center for Regulatory Effectiveness recommends (1) the use of PAMGUARD as part of the protected species observer program; (2) that the Five Year Final EIS should reflect the conclusion that seismic does not adversely affect marine mammals under current BOEM regulations; (3) any new seismic regulations issued by BOEM require a new proposed Information Collection Request; and (4) Coastal and Marine Spatial Planning (CMSP) violates the Act. CMSP requires that all ocean uses be considered equally, while the Act requires BOEM to give more weight to the development of oil and gas.

Center of Sustainable Economy critiques the Net Public Benefits (NPB) analysis incorporated in the PP. NPB presents a biased characterization and analysis of the no action alternative that significantly understates its economic and social value; overestimates program benefits by including private profits, relying on unwarranted assumptions about the effects of OCS oil and gas supplies on prices and by failing to account for final petroleum product exports; underestimates program costs by excluding costs of public subsidies, ecosystem service damages and carbon emissions damage; and fails to model the effects of a wide range of policy interventions that affect program economics.

Consumer Energy Alliance urges BOEM to ensure that the PP moves forward with all 15 proposed lease sales in a timely manner. The Alliance also expresses disappointment in the Department's decision to not include lease sales in areas of the Mid- and South Atlantic in the PP.

Institute for 21st Century Energy feels that the PP fails to allow for expeditious and orderly development of the OCS, but encourages DOI to finalize the program quickly and not constrain the scope of the potential leasing areas further. Lease sales should give preference to areas with highest potential for resource development. Once finalized, the Institute recommends immediately revising the program by scoping additional areas, including those proposed in the 2010-2015 DPP.

Institute for Policy Integrity advocates revising the PP analysis to account for the option value of offshore resources, which takes into account the potential value of postponing a decision to lease an area until later when more information may be available. When evaluating the costs and benefits of opening lands for leasing, the value of delay can be estimated and included as a cost of opening new lands for leasing. During the bid

adequacy process, the government can also set a higher reservation price, reflecting the option value of the land.

International Fund for Animal Welfare opposes lease sales in the Beaufort and Chukchi Seas, and encourages the agency to consider no sales in these areas. Their concerns include climate change projections of more storms of increasing strength in the Beaufort and Chukchi Seas that would overlap with the exploration or drilling season; harm to marine mammals from increased noise from seismic surveys and vessel traffic; and the lack of proven technologies and techniques for oil spill response and cleanup in Arctic waters. If BOEM decides to move forward with OCS oil and gas development, long-term extractive projects must be coupled with long-term industry-funded species monitoring programs and a rapid review process for Arctic research to develop more concrete mitigation strategies.

Marine Conservation Institute commends the Obama Administration's 2010 decision to exclude Bristol Bay from the PP. Oil and gas deposits in Bristol Bay are projected to yield just \$7.7 billion in revenue over 25 to 40 years, far less than the \$80 billion that a sustainable commercial fishing industry could generate during the same period.

Natural Resources Defense Council requests that the PP and its underlying NEPA documentation be substantially revised to remedy factual and analytical errors; Arctic lease sales be removed from the program entirely; and no new drilling be authorized anywhere on the OCS until recommendations of the National Commission and other post-BP *Deepwater Horizon* expert bodies have been fully implemented. The PP fails to meet section 18 requirements. Specifically, it fails to develop a leasing program that will best meet national energy needs; fails to consider a range of social, environmental, and renewable resource values contained in the OCS; fails to incorporate sufficient current and detailed information about ecological conditions, national policy commitments, and impacts of new oil and gas exploration; is based on an inadequate NEPA documentation; and suffers from other significant methodological errors.

National Audubon Society, Ocean Conservancy, Oceana, and Pew Trust urge BOEM to modify PP and Draft EIS to ensure lease sales are held consistent with stated commitments of DOI leadership: Expand and increase deferrals for areas known to be important for subsistence or ecological reasons, and create a deferral committee of experts to recommend leasing deferrals; terminate areawide lease sales in favor of a more targeted approach; make lease sales contingent on an integrated scientific research and monitoring program; make future Arctic sales contingent upon effective oil spill response capability; change the Draft EIS to include an additional alternative that excludes both the Beaufort and Chukchi Seas; include effects in climate change and ocean acidification in the EIS; and give local communities a more meaningful opportunity to express opinions.

