

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

2. ALTERNATIVES INCLUDING THE PROPOSED ACTIONS

2.1. MULTISALE NEPA ANALYSIS

This environmental impact statement (EIS) is being prepared in support of the nine areawide oil and gas lease sales in the Central and Western Planning Areas (CPA and WPA) of the Gulf of Mexico OCS (Figure 1-1). These lease sales are scheduled for 2003-2007 under the proposed *Outer Continental Shelf Oil and Gas Leasing Program: 2002-2007* (5-Year Program). An environmental assessment (EA) was prepared on the first sale in the 5-Year Program (Western Gulf Sale 184); that proposed lease sale is not included in this EIS. Federal regulations allow for several similar proposals to be analyzed in one EIS (40 CFR 1502.4). Given the similar and annual nature of these areawide lease sales, multisale EIS's are appropriate. This multisale EIS will lessen duplication and save resources. The multisale EIS is intended to focus the NEPA/EIS process on differences among the proposed sales and on significant environmental issues and recent information.

Although this EIS addresses nine proposed sale actions, each sale will have a separate decision process. This EIS will serve as a decision-support document for Sales 185 and 187, which are scheduled for 2003. The multisale approach allows the prelease process for subsequent lease sales to be completed in one year, as this EIS will serve as a base reference for the National Environmental Policy Act (NEPA) review and documentation for each of the subsequent proposed actions.

One Call for Information and Nominations (Call) and Notice of Intent to Prepare an EIS (NOI) was issued at the beginning of this multisale prelease process. One Area Identification (Area ID) was prepared for the 10 CPA and WPA lease sales scheduled under the proposed 5-Year Program. The Area ID describes the geographical areas and identifies the alternatives, mitigating measures, and issues to be analyzed in the NEPA documents for the proposed sales (specifically, the EA for Western Gulf Sale 184 and this multisale EIS for the other nine Central and Western Gulf sales).

Consultation with the public will be initiated in subsequent years. An Information Request will be issued, specifically requesting input on the scheduled sale under consideration. A NEPA review will be conducted for each subsequent sale. An EA will be prepared to determine whether or not the information and analyses in this multisale EIS are still valid for each subsequent sale under consideration. Consideration of the EA and any comments received in response to the Information Request will result in either a Finding of No New Significant Impact (FONNSI) or the determination that the preparation of a Supplemental EIS (SEIS) is warranted. Sale-specific notices will be published as usual, except that the Proposed Notice of Sale will be published after completion of the final NEPA document for each sale.

Because the EA will be prepared for a proposal that "is, or is closely similar to, one which normally requires the preparation of an EIS" (40 CFR 1501.4(e)(2)), the EA will be made available for public review for 30 days prior to making a decision on the proposed lease sale. If the EA results in a FONNSI, the EA and FONNSI will be sent to the Governors of the affected States. The availability of the EA and FONNSI will be announced in the *Federal Register*. The FONNSI will become part of the Record of Decision prepared for the decision on the Notice of Sale.

In some cases, the EA may result in a finding that it is necessary to prepare an SEIS (40 CFR 1502.9). Some of the factors that could justify an SEIS are a significant change in resource estimates, legal challenge on the EA/FONNSI, significant new information, significant new environmental issue(s), new proposed alternative(s), a significant change in the proposed action, or the previous analysis in the multisale EIS is deemed inadequate.

If an SEIS is necessary, the analysis will focus on addressing the new issue(s) or concern(s) that prompted the decision to prepare the SEIS. The SEIS will include a discussion explaining the purpose of the SEIS and incorporating the multisale EIS, a description of the proposed action and alternatives and a comparison of the alternatives, a description of the affected environment for any potentially affected resources that are the focus of the SEIS and were not described in the multisale EIS, an analysis of new impacts or changes in impacts from the multisale EIS because of new information or the new issue(s) analyzed in the SEIS, and a discussion of the consultation and coordination carried out for the new issues or information analyzed in the SEIS.

The MMS published the Call and NOI for the proposed 2003-2007 Central and Western Gulf of Mexico lease sales in the *Federal Register* on September 12, 2001. Federal, State, and local agencies,

along with other interested parties, were requested to send written comments to the MMS Gulf of Mexico OCS Region on the scope of the EIS, significant issues that should be addressed, and alternatives and mitigating measures that should be considered. The comment period closed on October 12, 2001. Additional public notices were distributed via newspapers, mailouts, and the Internet. The MMS received 14 comments in response to the Call and NOI. A summary of these comments can be found in Chapter 5.

In accordance with the Council on Environmental Quality's (CEQ) regulations implementing NEPA, scoping was conducted to solicit comments on the proposed actions and to update the Gulf of Mexico's environmental information base for the Central and Western Gulf of Mexico. Scoping provides those with an interest in the OCS Program an early opportunity to participate in the events leading to the publication of the Draft EIS. Although the scoping process is formally initiated by the publication of the Call and NOI, scoping efforts and other coordination meetings are carried out in an ongoing manner. In October 2001, scoping meetings were held in Galveston and Houston, Texas; New Orleans, Louisiana; and Mobile, Alabama. A summary of the scoping comments can be found in Chapter 5. The result of the scoping effort was the identification of the alternatives, mitigating measures, and issues described below.

2.2. ALTERNATIVES, MITIGATING MEASURES, AND ISSUES

2.2.1. Alternatives

2.2.1.1. Alternatives for Proposed Central Gulf Sales

Alternative A - The Proposed Action(s): This alternative would offer for lease all unleased blocks within the CPA for oil and gas operations (Figure 1-1), with the following exceptions: Lund South (Area NG16-07) Blocks 172, 173, 213-217, 252-261, 296-305, and 349; Amery Terrace (Area NG15-09) Blocks 280, 281, 318-320, and 355-359; and portions of Amery Terrace (Area NG15-09) Blocks 235-238, 273-279, and 309-359, which are deferred from the proposed actions under the "Treaty Between The Government of the United States of America And The Government Of The United Mexican States on the Delimitation Of The Continental Shelf In the Western Gulf of Mexico Beyond 200 Nautical Miles." The CPA encompasses about 47.8 million acres (ac). The estimated amount of resources projected to be developed as a result of any one proposed CPA lease sale is 0.276-0.654 billion barrels of oil (BBO) and 1.590-3.300 trillion cubic feet (tcf) of gas.

Alternative B - The Proposed Action(s) Excluding the Unleased Blocks Near Biologically Sensitive Topographic Features: This alternative would offer for lease all unleased blocks in the CPA, as described for the proposed action(s), with the exception of any unleased blocks within the 167 blocks subject to the Topographic Features Stipulation.

Alternative C - The Proposed Action(s) Excluding the Unleased Blocks Within 15 Miles of the Baldwin County, Alabama, Coast: This alternative would offer for lease all unleased blocks in the CPA, with the exception of any unleased blocks within 15 mi of the Baldwin County, Alabama, coast.

Alternative D - No Action: This alternative is equivalent to cancellation of one or more proposed CPA lease sales scheduled in the proposed *Outer Continental Shelf Oil and Gas Leasing Program: 2002-2007*. The opportunity for development of the estimated oil and gas resources that could have resulted from any proposed action(s) would be precluded or postponed, and any potential environmental impacts resulting from the proposed action(s) would not occur or would be postponed.

2.2.1.2. Alternatives for Proposed Western Gulf Sales

Alternative A - The Proposed Action(s): This alternative would offer for lease all unleased blocks within the WPA for oil and gas operations (Figure 1-1), with the following exceptions: High Island Area East Addition, South Extension, Blocks A-375 and A-398 and portions of other blocks within the Flower Garden Banks National Marine Sanctuary are deferred from leasing. Mustang Island Area Blocks 793, 799, and 816 have been identified by the Navy as needed for testing equipment and for training mine warfare personnel and are deferred from the proposed actions. Sigsbee Escarpment (Area NG15-08) Blocks 11, 57, 103, 148, 149, 194, 239, 284, and 331-341; portions of Sigsbee Escarpment (Area NG15-08) Blocks 12-14, 58-60, 104-106, 150, 151, 195, 196, 240, 241, 285-298, and 342-349; and Keathley Canyon (Area NG15-05) Blocks 978-980 are deferred from the proposed actions under the "Treaty Between The Government of the United States of America And The Government Of The United Mexican

States on the Delimitation Of The Continental Shelf In the Western Gulf of Mexico Beyond 200 Nautical Miles,” which took effect in January 2001. The WPA encompasses about 35.9 million ac. The estimated amount of resources projected to be developed as a result of any one proposed WPA lease sale is 0.136-0.262 BBO and 0.810-1.440 tcf of gas.

Alternative B - The Proposed Action(s) Excluding the Unleased Blocks Near Biologically Sensitive Topographic Features: This alternative would offer for lease all unleased blocks in the WPA, as described for the proposed action(s), with the exception of any unleased blocks within the 200 blocks subject to the Topographic Features Stipulation.

Alternative C - No Action: This alternative is equivalent to cancellation of one or more proposed WPA lease sales scheduled in the proposed *Outer Continental Shelf Oil and Gas Leasing Program: 2002-2007*. The opportunity for development of the estimated oil and gas resources that could have resulted from any proposed action(s) would be precluded or postponed, and any potential environmental impacts resulting from the proposed action(s) would not occur or would be postponed.

2.2.2. Mitigating Measures

In 1978, the Council on Environmental Quality (CEQ) defined mitigation as a 5-step process.

- Avoidance—The avoidance of an impact altogether by not taking a certain action or part of an action.
- Minimization—The minimizing of impacts by limiting the degree or magnitude of the action and its implementation.
- Restoration—The rectifying of the impact by repairing, rehabilitation, or restoring the affected environment.
- Maintenance—The reducing or eliminating of the impact over time by preservation and maintenance operations during the life of the action.
- Compensation—The compensation for the impact by replacing or providing substitute resources or environments.

2.2.2.1. Proposed Mitigating Measures

The potential mitigating measures included for analysis in this EIS were developed as the result of scoping efforts over a number of years for the continuing OCS Program in the Gulf of Mexico and from scoping efforts specifically for the proposed 2003-2007 Central and Western Gulf OCS lease sales. Five lease stipulations are proposed for the Central Gulf sales—the Topographic Features Stipulation; the Live Bottom (Pinnacle Trend) Stipulation; the Military Areas Stipulation; the Blocks South of Baldwin County, Alabama, Stipulation; and the Law of the Sea Convention Royalty Payment Stipulation. Four lease stipulations are proposed for the Western Gulf sales—the Topographic Features Stipulation, the Military Areas Stipulation, the Naval Mine Warfare Area Stipulation, and the Law of the Sea Convention Royalty Payment Stipulation. These measures will be considered for adoption by the Assistant Secretary of the Interior for Land and Minerals (ASLM). The analysis of any stipulations as part of Alternative A does not ensure that the ASLM will make a decision to apply the stipulations to leases that may result from any proposed lease sale, nor does it preclude minor modifications in wording during subsequent steps in the prelease process if comments indicate changes are necessary or if conditions change.

Any stipulations or mitigation requirements to be included in a lease sale will be described in the Record of Decision for that lease sale. Mitigation measures in the form of lease stipulations are added to the lease terms and are therefore enforceable as part of the lease. In addition, each exploration and development plan, as well as any pipeline applications that may result from a lease sale, will undergo a NEPA review, and additional project-specific mitigations may be applied as conditions of plan approval. The MMS has the authority to monitor and enforce these conditions, and under 30 CFR 250 Subpart N, may seek remedies and penalties from any operator that fails to comply with the conditions of permit approvals, including stipulations and other mitigating measures.

2.2.2.2. Mitigating Measures Considered But Not Analyzed in Detail

Numerous potential mitigating measures were identified through the scoping efforts for many past lease sale EIS's. The MMS funded studies to provide information to evaluate some of these potential mitigating measures. Some of these mitigating measures were adopted, or modified and adopted. Some measures were dropped from further consideration when analysis indicated that the measures were not warranted or would have been ineffective. Since the last multisale EIS, many MMS protective measures have been modified and strengthened (Chapter 2.2.2.3).

The MMS and the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), formerly known as the National Marine Fisheries Service (NMFS), have identified OCS-related debris, OCS-related vessel traffic, and seismic airgun noise as potential sources of "take" of marine protected species. Marine protected species may ingest or become entangled in marine debris, which results in their harm, injury, or mortality. Furthermore, collisions between OCS-related vessels and marine protected species can cause injury or mortality to animals. Because these sources of potential "take" may result from the lease sale action, the MMS, in consultation with NOAA Fisheries, developed a lease stipulation to (1) reduce trash and flotsam in the environment as generated by oil and gas activities offshore and (2) minimize the potential for vessel collisions with protected species. Marine protected species lease stipulations were included in Eastern Gulf Lease Sale 181, Central Gulf Lease Sale 182, and Western Gulf Lease Sale 184. These stipulations were developed as a result of Section 7 Consultations (Endangered Species Act) performed with NOAA Fisheries for the proposed lease sales. Although MMS anticipates that similar requirements will be developed for the WPA and CPA lease sales addressed in this EIS, the specific protective measures to be included will not be determined until NOAA Fisheries has completed their Biological Opinion (BO) for the required Section 7 Consultation.

2.2.2.3. Existing Mitigating Measures

Mitigating measures have been proposed, identified, evaluated, or developed through previous MMS lease sale NEPA review and analysis processes. Many of these mitigating measures have been adopted and incorporated into regulations and/or guidelines governing OCS exploration, development, and production activities. All plans for OCS activities go through MMS review and approval to ensure compliance with established laws and regulations. Mitigating measures must be incorporated and documented in plans submitted to MMS. Operational compliance is enforced through the MMS on-site inspection program.

Mitigating measures that are a standard part of the MMS program limit the size of charges used for explosive platform removal; require placing explosive charges at least 5 m below the mudline; ensure site clearance procedures to eliminate potential snags to commercial fishing nets; and require surveys to detect and avoid archaeological sites and biologically-sensitive areas such as pinnacles, low-relief live bottoms, and chemosynthetic communities.

Some MMS-identified mitigating measures are incorporated into OCS operations through cooperative agreements or efforts with industry and various State and Federal agencies. These include NOAA Fisheries's Observer Program to protect marine mammals and sea turtles during explosive removals, regulations on minimum helicopter altitudes to prevent disturbance of wildlife, labeling operational supplies to track possible sources of accidental debris loss, development of methods of pipeline landfall to eliminate impacts to barrier beaches, and semiannual beach cleanup events.

Most OCS revenue goes into the U.S. Treasury. A portion of the revenue goes into two special-purpose accounts—the Land and Water Conservation Fund (LWCF) and the National Historic Preservation Fund (NHPF). The LWCF was established by the Land and Water Conservation Act of 1965 to provide revenues for Federal, State, and local governments to purchase parks and recreation areas and to plan, acquire, and develop land and water resources for recreational use, habitat protection, scenic beauty, and biological diversity. From FY 1982 through FY 2000, about \$16.3 billion was dispersed from OCS revenues to the LWCF. The NHPF is designed to expand and accelerate historic plans and activities through matching grant-in-aid to States and local governments and funds for the National Trust for Historic Preservation. Offshore mineral leasing provides 100 percent of the \$150 million transferred to the fund annually.

The 1986 amendments to Section 8(g) of the OCS Lands Act mandated that the Federal Government share with affected coastal States 27 percent of future revenues generated from the leasing and

development of oil and natural gas resources located in the Federal OCS in a zone 3 mi wide adjacent to the seaward boundary of a State's offshore waters. Through FY 2000, over \$2.9 billion of 8(g) monies have been disbursed; all five Gulf Coast States receive 8(g) monies. The monies are used by the States as they deem necessary, without Federal restrictions, and may be used to mitigate coastal impacts from OCS-related activities.

2.2.3. Issues

Issues are defined by CEQ to represent those principal "effects" that an EIS should evaluate in-depth. Scoping identifies specific environmental resources and/or activities rather than "causes" as significant issues (CEQ Guidance on Scoping, April 30, 1981). The analysis in the EIS can then show the degree of change from present conditions for each issue due to the relevant actions related to the proposed actions.

Selection of environmental and socioeconomic issues to be analyzed was based on the following criteria:

- issue is identified in the CEQ regulations as subject to evaluation;
- the relevant resource/activity was identified through the scoping process or from comments on past EIS's;
- the resource/activity may be vulnerable to one or more of the impact-producing factors (IPF's) associated with the OCS Program; a reasonable probability of an interaction between the resource/activity and IPF should exist; or
- information that indicates a need to evaluate the potential impacts to a resource/activity has become available.

2.2.3.1. Issues to be Analyzed

The following issues relate to potential IPF's and the resources and activities that could be affected by OCS exploration, development, production, and transportation activities.

Petroleum Spills: Specific concerns were raised regarding the potential effects of oil spills on marine and coastal environments, marine mammals, other endangered and threatened species, commercial fishing, recreation and tourism, water quality, and wetlands. Other concerns raised over the years of scoping were fate and behavior of oil spills, availability and adequacy of oil-spill containment and cleanup technologies, oil-spill cleanup strategies, impacts of various oil-spill cleanup methods, effect of winds and currents on the transport of oil spills, effects of weathering on oil spills, toxicological effects of fresh and weathered oil, air pollution associated with spilled oil, and short-term and long-term impacts of oil on wetlands.

Drilling Fluids and Cuttings: Potential smothering of benthic communities by offshore disposal of drilling fluids and cuttings has been raised as an issue. Specific concerns related to the use and disposal of drilling fluids include potential spills of oil-based drilling fluids (OBF), onshore disposal of OBF, the fate and effects of synthetic-based drilling fluids (SBF) in the marine environment; and the potential toxic effects or bioaccumulation of trace metals in drilling fluids discharged into the marine environment.

Visual and Aesthetic Interference: The potential effects of the presence of drilling rigs and platforms, service vessels, helicopters, trash and debris, and flaring on visual aesthetics as seen by residents and visitors of the Pensacola area is an issue of great concern.

Air Emissions: The potential effects of emissions of combustion gases from platforms, drill rigs, service vessels, and helicopters have been raised as an issue. Also under consideration are the flaring of produced gases during extended well testing and the potential impacts of transport of production with associated hydrogen sulfide.

Water Quality Degradation: Issues raised related to water quality degradation were most often associated with operational discharges of drilling muds and cuttings, produced waters, and domestic wastes. Water quality issues also included concerns related to impacts from sediment disturbance, petroleum spills and blowouts, and discharges from service vessels.

Other Wastes: Other concerns include storage and disposal of trash and debris, and trash and debris on recreational beaches.

Structure and Pipeline Emplacement: Some of the issues related to structure and pipeline emplacement are bottom area disturbances from bottom-founded structures or anchoring, sediment displacement related to pipeline burial, space-use conflicts, and the vulnerability of offshore pipelines to damage that could result in hydrocarbon spills or H₂S leaks.

Platform Removals: Concerns about the abandonment of operations include how a platform is removed, potential impacts of explosive removals on marine organisms, remaining operational debris snagging fishing nets, and site clearance procedures.

OCS-Related Support Services, Activities, and Infrastructure: Concerns over activities related to the shore-base support of the Development and Production Plan include vessel and helicopter traffic and emission, construction or expansion of navigation channels or onshore infrastructure, maintenance and use of navigation channels and ports, and deepening of ports.

Sociocultural and Socioeconomic: Many concerns have focused on the potential impacts to coastal communities. Issues include impacts on employment, population fluctuations, demands on public services, effects on land use, tourism, impacts to low income or minority populations, and cultural impacts.

Coastal Zone Management: Concern has been expressed over potential conflicts with the coastal states' coastal zone management programs and with local county, parish, or community land-use plans.

OCS Oil and Gas Infrastructure Security: The MMS recognizes the increased importance of OCS oil and gas production and the need to protect offshore personnel and facilities. The MMS has taken and continues to take steps to ensure that OCS production facilities and the associated transportation network are secure. The MMS works closely with OCS operators, USCG, other Federal agencies, and local authorities to identify potential security risks and appropriate security measures that should be imposed. The MMS is also working with the Homeland Security Office in Washington, D.C., to develop OCS-wide security guidelines to enhance existing mitigation measures for the protection of OCS personnel, facilities, and equipment. The guidelines will establish protective measures for standard threat condition levels to help MMS personnel and operators respond during a crisis.

Other Issues: Many other issues have been identified. Several of these issues are subsets or variations of the issues listed above. All are taken under advisement and are considered in the analyses, if appropriate. Additional issues raised during scoping are noise from platforms, vessels, helicopters, and seismic surveys; turbidity as a result of seafloor disturbance or discharges; mechanical damage to biota and habitats; and multiple-use conflicts.

The analyses in Chapters 4.2-4.5 address the issues and concerns identified above for the following resource topics:

- Air Quality
- Alabama, Choctawhatchee, St. Andrew, and Perdido Key Beach Mice
- Archaeological Resources (Historic and Prehistoric)
- Deepwater Benthic Communities
- Coastal Barrier Beaches and Associated Dunes
- Coastal and Marine Birds
- Commercial Fisheries
- Fish Resources and Essential Fish Habitat
- Gulf Sturgeon
- Human Resources and Land Use
- Live Bottoms (Pinnacle Trend and Topographic Features)
- Marine Mammals
- Recreational Beaches
- Sea Turtles
- Submerged Vegetation
- Water Quality (Coastal and Marine)
- Wetlands

2.2.3.2. Issues Considered but Not Analyzed

As previously noted, CEQ's regulations for implementing NEPA instruct agencies to adopt an early process (termed "scoping") for determining the scope of issues to be addressed and for identifying significant issues related to a proposed action. As part of this scoping process, agencies shall identify and eliminate from detailed study the issues that are not significant to the proposed action or have been covered by prior environmental review.

Through our scoping efforts, numerous issues and topics were identified for consideration in the EIS for the proposed 2003-2007 Central and Western lease sales. After careful evaluation and study, the following categories were considered not to be significant issues related to the proposed actions or that have been covered by prior environmental review.

Program and Policy Issues

Comments and concerns that relate to program and policy are issues under the direction of the Department of the Interior and/or MMS, and their guiding regulations, statutes, and laws. The comments and concerns related to program and policy issues are not considered to be specifically related to the proposed actions and are forwarded to the appropriate program offices for their consideration.

Use of Revenues Generated by OCS Leasing

Comments and concerns that relate to the use of revenues are issues under the direction of the Congress of the United States or the Department of the Interior, and their guiding regulations, statutes, and laws. The comments and concerns related to program and policy issues are not considered to be specifically related to the proposed actions and are forwarded to the appropriate program offices for their consideration.

2.3. PROPOSED CENTRAL GULF LEASE SALES

2.3.1. Alternative A — The Proposed Actions

2.3.1.1. Description

The proposed actions would offer for lease all unleased blocks within the CPA for oil and gas operations (Figure 1-1), with the following exceptions: Lund South Area (Area NG16-07) Blocks 172, 173, 213-217, 252-261, 296-305, and 349; and Amery Terrace Area (Area NG15-09) Blocks 235-238, 273-281, 309-320, and 355-359. The CPA encompasses about 47.8 million acres. It is estimated that a proposed action in the CPA could result in the discovery and production of 0.276-0.654 BBO and 1.590-3.300 tcf of gas.

The analyses of impacts summarized below and described in detail in Chapters 4.2.1 and 4.4.3 are based on the development scenario, which is a set of assumptions and estimates on the amounts, locations, and timing for OCS exploration, development, and production operations and facilities, both offshore and onshore. A detailed discussion of the development scenario and major related impact-producing factors is included in Chapters 4.1.1, 4.1.2, and 4.4.

2.3.1.2. Summary of Impacts

Impacts on Sensitive Coastal Environments

Coastal Barrier Beaches and Associated Dunes (Chapters 4.2.1.1.1 and 4.4.3.1.1)

The 0-1 pipeline landfalls projected in support of a proposed action are not expected to cause significant impacts to barrier beaches because of the use of nonintrusive installation methods. Existing facilities originally built inland may, through natural erosion and shoreline recession, be located in the barrier beach and dune zone and contribute to erosion there. A proposed action may contribute to the continued use of such facilities.

Maintenance dredging of barrier inlets and bar channels is expected to occur, which combined with channel jetties, generally causes minor and very localized impacts on adjacent barrier beaches downdrift of the channel due to sediment deprivation. The worst of these situations is found on the sediment-starved coasts of Louisiana, where sediments are largely organic. Based on use, a proposed action would account for a very small percentage of these impacts, which would occur whether a proposed action is implemented or not.

In conclusion, a proposed action is not expected to adversely alter barrier beach configurations significantly beyond existing, ongoing impacts in very localized areas downdrift of artificially jettied and

maintained channels. A proposed action may extend the life and presence of facilities in eroding areas, which can accelerate erosion there. Strategic placement of dredged material from channel maintenance, channel deepening, and related actions can mitigate adverse impacts upon those localized areas.

Should a spill contact a barrier beach, oiling is expected to be light and sand removal during cleanup activities minimized. No significant impacts to the physical shape and structure of barrier beaches and associated dunes are expected to occur as a result of a proposed action.

Wetlands (Chapters 4.2.1.1.2 and 4.4.3.1.2)

Loss of 0-40 ha of habitat is estimated as a result of 0-10 km of new pipelines projected as a result of a proposed action. Secondary impacts, such as continued widening of existing pipeline and navigation channels and canals and failure of mitigation structures, are also expected to affect the rate at which wetlands convert to open water.

Maintenance dredging of navigation channels and canals is expected to occur with minimal impacts; a proposed action is expected to contribute minimally to the need for this dredging. Alternative dredged-material disposal methods can be used to enhance and create coastal wetlands. By artificially keeping navigation channels open and with larger dimensions than would the region's natural hydrodynamic processes, maintenance dredging maintains tidal and storm flushing potential of inland regions at maximum capacities, as they relate to the described needs of the canal project. Without maintenance dredging, these channels would naturally fill in, reducing the channels' cross-sectional areas and their capacities to flush or drain a region when under the influences of storms and tides.

In conclusion, adverse initial impacts and more importantly secondary impacts of installation, maintenance, continued existence, and the failure of mitigation structures for pipeline and navigation canals are considered the most significant OCS-related and proposed-action-related impacts to wetlands. Although initial impacts are considered locally significant and are largely limited to where OCS-related canals and channels pass through wetlands, secondary impacts may have substantial, progressive, and cumulative adverse impacts to the hydrologic basin or subbasin in which they are found.

Offshore oil spills resulting from a proposed action are not expected to significantly damage inland wetlands; however, if an inland oil spill related to a proposed action occurs, some impact to wetland habitat would be expected. Although the impact may occur generally over coastal regions, the impact has the highest probability of occurring in the coastal regions, by and large northeast of Galveston County, in the vicinities where WPA oil is handled, and in and around Plaquemines and St. Bernard Parishes in the CPA.

Although the probability of occurrence is low, the greatest threat to wetland habitat is from an inland spill resulting from a vessel accident or pipeline rupture. While a resulting slick may cause minor impacts to wetland habitat and surrounding seagrass communities, the equipment and personnel used to clean up a slick over the impacted area may generate the greatest impacts to the area. Associated foot traffic may work oil farther into the sediment than would otherwise occur. Close monitoring and restrictions on the use of bottom-disturbing equipment would be needed to avoid or minimize those impacts.

Seagrass Communities (Chapters 4.2.1.1.3 and 4.4.3.1.3)

Most seagrass communities located between the Southwest Pass of the Mississippi River and Cape San Blas, Florida, are inland of the barrier shorelines. Pipeline construction in coastal waters would temporarily elevate turbidity in nearby submerged vegetation beds, depending upon currents. If constructed, the pipeline landfall would temporarily elevate turbidity in submerged vegetation beds near the pipeline routes. The Corps of Engineers (COE) and State permit requirements are expected to require pipeline routes that avoid beds of high-salinity, submerged vegetation and to reduce turbidity impacts to within tolerable limits. Hence, impacts to submerged vegetation by pipeline installation are projected to be very small and short term.

After bottom sediments are disturbed by pipeline installation, they will be generally more easily suspended by storms than before the disturbance. In estuaries, this increase is not projected to be a problem. Due to tidal flushing, this increased turbidity is projected to be below significant levels and to continue after storms for up to one month.

Beds of submerged vegetation within a channel's area of influence will have already adjusted to bed configurations in response to turbidity generated there. Very little, if any, damage would then occur as a

result of typical channel traffic. Generally, propwash will not resuspend sediments in navigation channels beyond pre-project conditions.

Depending upon the submerged plant species involved, narrow scars in dense portions of the beds will take 1-7 years to recover. Scars through sparser areas will take 10 years or more to recover. The broader the scar, the longer the recovery period. Extensive damage to a broad area may never be corrected.

Maintenance dredging will not have a substantial impact on existing seagrass habitat given that no new channels are expected to be dredged as a result of a CPA proposed action.

Should a spill $\geq 1,000$ bbl occur offshore from activities resulting from a proposed action, the seagrass communities with the highest probabilities of contact within 10 days would be those located within Matagorda County, Texas, for a proposed action in the WPA and within Plaquemines Parish, Louisiana, for a proposed action in the CPA.

Because of the location of most submerged aquatic vegetation, inshore spills pose the greatest threat to them. Such spills may result from either vessel collisions that release fuel and lubricants or from pipelines that rupture. If an oil slick settles into a protective embayment where seagrass beds are found, shading may cause reduced chlorophyll production; shading for more than about 2 weeks could cause thinning of leaf density. Under certain conditions, a slick could reduce dissolved oxygen in an embayment and cause stress to the bed and associated organisms due to reduced oxygen conditions. These light and oxygen problems can correct themselves once the slick largely vacates the embayment, and light and oxygen levels are returned to pre-slick conditions.