Nature Conservancy urges BOEM to align the PP with recommendations of The White House Council on Environmental Quality's Interagency Ocean Policy Task Force, including the use of Coastal Marine Spatial Planning. The proposed delay in Arctic

planning area sales until 2015-16 is the minimum amount of time to allow for proper planning and consideration of ecosystem impacts, spill response, and the requirement for consultation with the Inupiat Nation. It supports a 2000-foot buffer around biologically sensitive areas in the GOM and recommends excluding the Eastern GOM for the duration of the program due to high risk and relatively low net benefit. It supports the exclusion of Atlantic and Pacific.

Ocean Conservation Research asks that BOEM limit the EIS exclusively to exploration because of a lack of understanding of the technologies. It recommends the "no action alternative" be selected.

Oceana recommends scheduling no lease sales in GOM until at least 2014, and scheduling no lease sales in the Chukchi and Beaufort Seas. BOEM must fundamentally reconsider the manner in which it estimates the costs and benefits of program alternatives, because it currently overstates the potential benefits of the PP and does not effectively account for the impact of a catastrophic spill. Oceana submitted an appendix on marine mammals, as well as several attachments: 1) an attachment co-authored by multiple groups (Oceana, Alaska's Big Village Network, Center for Biological Diversity, Center For Water Advocacy, Defenders of Wildlife, Gulf Restoration, Network, Ocean Conservation Research, Southern Environmental Law Center, Sierra Club) discussing continuing shortcomings in offshore regulation and safety measures, 2) an attachment discussing how the Draft EIS is inadequate and violates NEPA, and 3) an attachment by the Center for Sustainable Economy offering a critique of the Net Public Benefits analysis used in the PP.

Pew Trust pointed out a number of inconsistencies between the PP and public statements of BOEM officials such as consideration of additional subsistence deferrals. Officials publicly stated that BOEM is undertaking a new approach for leasing in the Arctic that would shift away from areawide leasing in frontier areas such as the Arctic. However, the PP retains the option of conducting areawide leasing in Beaufort and Chukchi Seas.

Surfrider Foundation strongly supports the Department's decision to exclude the Atlantic and Pacific coasts from the PP. It is concerned with any Alaska sales given the likely challenges with spill prevention and response in the harsh and remote marine environment off Alaska, particularly the Arctic Ocean. It generally agrees with concentrating GOM sales in the Western and Central planning areas but opposes issuing lease sales in the Eastern GOM.

World Society for the Protection of Animals and Whale and Dolphin Conservation Society express concerns that impacts upon marine mammals are not adequately measured, weighed, or considered. The PP does not address potential threats to marine mammals in the Arctic and GOM, which include oil spills, noise and vessel strikes. There was no apparent consideration of climate change or ocean acidification as required in response to the Court's remand decision (D.C. Cir. 2009). They believe that the PP may not satisfy NEPA requirements.

Oil and Gas Companies and Associations and Related Industry

Alaska Oil and Gas Association urges BOEM to move forward with the five year program, including the three sales on Alaska's OCS. The Association does not agree with BOEM's characterization in the PP of CMSP as a "national zone plan", and opposes inclusion of any deferral areas in PP, stating they should be addressed at lease sale stage. Additionally, it notes that Alaska's OCS is one of the most studied and understood oil and gas basins in the world, BOEM has appropriately considered impacts to resources, and urges BOEM to involve stakeholders in their efforts.

American Petroleum Institute supports moving forward with 2012-2017 PP and urges BOEM to expeditiously finalize the program. It argues there is no consistent rationale why the Pacific and Mid-Atlantic areas are excluded. The argument of military concerns in the Atlantic conflicting with oil and gas activities seems more spurious considering the OCS wind energy leasing programs planned offshore in Virginia, Maryland, New Jersey and Delaware. It states that the PP is overly constrained and fails to take advantage of enormous benefits documented in the program analysis and has short circuited the ability of the Nation to make informed decisions regarding energy security. It urges BOEM to begin work immediately on a new more robust five year program that will include OCS areas in Atlantic, Pacific and Eastern GOM.