Increased water turbulence due to storms or vessel traffic will break apart the surface sheen and disperse some oil into the water column, as well as increase suspended particle concentration, which will adsorb to the dispersed oil. Typically, these situations will not cause long-term or permanent damage to the seagrass beds, although some dieback of leaves is projected for one growing season. No permanent loss of seagrass is projected to result from oil contact, unless an unusually low tidal event allows direct contact between the slick and vegetation. The greatest danger under the more probable circumstances is a reduction, for up to 2 years, of the diversity or population of epifauna and benthic fauna found in seagrass beds.

Although the probability of their occurrence is low, the greatest threat to inland, seagrass communities would be from an inland spill resulting from a vessel accident or pipeline rupture. Although a resulting slick may cause minor impacts to the bed, equipment and personnel used to clean up a slick over shallow seagrass beds may generate the greatest impacts to the area. Associated foot traffic may work oil farther into the sediment than would otherwise occur. Scarring may occur if an oil slick is cleaned up over a shallow submerged aquatic vegetation bed where vessels, booms, anchors, and personnel on foot would be used and scar the bed. Close monitoring and restrictions on the use of bottom-disturbing equipment would be needed to avoid or minimize those impacts.

Impacts on Sensitive Offshore Resources

Pinnacle Trend (Chapters 4.2.1.2.1 and 4.4.3.2.1)

Activities resulting from a proposed action in the CPA are not expected to adversely impact the pinnacle trend environment because of implementation of the Live Bottom Stipulation. No community-wide impacts are expected. The inclusion of the Live Bottom Stipulation would minimize the potential for mechanical damage. The impacts of a proposed action are expected to be infrequent because of the few operations in the vicinity of the pinnacles and the small size and dispersed nature of many of the features. Potential impacts from blowouts, pipeline emplacement, mud and cutting discharges, and structure removals would be minimized because of the proposed Live Bottom Stipulation and the low levels of oil and gas activities anticipated in the area. The frequency of impacts on the pinnacles would be rare, and the severity should be slight because of the widespread nature of the features. Impacts from accidents involving anchor placement on pinnacles (those actually crushed or subjected to abrasions) could be severe in a few areas.

With implementation of the Live Bottom Stipulation, there would be few operations in the vicinity of the pinnacles as a result of a proposed action. Because of this and the small size and dispersed nature of many of the features, impacts from accidental events as a result of a proposed action are expected to be infrequent. No community-wide impacts are expected. Potential impacts from blowouts would be

minimized because of the proposed Live Bottom Stipulation and the low levels of oil and gas activities anticipated in the area. Oil spills would not be followed by adverse impacts (e.g., high elevated decrease in live cover) because of the depth of the features and dilution of spills (by currents and the quickly rising oil). The frequency of impacts on the pinnacles would be rare, and the severity should be slight because of the widespread nature of the features.

Topographic Features (Chapters 4.2.1.2.2 and 4.4.3.2.2)

The proposed Topographic Features Stipulation could prevent most of the potential impacts on live-bottom communities from bottom-disturbing activities (structure removal and emplacement) and operational discharges. Recovery from impact incidences of operational discharges would take place within 10 years.

The proposed Topographic Features Stipulations will assist in preventing most of the potential impacts on live-bottom communities from blowouts and surface and subsurface oil spills. Recovery from incidences of impacts from blowouts would take place within 10 years.

Contact with spilled oil would cause lethal and sublethal effects in benthic organisms. The oiling of benthic organisms is not likely because the proposed Topographic Features Stipulations would keep subsurface sources of spills away from the immediate vicinity of topographic features. In the unlikely event that oil from a subsurface spill would reach the biota of a topographic feature, the effects would be primarily sublethal for adult sessile biota, including coral colonies in the case of the Flower Garden Banks, and there would be limited incidences of mortality. The recovery of harmed benthic communities could take more than 10 years.

Chemosynthetic Deepwater Benthic Communities (Chapters 4.2.1.2.3 and 4.4.3.2.3)

Chemosynthetic communities are susceptible to physical impacts from structure placement (including templates or subsea completions), anchoring, and pipeline installation. The provisions of NTL 2000-G20 greatly reduce the risk of these physical impacts by requiring avoidance of potential chemosynthetic communities identified on required geophysical survey records or by requiring photodocumentation to establish the absence of chemosynthetic communities prior to approval of the structure emplacement.

If the presence of a high-density community were missed using existing procedures, potentially severe or catastrophic impacts could occur due to raking of the sea bottom by anchors and anchor chains, and partial or complete burial by muds and cuttings associated with pre-riser discharges or some types of riserless drilling. Variations in the dispersal and toxicity of synthetic-based drilling fluids may contribute to the potential areal extent of these impacts. The severity of such an impact is such that there would be incremental losses of productivity, reproduction, community relationships, and overall ecological functions of the community, and incremental damage to ecological relationships with the surrounding benthos.

Studies indicate that periods as long as hundreds of years are required to reestablish a seep community once it has disappeared (depending on the community type), although it may reappear relatively quickly once the process begins, as in the case of a mussel community. Tube-worm communities may be the most sensitive of all communities because of the combined requirements of hard substrate and active hydrocarbon seepage. Mature tube-worm bushes have been found to be several hundred years old. There is evidence that substantial impacts on these communities would permanently prevent reestablishment.

A proposed action in the CPA is expected to cause little damage to the ecological function or biological productivity of the widespread, low-density chemosynthetic communities. The rarer, widely scattered, high-density, Bush Hill-type chemosynthetic communities could experience minor impacts from drilling discharges or resuspended sediments located at more than 1,500 ft away, as required by NTL 2000-G20.

Chemosynthetic communities could be susceptible to physical impacts from a blowout depending on bottom-current conditions. The provisions of NTL 2000-G20 greatly reduce the risk of these physical impacts by requiring avoidance of potential chemosynthetic communities identified on required geophysical survey records or by requiring photodocumentation to establish the absence of chemosynthetic communities prior to approval of the structure emplacement. There is evidence that

substantial impacts on these communities would permanently prevent reestablishment, particularly if hard substrate required for recolonization was buried.

Potential accidental impacts from the proposed actions are expected to cause little damage to the ecological function or biological productivity of the widespread, low-density chemosynthetic communities. The rarer, widely scattered, high-density, Bush Hill-type chemosynthetic communities located at more than 1,500 ft away from a blowout could experience minor impacts from resuspended sediments.

Nonchemosynthetic Deepwater Benthic Communities (Chapters 4.2.1.2.4 and 4.4.3.2.4)

Some impact to benthic communities from drilling and production activities would occur as a result of physical impact from structure placement (including templates or subsea completions), anchoring, and installation of pipelines regardless of their locations. Megafauna and infauna communities at or below the sediment/water interface would be impacted from the muds and cuttings normally discharged at the seafloor at the start of every new well prior to riser installation. The impact from muds and cuttings discharged at the surface are expected to be low in deep water. Drilling muds would not be expected to reach the bottom beyond a few hundred meters from the surface-discharge location, and cuttings would be dispersed. Even in situations where substantial burial of typical benthic communities occurred, recolonization from populations from neighboring substrate would be expected over a relatively short period of time for all size ranges of organisms, in a matter of days for bacteria and probably less than one year for most all macrofauna species.

Deepwater coral habitats and other potential hard-bottom communities not associated with chemosynthetic communities appear to be very rare. These unique communities are distinctive and similar in nature to protected pinnacles and topographic features on the continental shelf. Any hard substrate communities located in deep water would be particularly sensitive to impacts from OCS activities. Impacts to these sensitive habitats could permanently prevent recolonization with similar organisms requiring hard substrate.

A proposed action in the CPA is expected to cause little damage to the ecological function or biological productivity of the widespread, typical deep-sea benthic communities.

Accidental events resulting from the proposed actions are expected to cause little damage to the ecological function or biological productivity of the widespread, typical, deep-sea benthic communities. Some impact to benthic communities would occur as a result of impact from an accidental blowout. Megafauna and infauna communities at or below the sediment/water interface would be impacted by the physical disturbance of a blowout or by burial from resuspended sediments. Even in situations where substantial burial of typical benthic communities occurred, recolonization from populations from neighboring substrate would be expected over a relatively short period of time for all size ranges of organisms, in a matter of hours to days for bacteria and probably less than one year for most all macrofauna species.

Deepwater coral habitats and other potential hard-bottom communities not associated with chemosynthetic communities appear to be very rare. These unique communities are distinctive and similar in nature to protected pinnacles and topographic features on the continental shelf. Any hard substrate communities located in deep water would be particularly sensitive to impacts. Impacts to these sensitive habitats could permanently prevent recolonization with similar organisms requiring hard substrate, but adherence to the provisions of NTL 2000-G-20 should prevent all but minor impacts to hard-bottom communities beyond 454 m (1,500 ft).

A proposed action in the CPA is expected to cause little damage to the ecological function or biological productivity of the widespread, typical, deep-sea benthic communities.

Accidental events resulting from the proposed actions are expected to cause little damage to the ecological function or biological productivity of the widespread, typical, deep-sea benthic communities. Some impact to benthic communities would occur as a result of impact from an accidental blowout. Megafauna and infauna communities at or below the sediment/water interface would be impacted by the physical disturbance of a blowout or by burial from resuspended sediments.

Impacts on Water Quality

Coastal Waters (Chapters 4.2.1.3.1 and 4.4.3.3.1)

The primary impacting sources to water quality in coastal waters are point-source and nonpoint-source discharges from support facilities and vessel discharges. The impacts to coastal water quality from a proposed action in the CPA should be minimal as long as all regulatory requirements are met.

Spills <1,000 bbl are not expected to significantly impact water quality in coastal waters. Larger spills, however, could impact coastal water quality. Chemical spills and the accidental release of SBF are expected to have temporary localized impacts on water quality.

Marine Waters (Chapters 4.2.1.3.2 and 4.4.3.3.2)

During exploration and development drilling activities, the primary impacting sources to marine water quality are discharges of drilling fluids and cuttings. Impacting discharges during production activities are produced water and supply-vessel discharges. Impacts to marine waters from a proposed action in the CPA should be minimal as long as all regulatory requirements are followed.

Spills <1,000 bbl are not expected to significantly impact marine water quality. Larger spills, however, could impact marine water quality. Chemical spills, the accidental release of SBF, and blowouts are expected to have temporary localized impacts on marine water quality.

Impacts on Air Quality (Chapters 4.2.1.4 and 4.4.3.4)

Emissions of pollutants into the atmosphere from the activities associated with a proposed action are not projected to have significant impacts on onshore air quality because of the prevailing atmospheric conditions, emission heights, emission rates, and the distance of these emissions from the coastline. Emissions from proposed-action activities are not expected to have concentrations that would change onshore air-quality classifications. The OCS modeling results show that increases in onshore annual average concentrations of NO_x, SO_x, and PM₁₀ are estimated to be less than the maximum increases allowed in the PSD Class I area and the PSD Class II areas.

Accidents involving high concentrations of H₂S could result in deaths as well as environmental damage. Other emissions of pollutants into the atmosphere from accidental events as a result of a proposed action are not projected to have significant impacts on onshore air quality because of the prevailing atmospheric conditions, emissions height, emission rates, and the distance of these emissions from the coastline. These emissions are not expected to have concentrations that would change onshore air quality classifications. Increases in onshore annual average concentrations of NO_x, SO_x, and PM₁₀ are estimated to be less than maximum increases allowed under the PSD Class I and II program.

Impacts on Marine Mammals (Chapters 4.2.1.5 and 4.4.3.5)

Small numbers of marine mammals could be killed or injured by chance collision with service vessels and by eating indigestible debris, particularly plastic items, lost from service vessels, drilling rigs, and fixed and floating platforms. Deaths due to structure removals are not expected due to existing mitigation measures or those being developed for structures placed in oceanic waters. There is no conclusive evidence whether anthropogenic noise has or has not caused long-term displacements of, or reductions in, marine mammal populations. Contaminants in waste discharges and drilling muds might indirectly affect marine mammals through food-chain biomagnification, although the scope of effects and their magnitude are not known.

The routine activities of a proposed action is not expected to have long-term adverse effects on the size and productivity of any marine mammal species or population stock endemic to the northern Gulf of Mexico.

Accidental blowouts, oil spills, and spill-response activities resulting from a proposed action have the potential to impact marine mammals in the Gulf of Mexico. Characteristics of impacts (i.e., acute vs. chronic impacts) depend on the magnitude, frequency, location, and date of accidents; characteristics of spilled oil; spill-response capabilities and timing; and various meteorological and hydrological factors.

Populations of marine mammals in the northern Gulf will be exposed to residuals of oils spilled as a result of a proposed action during their lifetimes.

Impacts on Sea Turtles (Chapters 4.2.1.6 and 4.4.3.6)

Routine activities resulting from a proposed action have the potential to harm individual sea turtles. These animals could be impacted by the degradation of water quality resulting from operational discharges; noise generated by helicopter and vessel traffic, platforms, and drillships; brightly-lit platforms; explosive removals of offshore structures; vessel collisions; and jetsam and flotsam generated by service vessels and OCS facilities. Lethal effects are most likely to be from chance collisions with OCS service vessels and ingestion of plastic materials. "Takes" due to explosive removals are expected to be rare due to mitigation measures already established (e.g., NOAA Fisheries observer program) and in development. Most OCS activities are expected to have sublethal effects. Contaminants in waste discharges and drilling muds might indirectly affect sea turtles through food-chain biomagnification; there is uncertainty concerning the possible effects. Chronic sublethal effects (e.g., stress) resulting in persistent physiological or behavioral changes and/or avoidance of impacted areas could cause declines in survival or fecundity, and result in either population declines, however, such declines are not expected. The routine activities of a proposed action are unlikely to have significant adverse effects on the size and recovery of any sea turtle species or population in the Gulf of Mexico.

Accidental blowouts, oil spills, and spill-response activities resulting from a proposed action have the potential to impact small to large numbers of sea turtles in the Gulf of Mexico, depending on the magnitude and frequency of accidents, the ability to respond to accidents, the location and date of accidents, and various meteorological and hydrological factors. Populations of sea turtles in the northern Gulf will be exposed to residuals of oils spilled as a result of a proposed action during their lifetimes.

Impacts on the Alabama, Choctawhatchee, St. Andrew, and Perdido Key Beach Mice (Chapters 4.2.1.7 and 4.4.3.7)

An impact from a proposed action in the CPA on the Alabama, Choctawhatchee, St. Andrew, and Perdido Key beach mice is possible but unlikely. Impact may result from the consumption of beach trash and debris by beach mice, efforts to clean up trash and debris, and beach restoration activities.

Given the low probability of a spill $\geq 1,000$ bbl occurring and contacting within 10 days beaches adjacent to beach mice habitats and the necessity of storm surge for oil to reach beach mouse habitat and contact the beach mice, no direct impacts of oil spills on beach mice from the proposed action are expected to occur as a result of a proposed action in the CPA or WPA. Protective measures required under the Endangered Species Act should prevent any oil-spill response and cleanup activities from having significant impact to the beach mice and their habitat.

Impacts on Coastal and Marine Birds (Chapters 4.2.1.8 and 4.4.3.8)

The majority of effects resulting from a proposed action in the CPA on endangered/threatened and nonendangered/nonthreatened coastal and marine birds are expected to be sublethal: behavioral effects, sublethal exposure to or intake of OCS-related contaminants or discarded debris, temporary disturbances, and displacement of localized groups from impacted habitats. Chronic sublethal stress, however, is often undetectable in birds. As a result of stress, individuals may weaken, facilitating infection and disease; then, migratory species may not have the strength to reach their destination. No significant habitat impacts are expected to occur directly from routine activities resulting from a proposed action. Secondary impacts to coastal habitats will occur over the long term and may ultimately displace species from traditional sites to alternative sites.

Oil spills from a proposed action pose the greatest potential direct and indirect impacts to coastal and marine birds. Birds that are heavily oiled are usually killed. If physical oiling of individuals or local groups of birds occurs, some degree of both acute and chronic physiological stress associated with direct and secondary uptake of oil would be expected. Small coastal spills, pipeline spills, and spills from accidents in navigated waterways can contact and affect the different groups of coastal and marine birds, most commonly marsh birds, waders, waterfowl, and certain shorebirds. Lightly oiled birds can sustain tissue and organ damage from oil ingested during feeding and grooming, or that is inhaled. Stress and

shock enhance the effects of exposure and poisoning. Low levels of oil could stress birds by interfering with food detection, feeding impulses, predator avoidance, territory definition, homing of migratory species, susceptibility to physiological disorders, disease resistance, growth rates, reproduction, and respiration. Reproductive success can be affected by the toxins in oil. Indirect effects occur by fouling of nesting habitat, and displacement of individuals, breeding pairs, or populations to less favorable habitats.

Dispersants used in spill cleanup activity can have toxic effects similar to oil on the reproductive success of coastal and marine birds. The, air, vehicle, and foot traffic that takes place during shoreline clean up activity can disturb nesting populations and degrade or destroy habitat.

Impacts on the Gulf Sturgeon (Chapters 4.2.1.9 and 4.4.3.9)

Potential impacts on Gulf sturgeon may occur from resuspended sediments and OCS-related discharges, as well from nonpoint runoff from estuarine OCS-related facilities. The low toxicity of this pollution and the almost absent overlap between individual Gulf sturgeon and occurrence of contamination is expected to result in little impact of a proposed action on Gulf sturgeon. Routine activities resulting from a proposed action in the CPA are expected to have little effect on Gulf sturgeon.

The Gulf sturgeon could be impacted by oil spills resulting from a proposed action. Contact with spilled oil could cause irritation of gill epithelium and disturbance of liver function in Gulf sturgeon. The likelihood of spill occurrence and contact to the Gulf sturgeon as a result of a proposed action is very low.

Impacts on Fish Resources and Essential Fish Habitat (Chapters 4.2.1.10 and 4.4.3.10)

It is expected that coastal and marine environmental degradation from a proposed action would have little effect on fish resources or essential fish habitat (EFH). The impact of coastal and marine environmental degradation is expected to cause an undetectable decrease in fish resources or in EFH. Fish resources and EFH are expected to recover from more than 99 percent, but not all, of the expected coastal and marine environmental degradation. Fish populations, if left undisturbed, will regenerate in one generation, but any loss of wetlands as EFH would be permanent.

Offshore live bottoms will not be impacted. Offshore discharges and subsequent changes to marine water quality will be regulated by NPDES permits. At the expected level of impact, the resultant influence on fish resources and EFH would be negligible and indistinguishable from natural population variations.

Activities such as pipeline trenching and OCS discharge of drilling muds and produced water would cause negligible impacts and would not deleteriously affect fish resources or EFH. At the expected level of impact, the resultant influence on fish resources would cause less than a 1 percent change in fish populations or EFH. As a result, there would be little disturbance to fish resources or EFH.

A proposed action is expected to result in less than a 1 percent decrease in fish resources and/or standing stocks or in EFH. It would require one generation for fish resources to recover from 99 percent of the impacts. Recovery from the loss of wetlands habitat would probably not occur.

Accidental events resulting from oil and gas development in CPA and WPA lease sale areas of the Gulf of Mexico have the potential to cause some detrimental effects on fisheries and fishing practices. It is expected that subsurface blowouts that may occur as a result of a proposed action would have a negligible effect on Gulf fish resources or commercial fishing. If spills due to a proposed action were to occur in open waters of the OCS proximate to mobile adult finfish or shellfish, the effects would likely be sublethal and the extent of damage would be reduced due to the capability of adult fish and shellfish to avoid a spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The effect of proposed-action-related oil spills on fish resources and commercial fishing is expected to cause less than a 1 percent decrease in standing stocks of any population, commercial fishing efforts, landings, or value of those landings. Any affected commercial fishing activity will recover within 6 months. At the expected level of impact, the resultant influence on fish populations and commercial fishing activities within the CPA or WPA lease sale areas would be negligible and indistinguishable from variations due to natural causes.

It is expected that coastal environmental degradation from a proposed action would have little effect on fish resources or EFH; however, wetland loss could occur due to a petroleum spill contacting inland areas.

Impacts on Commercial Fisheries (Chapters 4.2.1.11 and 4.4.3.11)

Activities such as seismic surveys and pipeline trenching will cause negligible impacts and will not deleteriously affect commercial fishing activities. Operations such as production platform emplacement, underwater OCS impediments, and explosive platform removal, will cause slightly greater impacts on commercial fishing. At the expected level of impact, the resultant influence on commercial fishing will be indistinguishable from variations due to natural causes. As a result, there would be very little impact to commercial fishing. A proposed action is expected to result in less than a 1 percent change in activities, in pounds landed, or in the value of landings. It will require less than 6 months for fishing activity to recover from any impacts.

Accidental events resulting from oil and gas development in CPA and WPA lease sale areas of the Gulf of Mexico have the potential to cause some detrimental effects on fisheries and fishing practices. It is expected that subsurface blowouts that may occur as a result of a proposed action would have a negligible effect on Gulf fish resources or commercial fishing. If spills due to a proposed action were to occur in open waters of the OCS proximate to mobile adult finfish or shellfish, the effects would likely be sublethal and the extent of damage would be reduced due to the capability of adult fish and shellfish to avoid a spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The effect of proposed-action-related oil spills on fish resources and commercial fishing is expected to cause less than a 1 percent decrease in standing stocks of any population, commercial fishing efforts, landings, or value of those landings. Any affected commercial fishing activity will recover within 6 months. At the expected level of impact, the resultant influence on fish populations and commercial fishing activities within the CPA or WPA lease sale areas would be negligible and indistinguishable from variations due to natural causes.

Impacts on Recreational Beaches (Chapters 4.2.1.12 and 4.4.3.12)

Marine debris will be lost from time to time from operations resulting from a proposed action. The impact on Gulf Coast recreational beaches is expected to be minimal. The incremental increase in helicopter and vessel traffic is expected to add very little additional noise that may affect beach users. A proposed action is expected to result in nearshore operations that may adversely affect the enjoyment of some Gulf Coast beach uses; however, these will have little effect on the number of beach users.

It is unlikely that a spill would be a major threat to recreational beaches because any impacts would be short-term and localized. Should a spill contact a recreational beach, short-term displacement of recreational activity from the areas directly affected would occur. Beaches directly impacted would be expected to close for periods of 2-6 weeks, or until the cleanup operations were complete. Should a spill result in a large volume of oil contacting a beach or a large recreational area being contacted by an oil slick, visitation to the area could be reduced by as much as 5-15 percent for as long as one season, but such an event should have no long-term effect on tourism.

Tarballs can lessen the enjoyment of the recreational beaches but should have no long-term effect on the overall use of beaches.

Impacts on Archaeological Resources

Historic Archaeological Resources (Chapters 4.2.1.13.1 and 4.4.3.13.1)

The greatest potential impact to a historic archaeological resource as a result of a proposed action in the CPA would result from direct contact between an offshore activity (platform installation, drilling rig emplacement, and dredging or pipeline project) and a historic shipwreck. An MMS-funded study (Garrison et al., 1989) resulted in the redefinition of the high-probability areas for the location of historic period shipwrecks. An MMS review of the historic high-probability areas is occurring at the time of this writing. The NTL for archaeological resources surveys in the Gulf of Mexico Region, NTL 2002-G01, mandates a 50-m linespacing for remote-sensing surveys of leases within the high-probability areas for historic shipwrecks.

Ferromagnetic debris has the potential to mask the magnetic signatures of historic shipwrecks.

Maintenance dredging of navigation channels may result in impacts to historic shipwrecks; however, the percentage of OCS use of these channels under a proposed action is less than 1 percent.

Most other routine activities associated with a proposed action in the CPA are not expected to impact historic archaeological resources. It is conservatively assumed that about 2 percent of the OCS Program's use of projected onshore facilities will occur as a result of a proposed action. It is expected that archaeological resources will be protected through the review and approval processes of the various Federal, State, and local agencies involved in permitting onshore activities.

Offshore oil and gas activities resulting from a proposed action could contact a shipwreck because of incomplete knowledge on the location of shipwrecks in the Gulf. Although this occurrence is not probable, such an event would result in the disturbance or destruction of important historic archaeological information. Other factors associated with a proposed action in the CPA are not expected to affect historic archaeological resources.

Impact to a historic archaeological resource could occur as a result of an accidental spill. As indicated in Chapter 4.4.1, it is not very likely that an oil spill will occur and contact coastal historic archaeological sites from accidental events associated with a proposed action in the WPA or CPA. The major effect from an oil-spill impact would be visual contamination of a historic coastal site, such as a historic fort or lighthouse. As historic archaeological sites are protected under law, it is expected that any spill cleanup operations would be conducted in such a way as to cause little or no impacts to historic archaeological resources. These impacts would be temporary and reversible.

Prehistoric Archaeological Resources (Chapters 4.2.1.13.2 and 4.4.3.13.2)

Several impact-producing factors may threaten the prehistoric archaeological resources of the Central Gulf. An impact could result from a contact between an OCS activity (pipeline and platform installations, drilling rig emplacement and operation, dredging, and anchoring activities) and a prehistoric site located on the continental shelf. The archaeological survey and archaeological clearance of sites required prior to an operator beginning oil and gas activities on a lease are expected to be highly effective (90%) at identifying possible prehistoric sites. Since the survey and clearance provide a significant reduction in the potential for a damaging interaction between an impact-producing factor and a prehistoric site, there is a very small possibility of an OCS activity contacting a prehistoric site. Should such contact occur, there would be damage to or loss of significant and/or unique archaeological information.

Onshore development as a result of a proposed action could result in the direct physical contact from new facility construction, pipeline trenching, and new navigation canal dredging. Protection of archaeological resources in these cases is expected to be achieved through the various approval processes of the Federal, State, and local agencies involved.

A proposed action in the CPA is not expected to result in impacts to prehistoric archaeological sites; however, should such an impact occur, unique or significant archaeological information could be lost.

Accidental events producing oil spills may threaten the prehistoric archaeological resources of the Gulf Coast. Impacts to prehistoric sites could occur as a result of an oil spill. Should a spill contact an archaeological site, damage might include loss of radiocarbon-dating potential, direct impact from oil-spill cleanup equipment, and/or looting. Previously unrecorded sites could be impacted by oil-spill cleanup operations on beaches.

As indicated in Chapter 4.4.1, it is not very likely for an oil spill to occur and contact coastal and barrier island prehistoric sites as a result of a proposed action in the WPA or CPA. The proposed actions are not expected to result in impacts to prehistoric archaeological sites; however, should such an impact occur, unique or significant archaeological information could be lost and this impact would be irreversible.

Impacts on Human Resources and Land Use

Land Use and Coastal Infrastructure (Chapters 4.2.1.14.1 and 4.4.3.14.1)

A proposed action in the CPA would not require additional coastal infrastructure or alter the current land use of the analysis area.

Accidental events such as oil or chemical spills, blowouts, and vessel collisions would have no effects on land use. Coastal or nearshore spills could have short-term adverse effects on coastal infrastructure requiring cleanup of any oil or chemicals spilled.

Demographics (Chapters 4.2.1.14.2 and 4.4.3.14.2)

Activities relating to a proposed CPA lease sale are expected to minimally affect the analysis area's land use, infrastructure, and demography. These impacts are projected to mirror employment effects that are estimated to be negligible to any one subarea. Baseline patterns and distributions of these factors, as described in Chapter 3.3.3, are expected to maintain. Changes in land use throughout the analysis area are expected to be contained and minimal. The OCS-related infrastructure is in place and will not change as a result of a proposed action. Current baseline estimates of population growth for the analysis area show a continuation of growth, but at a slower rate.

Accidental events such as oil or chemical spills, blowouts, and vessel collisions would have no effects on the demographic characteristics of the Gulf coastal communities.

Economic Factors (Chapters 4.2.1.14.3 and 4.4.3.14.3)

Should a proposed CPA lease sale occur, there would be only minor economic changes in the Texas, Louisiana, Mississippi, and Alabama subareas. A proposed action is expected to generate less than a 1 percent increase in employment in any of these subareas. This demand will be met primarily with the existing population and available labor force. There would be very little to no economic stimulus in the Florida subareas.

While a proposed CPA lease sale will not significantly impact the analysis area, OCS activities from past and future OCS lease sales will continue to occur and impact the analysis area. In other words, even if a proposed action were not held, there would still be impacts from past and future OCS lease sales in the analysis area. The OCS-related impacts will continue even in the absence of a proposed action.

The opportunity costs (employment and revenues) associated with oil-spill cleanup activities is expected to be temporary and of short duration. It is not expected to exceed 1 percent of baseline employment for any subarea within the analysis area. A large oil spill resulting from the proposed actions would acutely threaten shoreline recreational beaches for up to 30 days. After that, natural processes such as weathering and dispersion significantly change the nature and form of the oil to the point that it is unlikely to be a major threat to beach recreational resources and activities.

Environmental Justice (Chapters 4.2.1.14.4 and 4.4.3.14.4)

Because of the existing extensive and widespread support system for OCS-related industry and associated labor force, the effects of a proposed action in the CPA are expected to be widely distributed and little felt. In general, who will be hired and where new infrastructure might be located is impossible to predict. Impacts related to a proposed action are expected to be economic and have a limited but positive effect on low-income and minority populations. Given the existing distribution of the industry and the limited concentrations of minority and low-income peoples, a proposed action is not expected to have a disproportionate effect on these populations.