Arkema supports BOEM's Five Year 2012-2017 PP, implemented quickly and responsibly. In addition, they support inclusion of "Made in America" requirements as a part of a lease. Arkema strongly urges BOEM to increase the pace of permitting to the maximum extent possible.

ATP Oil & Gas Corporation is disappointed that the new OCS five year plan restricts oil and gas exploration, due to undue influence by 2010's *Deepwater Horizon* event. The PP is unnecessarily restrictive and should be amended to include frontier areas prior to its finalization. ATP requests BOEM provide a more robust rationale for expanding the areas open to OCS mineral development.

ConocoPhillips is pleased the PP includes 15 lease sales distributed among 6 OCS planning areas. However, they believe BOEM should expand the areas offered for leasing to include additional blocks in the Eastern GOM and additional areas in the Alaska and Atlantic Regions. ConocoPhillips' continued commitment to the OCS will largely depend on the extent to which BOEM's Oil and Gas Leasing Program makes high potential areas available for leasing.

International Association of Geophysical Contractors urges BOEM to expand the potential lease sale areas to include all areas of the OCS, in particular, the Atlantic and all of the Eastern GOM. They recommend that the final Five Year Leasing Program clearly provide for and facilitate new seismic data acquisition and subsequent analysis of the natural gas and oil potential of the OCS.

Independent Petroleum Association of America urges BOEM to finalize the 2012-2017 program as soon as possible and not further reduce the scope of the PP. The Association is disappointed that the PP does not include the broadest area of the OCS as possible and fails to include new opportunities to expand offshore oil and natural gas in highly prospective areas, including offshore Virginia. Additionally, the PP directly contradicts the impression the President gave the American people in the recent State of the Union Address [January 2012] and fails to meet the intent of the Act to provide the energy Americans need. They urge BOEM to begin work immediately to develop a new five year program that includes the Atlantic, Pacific, all of the Arctic, and the remainder of the Eastern GOM.

Louisiana Oil & Gas Association urges BOEM to enact the 2012-2017 PP without delay and further narrowing of the scope of proposed lease sales. The Association further urges BOEM to increase the pace of permitting to meet and eventually surpass historic levels and heed Virginia's desire for oil and gas development off its coast.

National Ocean Industries Association recognizes the PP must proceed but is disappointed to see there will be no lease sale proposed offshore Virginia and with the lack of access to new areas in the PP. It states that BOEM's decision not to move ahead with new access to the OCS lacks justifiable policy rationale. It asks BOEM to proceed without further reducing available areas, nor designated lease sales; and that the alternative with the highest level of potential for development be selected. Additionally, it urges BOEM to immediately begin work on a revision to the program by scoping at least those areas that were considered in the 2010-2015 DPP released in January 2009.

Shell Exploration & Production Company calls on Interior to finalize 2012-2017 five year program quickly so leasing can continue, and urges that work on new more robust five year program including additional areas in Atlantic, Pacific, and Eastern GOM begin immediately. Shell is disappointed with the Secretary's decision on December 1, 2010, to remove high potential areas from program without performing statutorily-mandated analysis and his rationale to limit areas in the program to GOM and Alaska without taking PP fiscal and employment benefit analysis into consideration. Additionally, Shell notes the PP approach to leasing in Alaska ignores the potential loss of benefits and that there was no discussion on the economic impacts related to not having a sale in Alaska. It questions how BOEM will balance analysis of areawide leasing preferences with tract selection offerings in the Arctic; and why *Deepwater Horizon* is used to justify limitations in frontier areas in lieu of the September 14, 2011 BOEMRE/USCG report that revealed no issues that would pose different risks in frontier area. Shell suggests the OCS Scientific Committee review results of climate change impacts on environmental sensitivity analysis.

Shell Upstream Americas provided most of the same comments as Shell Exploration & Production Company with additional page-by-page detailed comments.