Lafourche Parish will experience the most concentrated effects of a proposed action; however, because the parish is not heavily low-income or minority, because the Houma are not residentially segregated, and because the effects of road traffic and port expansion will not occur in areas of low-income or minority concentration, these groups will not be differentially affected. In general, the effects in Lafourche Parish are expected to be mostly economic and positive. A proposed action would help to maintain ongoing levels of activity rather than expand them. Future changes in activity levels will most likely be caused by fluctuations in oil prices and imports, and not by activities related to a proposed action. A proposed action is not expected to have disproportionate high/adverse environmental or health effects on minority or low-income people.

Considering the low likelihood of an oil spill and the nonhomogeneous population distribution along the Gulf of Mexico region, accidental spill events associated with a proposed action are not expected to have disproportionate adverse environmental or health effects on minority or low-income people.

2.3.1.3. Mitigating Measures

2.3.1.3.1. Topographic Features Stipulation

The topographic features of the Central Gulf provide habitat for coral reef community organisms (Chapter 3.2.2.2). These communities could be severely and adversely impacted by oil and gas activities resulting from the proposed actions if such activities took place on or near these communities without the Topographic Features Stipulation and if such activities were not mitigated. The DOI has recognized this problem for some years, and since 1973 stipulations have been made a part of leases on or near these biotic communities so that impacts from nearby oil and gas activities were mitigated to the greatest extent possible. This stipulation would not prevent the recovery of oil and gas resources but would serve to protect valuable and sensitive biological resources.

The Topographic Features Stipulation was formulated based on consultation with various Federal agencies and comments solicited from the States, industry, environmental organizations, and academic representatives. The stipulation is based on years of scientific information collected since the inception of the stipulation. This information includes various Bureau of Land Management/MMS-funded studies on the topographic highs in the Central Gulf; numerous stipulation-imposed, industry-funded monitoring reports; and the National Research Council (NRC) report entitled *Drilling Discharges in the Marine Environment* (1983). The location and lease status of the blocks affected by the Topographic Features Stipulation are shown on Figures 2-1 and 2-2.

The requirements in the stipulation are based on the following facts:

- (a) Shunting of the drilling effluent to the nepheloid layer confines the effluent to a level deeper than that of the living reef of a high-relief topographic feature. Shunting is therefore an effective measure for protecting the biota of high-relief topographic features (Bright and Rezak, 1978; Rezak and Bright, 1981; NRC, 1983).
- (b) The biological effect on the benthos from the deposition of nonshunted discharge is mostly limited to within 1,000 m of the discharge (NRC, 1983).
- (c) The biota of topographic features can be categorized into depth-related zones defined by degree of reef-building activity (Rezak and Bright, 1981; Rezak et al., 1983 and 1985).

The stipulation establishes No Activity Zones at the topographic features. A zone is defined by the 85-m bathymetric contour (isobath) since, generally, the biota shallower than 85 m are more typical of the Caribbean reef biota, while the biota deeper than 85 m are similar to soft-bottom organisms found throughout the Gulf. Where a topographic feature is in water depths less than 85 m, the deepest “closing” isobath defines the No Activity Zone for that area. Within the No Activity Zones, no operations, anchoring, or structures are allowed. Outside the No Activity Zones, additional restrictive zones are established where oil and gas operations could occur, but where drilling discharges would be shunted.

The stipulation requires that all effluents within 1,000 m of banks containing an antipatharian-transitional zone be shunted to within 10 m of the seafloor. Banks containing the more sensitive and productive algal-sponge zone require a shunt zone extending 1 nautical mile (nmi) and an additional 3-nmi shunt zone for development only.

The stipulation reads as follows:

Topographic Features Stipulation

- (a) No activity including structures, drilling rigs, pipelines, or anchoring will be allowed within the listed isobath (“No Activity Zone”) of the banks as listed above.
- (b) Operations within the area shown as “1,000-Meter Zone” shall be restricted by shunting all drill cuttings and drilling fluids to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom.

- (c) Operations within the area shown as “1-Mile Zone” shall be restricted by shunting all drill cuttings and drilling fluids to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom. (Where there is a “1-Mile Zone” designated, the “1,000-Meter Zone” in paragraph (b) is not designated.)
- (d) Operations within the area shown as “3-Mile Zone” shall be restricted by shunting all drill cuttings and drilling fluids from development operations to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom.

The banks and corresponding blocks to which this stipulation may be applied in the Central Gulf are as follows:

| Bank Name | Isobath (m) | Bank Name | Isobath (m) |
|---------------------------|-------------|---------------------------|-------------|
| Shelf Edge Banks | | Sweet Bank ¹ | 85 |
| McGrail Bank | 85 | Bright Bank | 85 |
| Bouma Bank | 85 | Geyer Bank ³ | 85 |
| Rezak Bank | 85 | MacNeil Bank ³ | 82 |
| Sidner Bank | 85 | Alderdice Bank | 80 |
| Rankin Bank | 85 | Midshelf Banks | |
| Sackett Bank ² | 85 | Fishnet Bank ² | 76 |
| Ewing Bank | 85 | 29 Fathom Bank | 64 |
| Diaphus Bank ² | 85 | Sonnier Bank | 55 |
| Parker Bank | 85 | | |
| Jakkula Bank | 85 | | |

¹ Only paragraph (a) of the stipulation applies.

² Only paragraphs (a) and (b) apply.

³ WPA bank with a portion of its “3-Mile Zone” in the CPA.

Effectiveness of the Lease Stipulation

The purpose of the stipulation is to protect the biota of the topographic features from adverse effects due to routine oil and gas activities. Such effects include physical damage from anchoring and rig emplacement and potential toxic and smothering effects from muds and cuttings discharges. The Topographic Features Stipulation has been used on leases since 1973, and this experience shows conclusively that the stipulation effectively prevents damage to the biota of these banks from routine oil and gas activities. Anchoring related to oil and gas activities on the sensitive portions of the topographic features has been prevented. Monitoring studies have demonstrated that the shunting requirements of the stipulations are effective in preventing the muds and cuttings from impacting the biota of the banks. The stipulation, if adopted for the proposed actions, will continue to protect the biota of the banks, specifically as discussed below.

Mechanical damage resulting from oil and gas operations is probably the single most serious impact to benthic habitat. Complying with the No Activity Zone designation of the Topographic Features Stipulation should completely eliminate this threat to the sensitive biota of WPA topographic features from activities resulting from the proposed actions. The sensitive biota within the zones provided for in the Topographic Features Stipulation will thus be protected.

Several other impact-producing factors may threaten communities associated with topographic features. Vessel anchoring and structure emplacement result in physical disturbance of benthic habitat and are the most likely activities to cause permanent or long-lasting impacts to sensitive offshore habitats. Recovery from damage caused by such activities may take 10 or more years (depending on the maturity of the impacted community). Operational discharges (drilling muds and cuttings, produced waters) may impact the biota of the banks due to turbidity and sedimentation, resulting in death to benthic organisms

in large areas. Recovery from such damage may take 10 or more years (depending on the maturity of the impacted community). Blowouts may cause similar damage to benthic biota by resuspending sediments, causing turbidity and sedimentation, which could ultimately have a lethal impact on benthic organisms. Recovery from such damage may take up to 10 years (depending on the maturity of the impacted community). Oil spills will cause damage to benthic organisms if the oil contacts the organisms; such contact is unlikely except from spills from blowouts. There have been few blowouts in the Gulf of Mexico. Structure removal using explosives can result in water turbidity, redeposition of sediments, and explosive shock-wave impacts. Recovery from such damage could take more than 10 years (depending on the maturity of the impacted community). The above activities, especially bottom-disturbing activities, have the greatest potential to severely impact the biota of topographic features. Those activities having the greatest impacts are also those most likely to occur. The proposed actions, without benefit of the Topographic Features Stipulation or comparable mitigation, are expected to have a severe impact on the sensitive offshore habitats of the topographic features.

The stipulation provides different levels of protection for banks in different categories as defined by Rezak and Bright (1981). The categories and their definitions are as follows:

- Category A: zone of major reef-building activity; maximum environmental protection recommended;
- Category B: zone of minor reef-building activity; environmental protection recommended;
- Category C: zone of negligible reef-building activity, but crustose algae present; environmental protection recommended; and
- Category D: zone of no reef-building or crustose algae; additional protection not necessary.

The stipulation requires that all effluents within 1,000 m of Sackett, Fishnet, and Diaphus Banks, categorized by Rezak and Bright (1981) as Category C banks, be shunted into the nepheloid layer; the potentially harmful materials in drilling muds will be trapped in the bottom boundary layer and will not move up the banks where the biota of concern are located. Surface drilling discharge at distances greater than 1,000 m from the bank is not expected to impact the biota.

The stipulation protects the remaining banks (Category A and B banks) with even greater restrictions. Surface discharge will not be allowed within 1 nmi of these more sensitive banks. Surface discharges outside of 1 nmi are not expected to impact the biota of the banks, as adverse effects from surface discharge are limited to 1,000 m. However, it is possible that, when multiple wells are drilled from a single platform (surface location), typical during development operations, extremely small amounts of muds discharged more than 1 nmi from the bank may reach the bank. In order to eliminate the possible cumulative effect of muds discharged during development drilling, the stipulation imposes a 3-Mile Zone within which shunting of development well effluent is required.

The stipulation would prevent damage to the biota of the banks from routine oil and gas activities resulting from the proposals, while allowing the development of nearby oil and gas resources. The stipulation will not protect the banks from the adverse effects of an accident such as a large blowout on a nearby oil or gas operation.

2.3.1.3.2. Live Bottom (Pinnacle Trend) Stipulation

The Live Bottom (Pinnacle Trend) Stipulation covers the pinnacle trend area of the CPA (Figure 2-3). A small portion of the northeastern CPA, including portions of 70 lease blocks (Figure 2-3), is characterized by a pinnacle trend, which is classified as a live bottom under the stipulation. The pinnacle trend extends into the northwest portion of the Eastern Planning Area (EPA). The pinnacles are a series of topographic irregularities with variable biotal coverage, which provide structural habitat for a variety of pelagic fish. The pinnacles in the region could be impacted from physical damage of unrestricted oil and gas activities, as noted in Chapter 4.2.1.2.1. The Live Bottom (Pinnacle Trend) Stipulation is intended to protect the pinnacle trend and the associated hard-bottom communities from damage and, at the same time, provide for recovery of potential oil and gas resources.

The stipulation reads as follows:

Live Bottom (Pinnacle Trend) Stipulation

(To be included only on leases in the following blocks: Main Pass Area, South and East Addition Blocks 190, 194, 198, 219-226, 244-266, 276-290; Viosca Knoll Area Blocks 473-476, 521, 522, 564, 565, 566, 609, 610, 654, 692-698, 734, 778.)

For the purpose of this stipulation, “live bottom areas” are defined as seagrass communities; or those areas which contain biological assemblages consisting of such sessile invertebrates as sea fans, sea whips, hydroids, anemones, ascidians, sponges, bryozoans, or corals living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; or areas whose lithotope favors the accumulation of turtles, fishes, and other fauna.

Prior to any drilling activities or the construction or placement of any structure for exploration or development on this lease, including, but not limited to, anchoring, well drilling, and pipeline and platform placement, the lessee will submit to the Regional Director (RD) a live bottom survey report containing a bathymetry map prepared utilizing remote sensing techniques. The bathymetry map shall be prepared for the purpose of determining the presence or absence of live bottoms which could be impacted by the proposed activity. This map shall encompass such an area of the seafloor where surface disturbing activities, including anchoring, may occur.

If it is determined that the live bottoms might be adversely impacted by the proposed activity, the RD will require the lessee to undertake any measure deemed economically, environmentally, and technically feasible to protect the pinnacle area. These measures may include, but are not limited to, the following:

- (a) the relocation of operations; and
- (b) the monitoring to assess the impact of the activity on the live bottoms.

Effectiveness of the Lease Stipulation

Through detection and avoidance, this stipulation minimizes the likelihood of mechanical damage from OCS activities associated with rig and anchor emplacement to the sessile and pelagic communities associated with the crest and flanks of such features. Since this area is subject to heavy natural sedimentation, this stipulation does not include any specific measures to protect the pinnacles from the discharge of effluents.

The sessile and pelagic communities associated with the crest and flanks of the pinnacle and hard-bottom features could be adversely impacted by oil and gas activities resulting from the proposed actions if such activities took place on or near these communities without the Live Bottom (Pinnacle Trend) Stipulation. For many years, this stipulation has been made a part of leases on blocks in the CPA on or near these biotic communities so that impacts from nearby oil and gas activities were mitigated to the greatest extent possible. This stipulation does not prevent the recovery of oil and gas resources; however, it does serve to protect valuable and sensitive biological resources.

Activities resulting from the proposed actions, particularly anchor damage to localized pinnacle areas, are expected to cause substantial damage to portions of the pinnacle trend environment because these activities are potentially destructive to the biological communities and could damage one or several individual pinnacles. The most potentially damaging of these are the impacts associated with mechanical damages that may result from anchors. However, the action is judged to be infrequent because of the limited operations in the vicinity of the pinnacles and the small size of many of the features. Minor impact is expected from large oil spills, blowouts, pipeline emplacement, muds and cuttings discharges, and structure removals. The frequency of impacts to the pinnacles is rare, and the severity is judged to be slight because of the widespread nature of the features within the pinnacle trend area. The proposed actions, without the benefit of the Live Bottom (Pinnacle Trend) Stipulation, could have an adverse impact on the pinnacle region, but such impact is expected to be of a localized nature. Impact from

mechanical damage including anchors could potentially be long term if the physical integrity of the pinnacles themselves became altered.

The pinnacle trend occurs as patchy regions within the general area of the eastern portion of the CPA (Ludwick and Walton, 1957; Vittor and Associates, Inc., 1985; Brooks and Giammona, 1990). The pinnacle trend also extends into the EPA. The stipulation would require the operators to locate the individual pinnacles and associated communities that may be present in the block. The stipulation requires that a survey be done to encompass the potential area of proposed surface disturbance and that a bathymetry map depicting any pinnacles in the vicinity be prepared from the survey. (Since it is the pinnacles themselves and the habitat they provide for various species that are sensitive to impacts from oil and gas activities, photo-documentation of the identified pinnacles is not warranted.) The MMS Gulf of Mexico Regional Director, through consultation with FWS, could then decide if pinnacles in the trend would be potentially impacted and, if so, require appropriate mitigative measures.

By identifying the individual pinnacles present at the activity site, the lessee would be directed to avoid placement of the drilling rig and anchors on the sensitive areas. Thus, mechanical damage to the pinnacles is eliminated when measures required by the stipulation are imposed. The stipulation does not address the discharge of effluents near the pinnacles because the pinnacle trend is subjected to heavy natural sedimentation and is at considerable depths. The rapid dilution of drill cuttings and muds will minimize the potential of significant concentration of effluents on the pinnacles.

2.3.1.3.3. Military Areas Stipulation

A standard military warning areas stipulation has been applied to all blocks leased in military areas in the Gulf of Mexico since 1977. Figure 2-4 shows the military warning areas in the Gulf of Mexico. This stipulation would be a part of any lease resulting from the proposed actions. The stipulation reads as follows:

Military Areas Stipulation

(a) *Hold and Save Harmless*

Whether compensation for such damage or injury might be due under a theory of strict or absolute liability or otherwise, the lessee assumes all risks of damage or injury to persons or property, which occur in, on, or above the OCS, to any persons or to any property of any person or persons who are agents, employees, or invitees of the lessee, its agents, independent contractors, or subcontractors doing business with the lessee in connection with any activities being performed by the lessee in, on, or above the OCS, if such injury or damage to such person or property occurs by reason of the activities of any agency of the United States Government, its contractors or subcontractors, or any of its officers, agents, or employees, being conducted as a part of, or in connection with, the programs and activities of the command headquarters listed in Table 2-1.

Notwithstanding any limitation of the lessee's liability in Section 14 of the lease, the lessee assumes this risk whether such injury or damage is caused in whole or in part by any act or omission, regardless of negligence or fault, of the United States, its contractors or subcontractors, or any of its officers, agents, or employees. The lessee further agrees to indemnify and save harmless the United States against all claims for loss, damage, or injury sustained by the lessee, or to indemnify and save harmless the United States against all claims for loss, damage, or injury sustained by the agents, employees, or invitees of the lessee, its agents, or any independent contractors or subcontractors doing business with the lessee in connection with the programs and activities of the aforementioned military installation, whether the same be caused in whole or in part by the negligence or fault of the United States, its contractors, or subcontractors, or any of its officers, agents, or employees and whether such claims might be sustained under a theory of strict or absolute liability or otherwise.

(b) Electromagnetic Emissions

The lessee agrees to control its own electromagnetic emissions and those of its agents, employees, invitees, independent contractors or subcontractors emanating from individual designated defense warning areas in accordance with requirements specified by the commander of the command headquarters listed in Table 2-1 to the degree necessary to prevent damage to, or unacceptable interference with Department of Defense flight, testing, or operational activities, conducted within individual designated warning areas. Necessary monitoring control and coordination with the lessee, its agents, employees, invitees, independent contractors, or subcontractors, will be effected by the commander of the appropriate onshore military installation conducting operations in the particular warning area; provided, however, that control of such electromagnetic emissions shall in no instance prohibit all manner of electromagnetic communication during any period of time between a lessee, its agents, employees, invitees, or independent contractors, or subcontractors and onshore facilities.

(c) Operational

The lessee, when operating or causing to be operated on its behalf, boat, ship, or aircraft traffic in the individual designated warning areas, shall enter into an agreement with the commander of the individual command headquarters listed in Table 2-1, upon utilizing an individual designated warning area prior to commencing such traffic. Such an agreement will provide for positive control of boats, ships, and aircraft operating into the warning areas at all times.

Effectiveness of the Lease Stipulation

The hold harmless section of the military stipulation serves to protect the U.S. Government from liability in the event of an accident involving the lessee and military activities. The actual operations of the military and the lessee and its agents will not be affected.

The electromagnetic emissions section of the stipulation requires the lessee and its agents to reduce and curtail the use of radio, CB, or other equipment emitting electromagnetic energy within some areas. This serves to reduce the impact of oil and gas activity on the communications of military missions and reduces the possible effects of electromagnetic energy transmissions on missile testing, tracking, and detonation.

The operational section requires notification to the military of oil and gas activity to take place within a military use area. This allows the base commander to plan military missions and maneuvers that will avoid the areas where oil and gas activities are taking place or to schedule around these activities. Prior notification helps reduce the potential impacts associated with vessels and helicopters traveling unannounced through areas where military activities are underway.

This stipulation reduces potential impacts, particularly in regards to safety, but does not reduce or eliminate the actual physical presence of oil and gas operations in areas where military operations are conducted. The reduction in potential impacts resulting from this stipulation makes multiple-use conflicts most unlikely. Without the stipulation, some potential conflict is likely. The best indicator of the overall effectiveness of the stipulation may be that there has never been an accident involving a conflict between military operations and oil and gas activities.

2.3.1.3.4. Blocks South of Baldwin County, Alabama, Stipulation

This stipulation will be included only on leases on blocks south of and within 15 mi of Baldwin County, Alabama.

Blocks South of Baldwin County, Alabama, Stipulation

In order to minimize visual impacts from development operations on these blocks, lessees will contact other lessees and operators of leases in the vicinity prior to submitting a

Development Operations Coordination Document (DOCD) to determine if existing or planned surface production structures can be shared. If feasible, the DOCD should reflect the results of any resulting sharing agreement, propose the use of subsea technologies, or propose another development scenario that does not involve new surface structures. If a feasible development scenario that does not call for new surface structure(s) cannot be formulated, the DOCD should ensure that they are the minimum necessary for the proper development of the block and that they will be constructed and placed, using orientation, camouflage, or other design measures, to limit their visibility from shore. The MMS will review and make decisions on the DOCD in accordance with applicable Federal regulations and MMS policies, and in consultation with the State of Alabama (Geological Survey/Oil and Gas Board).

Effectiveness of the Lease Stipulation

For several years, the Governor of Alabama has continually indicated opposition to new leasing south and within 15 mi of Baldwin County but has requested that, if the area is offered for lease, a lease stipulation to reduce the potential for visual impacts should be applied to all new leases in this area. Prior to the decision in 1999 on the Final Notice of Sale for Sale 172, the MMS, GOM OCS Regional Director, in consultation with the Geological Survey of Alabama/State Oil and Gas Board, developed a lease stipulation to be applied to any new leases within the 15-mi area to mitigate potential visual impacts. The stipulation specifies requirements for consultation that lessees must follow when developing plans for fixed structures. The stipulation has been continually adopted in annual Central Gulf of Mexico lease sales since 1999. It has been considered satisfactorily responsive to the concern of the Governor of Alabama and is proposed at this time for adoption in each of the future Central Gulf of Mexico lease sales in the current 5-Year Program, i.e., Sales 185, 190, 194, 198, and 201.

2.3.1.3.5. Law of the Sea Convention Royalty Payment Stipulation

This stipulation will be included in leases beyond the United States (U.S.) Exclusive Economic Zone (EEZ) in the area formerly known as the Western Gap.

Law of the Sea Convention Royalty Payment Stipulation

If the U.S. becomes a party to the 1982 Law of the Sea Convention (Convention) prior to or during the life of a lease issued by the U.S. on a block or portion of a block located beyond the U.S. EEZ and subject to such conditions that the Senate may impose through its constitutional role of advice and consent, then the following royalty payment lease provisions will apply to the lease so issued, consistent with Article 82 of the Convention:

1. The Convention requires payments annually by coastal States party to the Convention with respect to all production at a site after the first five years of production at that site. Any such payments will be made by the U.S. Government and not the lessee.
2. For the purpose of this stipulation regarding payments by the lessee to the U.S., a site is defined as an individual lease whether or not the lease is located in a unit.
3. For the purpose of this stipulation, the first production year begins on the first day of commercial production (excluding test production). Once a production year begins it shall run for a period of 365 days whether or not the lease produces continuously in commercial quantities. Subsequent production years shall begin on the anniversary date of first production.
4. If total lease production during the first five years following first production exceeds the total royalty suspension volume(s) provided in the lease terms, or through application and approval of relief from royalties, the following provisions of this stipulation will not apply. If after the first five years of

production but prior to termination of this lease, production exceeds the total royalty suspension volume(s) provided in the lease terms, or through application and approval of relief from royalties, the following provisions of this stipulation will no longer apply effective the day after the suspension volumes have been produced.

5. If, in any production year after the first five years of lease production, due to lease royalty suspension provisions or through application and approval of relief from royalties, no lease production royalty is due or payable by the lessee to the U.S., then the lessee will be required to pay, as stipulated in paragraph 9 below, Convention-related royalty in the following amount so that the required Convention payments may be made by the U.S. Government as provided under the Convention:
 - a. In the sixth year of production, one percent of the value of the sixth year's lease production saved, removed, or sold from the leased area;
 - b. After the sixth year of production, the Convention-related royalty payment rate shall increase by one percent for each subsequent year until the twelfth year and shall remain at seven percent thereafter until lease termination.
6. If the U.S. becomes a party to the Convention after the fifth year of production from the lease, and a lessee is required, as provided herein, to pay Convention-related royalty, the amount of the royalty due will be based on the above payment schedule as determined from first production.

For example, U.S. accession to the Convention in the tenth year of lease production would result in a Convention-related royalty payment of five percent of the value of the tenth year's lease production, saved, removed, or sold from the lease. The following year, a payment of six percent would be due, and so forth as stated above, up to a maximum of seven percent per year.
7. If, in any production year after the first five years of lease production, due to lease royalty suspension provisions or through application and approval of relief from royalties, lease production royalty is paid but is less than the payment provided for by the Convention, then the lessee will be required to pay to the U.S. Government the Convention-related royalty in the amount of the shortfall.
8. In determining the value of production from the lease if a payment of Convention-related royalty is to be made, the provisions of the lease and applicable regulations shall apply.
9. The Convention-related royalty payment(s) required under paragraphs 5 through 7 of this stipulation, if any, shall not be paid monthly but shall be due and payable to MMS on or before 30 days after the expiration of the relevant production lease year.
10. The lessee will receive royalty credit in the amount of the Convention-related royalty payment required under paragraphs 5 through 7 of this stipulation, which will apply to royalties due under the lease for which the Convention-related royalty accrued in subsequent periods as non-Convention related royalty payments become due.
11. Any lease production for which the lessee pays no royalty other than a Convention-related requirement, due to lease royalty suspension provisions or through application and approval of relief from royalties, will count against the lease's applicable royalty suspension or relief volume.

12. The lessee will not be allowed to apply or recoup any unused Convention-related credit(s) associated with a lease that has been relinquished or terminated.

Effectiveness of the Lease Stipulation

Adoption of this stipulation in future Western Gulf of Mexico lease sales in the current 5-Year Program, i.e., Sales 187, 192, 196, and 200, would ensure that blocks beyond the U.S. Exclusive Economic Zone (EEZ) in the area formerly known as the Western Gap would be offered consistent with both U.S. law (the OCSLA and the Truman Proclamation asserting U.S. dominion over our OCS to its farthest exploitable reach) and provisions of the 1982 Law of the Sea Convention, which is internally recognized, but not acceded to by the U.S. The Convention balances the extension of coastal Nation control over the natural resources of the continental margin seaward of 200 mi with a modest obligation on such Nations to share revenues from successful mineral development seaward of 200 mi. This proposed stipulation specifies royalty payment provisions that would facilitate the U.S. Government's ability to make any payment required by the Convention. It has continually been adopted for annual Western Gulf of Mexico lease sales since 2001.

2.3.2. Alternative B — The Proposed Actions Excluding the Unleased Blocks Near the Biologically Alternative B Sensitive Topographic Features

2.3.2.1. Description

This alternative would offer for lease all unleased blocks in the CPA, as described for the proposed actions, with the exception of any unleased blocks within the 167 blocks in the CPA that are subject to the Topographic Features Stipulation. As of June 6, 2002, 72 blocks of the 167 blocks were unleased. Although the blocks to be excluded contain oil and/or gas resources, this alternative would not change the resource estimate and activity ranges for the overall proposed actions. It is estimated that a proposed action in the CPA could result in the discovery and production of 0.276-0.654 BBO and 1.590-3.300 tcf of gas.

2.3.2.2. Summary of Impacts

The analyses of impacts summarized below and described in detail in Chapters 4.2.2 and 4.4.3 are based on the development scenario, which is a set of assumptions and estimates on the amounts, locations, and timing for OCS exploration, development, and production operations and facilities, both offshore and onshore. A detailed discussion of the development scenario and major related impact-producing factors is included in Chapters 4.1.1, 4.1.2, and 4.4.

The difference between the potential impacts described for Alternative A and those under Alternative B is that under Alternative B no oil and gas activity would take place in the unleased blocks within the 167 blocks subject to the Topographic Features Stipulation. The assumption that the levels of activity for Alternative B are essentially the same as those projected for the proposed actions leads to the conclusion that the impacts expected to result from Alternative B would be very similar to those described under the proposed actions (Chapter 4.2.1). Therefore, the regional impact levels for all resources, except for the topographic features, would be similar to those described under the proposed actions. This alternative, if adopted, would prevent any oil and gas activity whatsoever in the affected blocks; thus, it would eliminate any potential direct impacts to the biota of those blocks from oil and gas activities, which otherwise would be conducted within the blocks.

2.3.3. Alternative C — The Proposed Actions Excluding the Unleased Blocks within 15 Miles of the Baldwin County, Alabama, Coast

2.3.3.1. Description

This alternative would offer for lease all unleased blocks in the CPA, as described for the proposed actions, with the exception of any unleased blocks within 15 mi of the coast of Baldwin County, Alabama (Figure 2-5). Although the blocks to be excluded contain oil and/or gas resources, this alternative would

not change the resource estimate and activity ranges for the overall proposed actions. It is estimated that a proposed action in the CPA could result in the discovery and production of 0.276-0.654 BBO and 1.590-3.300 tcf of gas.

2.3.3.2. Summary of Impacts

The analyses of impacts summarized below and described in detail in Chapters 4.2.3 and 4.4.3 are based on the development scenario, which is a set of assumptions and estimates on the amounts, locations, and timing for OCS exploration, development, and production operations and facilities, both offshore and onshore. A detailed discussion of the development scenario and major related impact-producing factors is included in Chapters 4.1.1, 4.1.2, and 4.4.

The difference between the potential impacts described for Alternative A and those under Alternative C is that under Alternative C no oil and gas activity would take place in the unleased blocks within 15 mi of the Baldwin County coast. The assumption that the levels of activity for Alternative C are the essentially the same as those projected for the proposed actions leads to the conclusion that the impacts expected to result from Alternative C would be very similar to those described under the proposed actions (Chapter 4.2.1). Therefore, the regional impact levels for all resources, except recreational beaches, would be similar to those described under the proposed actions. This alternative, if adopted, would reduce the potential aesthetic impacts to recreational beaches along the Baldwin County coast.

2.3.4. Alternative D — No Action

2.3.4.1. Description

This alternative is equivalent to cancellation of one or more proposed CPA lease sales scheduled in the proposed *Outer Continental Shelf Oil and Gas Leasing Program: 2002-2007*. The opportunity for development of the estimated of 0.276-0.654 BBO and 1.590-3.300 tcf of gas could have resulted from any proposed action(s) would be precluded or postponed, and any potential environmental impacts resulting from the proposed action(s) would not occur or would be postponed.

2.3.4.2. Summary of Impacts

If Alternative D is selected, all impacts, positive and negative, associated with the proposed actions would not occur. This alternative would therefore result in no effect on the sensitive resources and activities discussed in Chapters 4.2.4 and 4.4.3. The incremental contribution of any of the proposed sales to cumulative effects would not occur, but effects from other activities, including other OCS sales, would remain. Oil-spill risk could increase due to the importation of foreign oil to replace the resources lost through cancellation of any of the proposed actions.