Statoil supports the overall program and encourages BOEM to expeditiously finalize the program to allow continued leasing in 2012 and beyond. Additionally, they note focused

leasing in Alaska makes it difficult to comment. However, they are willing to share expertise with BOEM and relevant stakeholders on technological and environmental challenges in Arctic. BOEM should revise the PP to allow for additional sales in both Beaufort and Chukchi Seas and extend the term of OCS leases in the Arctic as current terms do not provide sufficient time to evaluate and explore resource potential.

Stone Energy urges BOEM to approve the Five Year Program for 2012-2017 with maximum access possible. They are disappointed that the PP does not include the broadest area of OCS possible and especially the omission of a lease sale offshore Virginia. It urges BOEM to not further reduce the scope of the PP.

TGS-NOPEC Geophysical Company urges BOEM not to reduce the scope of proposed lease sales in the PP and increase the pace of permitting to meet, and eventually surpass, historic levels

Non-Energy Industry Businesses, Associations and Groups

American Chemistry Council states that abundant and affordable supplies of natural gas are critical to the industry's ability to create jobs and to successfully compete in the global economy and urges BOEM to reconsider its 2012-2017 program and include lease sales in planning areas that were included in the 2009 DPP.

American Farm Bureau Federation urges BOEM not to reduce the scope of proposed lease sales in the PP and increase the pace of permitting to meet, and eventually surpass, historic levels. It further urges BOEM and DOI to heed Virginia's desire for oil and gas development off its coast and to identify opportunities to move such policy forward.

American Forest & Paper Association states that demand for natural gas will grow rapidly in the coming years in many sectors of the U.S. economy. The Administration has either developed many of these measures or supported them. The Association urges BOEM to significantly revise the program to at least include the lease sales in planning areas that were included in the 2009 DPP.

Associated Industries of Florida urges BOEM not to reduce the scope of proposed lease sales in the PP and increase the pace of permitting to meet, and eventually surpass, historic levels.

Georgia Chamber of Commerce urges BOEM to not further reduce the scope of proposed lease sales in the PP and to increase the pace of permitting to meet, and eventually surpass historic levels.

Louisiana Chemical Association urges BOEM not to reduce the scope of proposed lease sales in the PP and increase the pace of permitting to meet, and eventually surpass, historical levels. It further urges BOEM and DOI to heed Virginia's desire for oil and gas development off its coast and to identify opportunities to move such policy forward.

Manufacture Alabama! urges BOEM not to reduce the scope of proposed lease sales in the PP and increase the pace of permitting to meet, and eventually surpass, historical levels. It further urges BOEM and DOI to heed Virginia's desire for oil and gas development off its coast and to identify opportunities to move such policy forward.

North Carolina Chamber of Commerce urges BOEM to enact the PP and increase the pace of permitting to meet, and eventually surpass, historic levels.

New Tech Global urges BOEM not to reduce the scope of proposed lease sales in the PP but to increase the pace of permitting to meet, and eventually surpass, historic levels.

North Carolina Farm Bureau Federation asks BOEM to expand the scope of the PP to provide relief to North Carolina's farming families from increasing production costs.

Pennsylvania Manufacturers' Association urges BOEM not to reduce the scope of proposed lease sales in the PP and increase the pace of permitting to meet, and eventually surpass, historical levels. It further urges BOEM and DOI to heed Virginia's desire for oil and gas development off its coast and to identify opportunities to move such policy forward.

PPG Industries urge BOEM not to reduce the scope of proposed lease sales in the PP but to increase the pace of permitting to meet, and eventually surpass, historic levels.

Tidewater Inc. urges BOEM not to reduce the scope of proposed lease sales in the PP but to increase the pace of permitting to meet, and eventually surpass, historic levels.

General Public

More than 280,000 comments were received from private citizens regarding the Five Year Program for 2012-2017. The overwhelming majority were comments submitted through various public interest groups. Most were from environmental-oriented organizations. There was particular concern about oil and gas activities in the Alaskan Arctic areas of the Beaufort and Chukchi Seas. Citing the *Deepwater Horizon* event, there was apprehension about the ability to respond to an oil spill anywhere in the OCS, but particularly in the remote Arctic. Commenters favoring the program were disappointed that more areas were not available, citing the need for jobs, boosts to the economy, a reduced reliance on imported oil, and national security.



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.