Strategies that could provide replacement resources for lost domestic OCS oil and gas production include a combination of energy conservation; onshore domestic oil and gas supplies; alternative energy sources; and imports of oil, natural gas, and liquefied natural gas. Market forces are assumed to be the predominant factor in determining substitutes for OCS oil and gas. Based on this, increased imports of foreign oil are assumed to be the largest replacement source. Much of this imported oil would enter the United States through the Gulf of Mexico, thus increasing the risks due to tanker spills. Potential alternative energy sources are discussed in the Final EIS for the *Outer Continental Shelf Oil and Gas Leasing Program: 1997-2002*.

2.4. PROPOSED WESTERN GULF LEASE SALES

2.4.1. Alternative A — The Proposed Actions

2.4.1.1. Description

The proposed actions would offer for lease all unleased blocks within the WPA for oil and gas operations (Figure 1-1), with the following exceptions: High Island Area East Addition, South Extension, Blocks A-375 and A -376; Sigsbee Escarpment Area (Area NG15-08) Blocks 11-14, 57-60, 103-106, 148-151, 194-196, 239-241, 285-298, and 331-349; and Keathley Canyon Area (Area NG15-05) Blocks

978-980. The WPA encompasses about 35.9 million acres. The estimated amount of resources projected to be developed as a result of any one proposed WPA lease sale is 0.136-0.262 BBO and 0.810-1.440 tcf of gas.

The analyses of impacts summarized below and described in detail in Chapters 4.3.1 and 4.4.3 are based on the development scenario, which is a set of assumptions and estimates on the amounts, locations, and timing for OCS exploration, development, and production operations and facilities, both offshore and onshore. A detailed discussion of the development scenario and major related impact-producing factors is included in Chapters 4.1.1, 4.1.2, and 4.4.

2.4.1.2. Summary of Impacts

Impacts on Sensitive Coastal Environments

Coastal Barrier Beaches and Associated Dunes (Chapters 4.3.1.1.1 and 4.4.3.1.1)

The 0-1 pipeline landfalls projected in support of a proposed action are not expected to cause significant impacts to barrier beaches because of the use of nonintrusive installation methods. Existing facilities originally built inland may, through natural erosion and shoreline recession, be located in the barrier beach and dune zone and contribute to erosion there. A proposed action may contribute to the continued use of such facilities.

Maintenance dredging of barrier inlets and bar channels is expected to occur, which combined with channel jetties, generally causes minor and very localized impacts on adjacent barrier beaches downdrift of the channel due to sediment deprivation. Based on use, a proposed action would account for a very small percentage of these impacts, which would occur whether a proposed action is implemented or not.

In conclusion, a proposed action is not expected to adversely alter barrier beach configurations significantly beyond existing, ongoing impacts in very localized areas downdrift of artificially jettied and maintained channels. A proposed action may extend the life and presence of facilities in eroding areas, which can accelerate erosion there. Strategic placement of dredged material from channel maintenance, channel deepening, and related actions can mitigate adverse impacts upon those localized areas.

Should a spill contact a barrier beach, oiling is expected to be light and sand removal during cleanup activities minimized. No significant impacts to the physical shape and structure of barrier beaches and associated dunes are expected to occur as a result of a proposed action.

Wetlands (Chapters 4.3.1.1.2 and 4.4.3.1.2)

A proposed action is projected to contribute to the construction of 0-1 new onshore pipelines in the WPA; therefore, the projected impact to wetlands from pipeline emplacement is expected to be minimal. As a secondary impact, some wetlands could potentially be converted to open water by continued widening of existing pipeline and navigational canals.

Maintenance dredging of navigation channels related to a proposed action is expected to occur with minimal impacts. Alternative dredged-material disposal methods can be used to enhance and create coastal wetlands.

Deepening an existing channel to accommodate larger service vessels may occur within the previously described environment(s) and could generate the creation of a small area of wetland that would be attributable to a proposed action.

In conclusion, adverse impacts of installation, maintenance, continued existence, and the failure of mitigation structures of pipeline and especially navigation canals are considered the most significant, proposed-action-related impacts to wetlands.

Offshore oil spills resulting from a proposed action are not expected to significantly damage inland wetlands; however, if an inland oil spill related to a proposed action occurs, some impact to wetland habitat would be expected. Although the impact may occur generally over coastal regions, the impact has the highest probability of occurring in the coastal regions, by and large northeast of Galveston County, in the vicinities where WPA oil is handled, and in and around Plaquemines and St. Bernard Parishes in the CPA.

Although the probability of occurrence is low, the greatest threat to wetland habitat is from an inland spill resulting from a vessel accident or pipeline rupture. While a resulting slick may cause minor impacts to wetland habitat and surrounding seagrass communities, equipment and personnel used to cleanup a

slick over the impacted area may generate the greatest direct impacts to the area. Associated foot traffic may work oil farther into the sediment than would otherwise occur. In addition, close monitoring and restrictions on the use of bottom-disturbing equipment would be needed to avoid or minimize those impacts.

Seagrass Communities (Chapters 4.3.1.1.3 and 4.4.3.1.3)

Most seagrass communities located within a WPA proposed action are located behind the barrier islands, sparsely distributed in bays and estuaries along coastal Louisiana and Texas, including the Tamaulipas, Mexico Laguna Madre Pipeline construction in coastal waters would temporarily elevate turbidity in nearby submerged vegetation beds, depending upon currents. If constructed, the pipeline landfall would temporarily elevate turbidity in submerged vegetation beds near the pipeline routes. The COE and State permit requirements are expected to require pipeline routes that avoid beds of high-salinity, submerged vegetation and to reduce turbidity impacts to within tolerable limits. Therefore, impacts to submerged vegetation by pipeline installation are projected to be very small and short term. Petroleum reservoirs in deepwater areas could require their own pipeline landfall.

After bottom sediments are disturbed by pipeline installation, they will be generally more easily suspended by storms than before the disturbance. In estuaries, this increase is not projected to be a problem. Due to tidal flushing, this increased turbidity is projected to be below significant levels and to continue after storms for up to one month.

Beds of submerged vegetation within a channel's area of influence will have already adjusted to bed configurations in response to turbidity generated there. Very little, if any, damage would then occur as a result of typical channel traffic. Generally, propwash will not resuspend sediments in navigation channels beyond pre-project conditions.

Depending upon the submerged plant species involved, narrow scars in dense portions of the beds will take 1-7 years to recover. Scars through sparser areas will take 10 years or more to recover. The broader the scar, the longer the recovery period. Extensive damage to a broad area may never be corrected.

Maintenance dredging will not have a substantial impact on existing seagrass habitat given that no new channels are expected to be dredged as a result of a WPA proposed action.

Should a spill $\geq 1,000$ bbl occur offshore from activities resulting from a proposed action, the seagrass communities with the highest probabilities of contact within 10 days would be those located within Matagorda County, Texas, for a proposed action in the WPA and Plaquemines Parish, Louisiana, for a proposed action in the CPA.

Because of the location of most submerged aquatic vegetation, inshore spills pose the greatest threat to them. Such spills may result from either vessel collisions that release fuel and lubricants or from pipelines that rupture. If an oil slick settles into a protective embayment where seagrass beds are found, shading may cause reduced chlorophyll production; shading for more than about 2 weeks could cause thinning of leaf density. Under certain conditions, a slick could reduce dissolved oxygen in an embayment and cause stress to the bed and associated organisms due to reduced oxygen conditions. These light and oxygen problems can correct themselves once the slick largely vacates the embayment, and light and oxygen levels are returned to pre-slick conditions.

Increased water turbulence due to storms or vessel traffic will break apart the surface sheen and disperse some oil into the water column, as well as increase suspended particle concentration, which will adsorb to the dispersed oil. Typically, these situations will not cause long-term or permanent damage to the seagrass beds, although some dieback of leaves is projected for one growing season. No permanent loss of seagrass is projected to result from oil contact, unless an unusually low tidal event allows direct contact between the slick and vegetation. The greatest danger under the more probable circumstances is a reduction, for up to 2 years, of the diversity or population of epifauna and benthic fauna found in seagrass beds.

Although the probability of their occurrence is low, the greatest threat to inland, seagrass communities would be from an inland spill resulting from a vessel accident or pipeline rupture. Although a resulting slick may cause minor impacts to the bed, equipment and personnel used to cleanup a slick over shallow seagrass beds may generate the greatest direct impacts to the area. Associated foot traffic may work oil farther into the sediment than would otherwise occur. Scarring may occur if an oil slick is cleaned up over a shallow submerged aquatic vegetation bed where vessels, booms, anchors, and

personnel on foot would be used and scar the bed. Close monitoring and restrictions on the use of bottom-disturbing equipment would be needed to avoid or minimize those impacts.

Impacts on Sensitive Offshore Resources

Topographic Features (Chapters 4.3.1.2.1 and 4.4.3.2.1)

The proposed Topographic Features Stipulation could prevent most of the potential impacts on live-bottom communities from bottom-disturbing activities (structure removal and emplacement) and operational discharges. Recovery from impact incidences of operational discharges would take place within 10 years.

The proposed Topographic Features Stipulations will assist in preventing most of the potential impacts on live-bottom communities from blowouts and surface and subsurface oil spills. Recovery from incidences of impacts from blowouts would take place within 10 years.

Contact with spilled oil would cause lethal and sublethal effects in benthic organisms. The oiling of benthic organisms is not likely because the proposed Topographic Features Stipulations would keep subsurface sources of spills away from the immediate vicinity of topographic features. In the unlikely event that oil from a subsurface spill would reach the biota of a topographic feature, the effects would be primarily sublethal for adult sessile biota, including coral colonies in the case of the Flower Garden Banks, and there would be limited incidences of mortality. The recovery of harmed benthic communities could take more than 10 years.

Chemosynthetic Deepwater Benthic Communities Chapters 4.3.1.2.2 and 4.4.3.2.3)

Chemosynthetic communities are susceptible to physical impacts from structure placement (including templates or subsea completions), anchoring, and pipeline installation. The provisions of NTL 2000-G20 greatly reduce the risk of these physical impacts by requiring avoidance of potential chemosynthetic communities identified on required geophysical survey records or by requiring photodocumentation to establish the absence of chemosynthetic communities prior to approval of the structure emplacement.

If the presence of a high-density community were missed using existing procedures, potentially severe or catastrophic impacts could occur due to raking of the sea bottom by anchors and anchor chains and partial or complete burial by muds and cuttings associated with pre-riser discharges or some types of riserless drilling. Variations in the dispersal and toxicity of synthetic-based drilling fluids may contribute to the potential areal extent of these impacts. The severity of such an impact is such that there would be incremental losses of productivity, reproduction, community relationships, and overall ecological functions of the community, and incremental damage to ecological relationships with the surrounding benthos.

Studies indicate that periods as long as hundreds of years are required to reestablish a seep community once it has disappeared (depending on the community type), although it may reappear relatively quickly once the process begins, as in the case of a mussel community. Tube-worm communities may be the most sensitive of all communities because of the combined requirements of hard substrate and active hydrocarbon seepage. Mature tube-worm bushes have been found to be several hundred years old. There is evidence that substantial impacts on these communities would permanently prevent reestablishment.

A proposed action in the WPA is expected to cause little damage to the ecological function or biological productivity of the widespread, low-density chemosynthetic communities. The rarer, widely scattered, high-density, Bush Hill-type chemosynthetic communities could experience minor impacts from drilling discharges or resuspended sediments located at more than 1,500 ft away as required by NTL 2000-G20.

Chemosynthetic communities could be susceptible to physical impacts from a blowout depending on bottom-current conditions. The provisions of NTL 2000-G20 greatly reduce the risk of these physical impacts by requiring avoidance of potential chemosynthetic communities identified on required geophysical survey records or by requiring photodocumentation to establish the absence of chemosynthetic communities prior to approval of the structure emplacement. There is evidence that substantial impacts on these communities would permanently prevent reestablishment, particularly if hard substrate required for recolonization were to be buried.

Potential accidental impacts from the proposed actions are expected to cause little damage to the ecological function or biological productivity of the widespread, low-density chemosynthetic communities. The rarer, widely scattered, high-density, Bush Hill-type chemosynthetic communities located at more than 1,500 ft away from a blowout could experience minor impacts from resuspended sediments.

Nonchemosynthetic Deepwater Benthic Communities (Chapters 4.3.1.2.3 and 4.4.3.2.4)

Some impact to benthic communities from drilling and production activities would occur as a result of physical impact from structure placement (including templates or subsea completions), anchoring, and installation of pipelines regardless of their locations. Megafauna and infauna communities at or below the sediment/water interface would be impacted from the muds and cuttings normally discharged at the seafloor at the start of every new well prior to riser installation. The impact from muds and cuttings discharged at the surface are expected to be low in deep water. Drilling muds would not be expected to reach the bottom beyond a few hundred meters from the surface-discharge location, and cuttings would be dispersed. Even in situations where substantial burial of typical benthic communities occurred, recolonization from populations from neighboring substrate would be expected over a relatively short period of time for all size ranges of organisms, in a matter of days for bacteria and probably less than 1 year for most all macrofauna species.

Deepwater coral habitats and other potential hard-bottom communities not associated with chemosynthetic communities appear to be very rare. These unique communities are distinctive and similar in nature to protected pinnacles and topographic features on the continental shelf. Any hard substrate communities located in deep water would be particularly sensitive to impacts from OCS activities. Impacts to these sensitive habitats could permanently prevent recolonization, with similar organisms requiring hard substrate.

A proposed action in the WPA is expected to cause little damage to the ecological function or biological productivity of the widespread, typical deep-sea benthic communities.

Accidental events resulting from the proposed actions are expected to cause little damage to the ecological function or biological productivity of the widespread, typical, deep-sea benthic communities. Some impact to benthic communities would occur as a result of impact from an accidental blowout. Megafauna and infauna communities at or below the sediment/water interface would be impacted by the physical disturbance of a blowout or by burial from resuspended sediments.

Impacts on Water Quality

Coastal Waters (Chapters 4.3.1.3.1 and 4.4.3.3.1)

The primary impacting sources to water quality in coastal waters are point-source and nonpoint-source discharges from support facilities and vessel discharges. The impacts to coastal water quality from a proposed action in the WPA should be minimal as long as all regulatory requirements are met.

Spills <1,000 bbl are not expected to significantly impact water quality in coastal waters. Larger spills, however, could impact water quality. Chemical spills and the accidental release of SBF are expected to have temporary localized impacts on water quality.

Marine Waters (Chapters 4.3.1.3.2 and 4.4.3.3.2)

During exploration and development drilling activities, the primary impacting sources to marine water quality are discharges of drilling fluids and cuttings. Impacting discharges during production activities are produced water and supply-vessel discharges. Impacts to marine waters from a proposed action in the WPA should be minimal as long as all regulatory requirements are followed.

Spills <1,000 bbl are not expected to significantly impact marine water quality. Larger spills, however, could impact marine water quality. Chemical spills, the accidental release of SBF, and blowouts are expected to have temporary localized impacts on marine water quality.

Impacts on Air Quality (Chapters 4.3.1.4 and 4.4.3.4)

Emissions of pollutants into the atmosphere from the activities associated with a proposed action are not projected to have significant impacts on onshore air quality because of the prevailing atmospheric conditions, emission heights, emission rates, and the distance of these emissions from the coastline. Emissions from proposed-action activities are not expected to have concentrations that would change onshore air-quality classifications. The OCS modeling results show that increases in onshore annual average concentrations of NO_x, SO_x, and PM₁₀ are estimated to be less than the maximum increases allowed in the PSD Class II areas.

Accidents involving high concentrations of H₂S could result in deaths as well as environmental damage. Other emissions of pollutants into the atmosphere from accidental events as a result of a proposed action are not projected to have significant impacts on onshore air quality because of the prevailing atmospheric conditions, emissions height, emission rates, and the distance of these emissions from the coastline. These emissions are not expected to have concentrations that would change onshore air quality classifications. Increases in onshore annual average concentrations of NO_x, SO_x, and PM₁₀ are estimated to be less than maximum increases allowed under the PSD Class I and II program.

Impacts on Marine Mammals (Chapters 4.3.1.5 and 4.4.3.5)

Small numbers of marine mammals could be killed or injured by chance collision with service vessels and by eating indigestible debris, particularly plastic items, lost from service vessels, drilling rigs, and fixed and floating platforms. Deaths due to structure removals are not expected due to existing mitigation measures or those being developed for structures placed in oceanic waters. There is no conclusive evidence whether anthropogenic noise has or has not caused long-term displacements of, or reductions in, marine mammal populations. Contaminants in waste discharges and drilling muds might indirectly affect marine mammals through food-chain biomagnification, although the scope of effects and their magnitude are not known.

The routine activities of a proposed action is not expected to have long-term adverse effects on the size and productivity of any marine mammal species or population stock endemic to the northern Gulf of Mexico.

Accidental blowouts, oil spills, and spill-response activities resulting from a proposed action have the potential to impact marine mammals in the Gulf of Mexico. Characteristics of impacts (i.e., acute vs. chronic impacts) depend on the magnitude, frequency, location, and date of accidents; characteristics of spilled oil; spill-response capabilities and timing; and various meteorological and hydrological factors. Populations of marine mammals in the northern Gulf will be exposed to residuals of oils spilled as a result of a proposed action during their lifetimes.

Impacts on Sea Turtles (Chapters 4.3.1.6 and 4.4.3.6)

Routine activities resulting from a proposed action have the potential to harm sea turtles. These animals could be impacted by the degradation of water quality resulting from operational discharges; noise generated by helicopter and vessel traffic, platforms, and drillships; brightly-lit platforms; explosive removals of offshore structures; vessel collisions; and jetsam and flotsam generated by service vessels and OCS facilities. Lethal effects are most likely to be from chance collisions with OCS service vessels and ingestion of plastic materials. "Takes" due to explosive removals are expected to be rare due to mitigation measures already established (e.g., NOAA Fisheries observer program) and in development. Most OCS activities are expected to have sublethal effects. Contaminants in waste discharges and drilling muds might indirectly affect sea turtles through food-chain biomagnification; there is uncertainty concerning the possible effects. Chronic sublethal effects (e.g., stress) resulting in persistent physiological or behavioral changes and/or avoidance of impacted areas could cause declines in survival or fecundity and result in either population declines; however, such declines are not expected. The routine activities of a proposed action are unlikely to have significant adverse effects on the size and recovery of any sea turtle species or population in the Gulf of Mexico.

Accidental blowouts, oil spills, and spill-response activities resulting from a proposed action have the potential to impact small to large numbers of sea turtles in the Gulf of Mexico, depending on the magnitude and frequency of accidents, the ability to respond to accidents, the location and date of

accidents, and various meteorological and hydrological factors. Populations of sea turtles in the northern Gulf will be exposed to residuals of oils spilled as a result of a proposed action during their lifetimes.

Impacts on Coastal and Marine Birds (Chapters 4.3.1.7 and 4.4.3.8)

The majority of effects resulting from a proposed action in the WPA on endangered/threatened and nonendangered/nonthreatened coastal and marine birds are expected to be sublethal: behavioral effects, sublethal exposure to or intake of OCS-related contaminants or discarded debris, temporary disturbances, and displacement of localized groups from impacted habitats. Chronic sublethal stress, however, is often undetectable in birds. As a result of stress, individuals may weaken, facilitating infection and disease; then, migratory species may not have the strength to reach their destination. No significant habitat impacts are expected to occur directly from routine activities resulting from a proposed action. Secondary impacts to coastal habitats will occur over the long term and may ultimately displace species from traditional sites to alternative sites.

Oil spills from a proposed action pose the greatest potential direct and indirect impacts to coastal and marine birds. Birds that are heavily oiled are usually killed. If physical oiling of individuals or local groups of birds occurs, some degree of both acute and chronic physiological stress associated with direct and secondary uptake of oil would be expected. Small coastal spills, pipeline spills, and spills from accidents in navigated waterways can contact and affect the different groups of coastal and marine birds, most commonly marsh birds, waders, waterfowl, and certain shorebirds. Lightly oiled birds can sustain tissue and organ damage from oil ingested during feeding and grooming, or that is inhaled. Stress and shock enhance the effects of exposure and poisoning. Low levels of oil could stress birds by interfering with food detection, feeding impulses, predator avoidance, territory definition, homing of migratory species, susceptibility to physiological disorders, disease resistance, growth rates, reproduction, and respiration. Reproductive success can be affected by the toxins in oil. Indirect effects occur by fouling of nesting habitat, and displacement of individuals, breeding pairs, or populations to less favorable habitats.

Dispersants used in spill cleanup activity can have toxic effects similar to oil on the reproductive success of coastal and marine birds. The, air, vehicle, and foot traffic that takes place during shoreline clean up activity can disturb nesting populations and degrade or destroy habitat.

Impacts on Fish Resources and Essential Fish Habitat (Chapters 4.3.1.8 and 4.4.3.10)

It is expected that coastal and marine environmental degradation from a proposed action would have little effect on fish resources or EFH. The impact of coastal and marine environmental degradation is expected to cause an undetectable decrease in fish resources or in EFH. Fish resources and EFH are expected to recover from more than 99 percent, but not all, of the expected coastal and marine environmental degradation. Fish populations, if left undisturbed, will regenerate in one generation, but any loss of wetlands as EFH would be permanent.

Offshore live bottoms will not be impacted. Offshore discharges and subsequent changes to marine water quality will be regulated by NPDES permits. At the expected level of impact, the resultant influence on fish resources and EFH would be negligible and indistinguishable from natural population variations.

Activities such as pipeline trenching and OCS discharge of drilling muds and produced water would cause negligible impacts and would not deleteriously affect fish resources or EFH. At the expected level of impact, the resultant influence on fish resources would cause less than a 1 percent change in fish populations or EFH. As a result, there would be little disturbance to fish resources or EFH.

A proposed action is expected to result in less than a 1 percent decrease in fish resources and/or standing stocks or in EFH. It would require one generation for fish resources to recover from 99 percent of the impacts. Recovery from the loss of wetlands habitat would probably not occur.

Accidental events resulting from oil and gas development in CPA and WPA lease sale areas of the Gulf of Mexico have the potential to cause some detrimental effects on fisheries and fishing practices. It is expected that subsurface blowouts that may occur as a result of a proposed action would have a negligible effect on Gulf fish resources or commercial fishing. If spills due to a proposed action were to occur in open waters of the OCS proximate to mobile adult finfish or shellfish, the effects would likely be sublethal and the extent of damage would be reduced due to the capability of adult fish and shellfish to avoid a spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The

effect of proposed-action-related oil spills on fish resources and commercial fishing is expected to cause less than a 1 percent decrease in standing stocks of any population, commercial fishing efforts, landings, or value of those landings. Any affected commercial fishing activity will recover within 6 months. At the expected level of impact, the resultant influence on fish populations and commercial fishing activities within the CPA or WPA lease sale areas would be negligible and indistinguishable from variations due to natural causes.

It is expected that coastal environmental degradation from a proposed action would have little effect on fish resources or EFH; however, wetland loss could occur due to a petroleum spill contacting inland areas.

Impacts on Commercial Fisheries (Chapters 4.3.1.9 and 4.4.3.11)

Activities such as seismic surveys and pipeline trenching will cause negligible impacts and will not deleteriously affect commercial fishing activities. Operations such as production platform emplacement, underwater OCS impediments, and explosive platform removal, will cause slightly greater impacts on commercial fishing. At the expected level of impact, the resultant influence on commercial fishing will be indistinguishable from variations due to natural causes. As a result, there would be very little impact to commercial fishing. A proposed action is expected to result in less than a 1 percent change in activities, in pounds landed, or in the value of landings. It will require less than 6 months for fishing activity to recover from any impacts.

Accidental events resulting from oil and gas development in CPA and WPA lease sale areas of the Gulf of Mexico have the potential to cause some detrimental effects on fisheries and fishing practices. It is expected that subsurface blowouts that may occur as a result of a proposed action would have a negligible effect on Gulf fish resources or commercial fishing. If spills due to a proposed action were to occur in open waters of the OCS proximate to mobile adult finfish or shellfish, the effects would likely be sublethal and the extent of damage would be reduced due to the capability of adult fish and shellfish to avoid a spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The effect of proposed-action-related oil spills on fish resources and commercial fishing is expected to cause less than a 1 percent decrease in standing stocks of any population, commercial fishing efforts, landings, or value of those landings. Any affected commercial fishing activity will recover within 6 months. At the expected level of impact, the resultant influence on fish populations and commercial fishing activities within the CPA or WPA lease sale areas would be negligible and indistinguishable from variations due to natural causes.

Impacts on Recreational Beaches (Chapters 4.3.1.10 and 4.4.3.12)

Marine debris will be lost from time to time from operations resulting from a proposed action. The impact on Gulf Coast recreational beaches is expected to be minimal. The incremental increase in helicopter and vessel traffic is expected to add very little additional noise that may affect beach users. A proposed action is expected to result in nearshore operations that may adversely affect the enjoyment of some Gulf Coast beach uses; however, these will have little effect on the number of beach users.

It is unlikely that a spill would be a major threat to recreational beaches because any impacts would be short-term and localized. Should a spill contact a recreational beach, short-term displacement of recreational activity from the areas directly affected would occur. Beaches directly impacted would be expected to close for periods of 2-6 weeks, or until the cleanup operations were complete. Should a spill result in a large volume of oil contacting a beach or a large recreational area being contacted by an oil slick, visitation to the area could be reduced by as much as 5-15 percent for as long as one season, but such an event should have no long-term effect on tourism.

Tarballs can lessen the enjoyment of the recreational beaches but should have no long-term effect on the overall use of beaches.

Impacts on Archaeological Resources

Historic Archaeological Resources (Chapters 4.3.1.11.1 and 4.4.3.13.1)

The greatest potential impact to a historic archaeological resource as a result of a proposed action in the WPA would result from direct contact between an offshore activity (platform installation, drilling rig

emplacement, and dredging or pipeline project) and a historic shipwreck. An MMS-funded study (Garrison et al., 1989) resulted in the redefinition of the high-probability areas for the location of historic period shipwrecks. An MMS review of the historic high-probability areas is occurring at the time of this writing. The NTL for archaeological resources surveys in the Gulf of Mexico Region, NTL 2002-G01, mandates a 50-m linespacing for remote-sensing surveys of lease within the high-probability areas for historic shipwrecks.

Ferromagnetic debris has the potential to mask the magnetic signatures of historic shipwrecks.

Maintenance dredging of navigation channels may result in impacts to historic shipwrecks; however, the percentage of OCS use of these channels under a proposed action is less than 1 percent.

Most other routine activities associated with a proposed action in the WPA are not expected to impact historic archaeological resources. It is conservatively assumed that 1 percent of the OCS Program's use of projected onshore facilities will occur in support of a proposed action (Table 4-11). It is expected that archaeological resources will be protected through review and approval processes of various Federal, State, and local agencies involved in permitting onshore activities.

Offshore oil and gas activities resulting from a proposed action could contact a shipwreck because of incomplete knowledge on the location of shipwrecks in the Gulf. Although this occurrence is not probable, such an event would result in the disturbance or destruction of important historic archaeological information. Other factors associated with a proposed action in the WPA are not expected to affect historic archaeological resources.

Impact to a historic archaeological resource could occur as a result of an accidental spill. As indicated in Chapter 4.4.1, it is not very likely that an oil spill will occur and contact coastal historic archaeological sites from accidental events associated with a proposed action in the WPA or CPA. The major effect from an oil-spill impact would be visual contamination of a historic coastal site, such as a historic fort or lighthouse. As historic archaeological sites are protected under law, it is expected that any spill cleanup operations would be conducted in such a way as to cause little or no impacts to historic archaeological resources. These impacts would be temporary and reversible.

Prehistoric Archaeological Resources (Chapters 4.3.1.11.2 and 4.4.3.13.2)

Several impact-producing factors may threaten the prehistoric archaeological resources of the Western Gulf. An impact could result from a contact between an OCS activity (pipeline and platform installations, drilling rig emplacement and operation, dredging, and anchoring activities) and a prehistoric site located on the continental shelf. The archaeological survey and archaeological clearance of sites required prior to an operator beginning oil and gas activities on a lease are expected to be highly effective (90%) at identifying possible prehistoric sites. Since the survey and clearance provide a significant reduction in the potential for a damaging interaction between an impact-producing factor and a prehistoric site, there is a very small possibility of an OCS activity contacting a prehistoric site. Should such contact occur, there would be damage to or loss of significant or unique archaeological information.

Onshore development as a result of a proposed action could result in the direct physical contact from new facility construction, pipeline trenching, and new navigation canal dredging. Protection of archaeological resources in these cases is expected to be achieved through the various approval processes of the Federal, State, and local agencies involved.

A proposed action in the WPA is not expected to result in impacts to prehistoric archaeological sites; however, should such an impact occur, unique or significant archaeological information could be lost.

Accidental events producing oil spills may threaten the prehistoric archaeological resources of the Gulf Coast. Impacts to prehistoric sites could occur as a result of an oil spill. Should a spill contact an archaeological site, damage might include loss of radiocarbon-dating potential, direct impact from oil-spill cleanup equipment, and/or looting. Previously unrecorded sites could be impacted by oil-spill cleanup operations on beaches.

As indicated in Chapter 4.4.1, it is not very likely for an oil spill to occur and contact coastal and barrier island prehistoric sites as a result of a proposed action in the WPA or CPA. The proposed actions are not expected to result in impacts to prehistoric archaeological sites; however, should such an impact occur, unique or significant archaeological information could be lost and this impact would be irreversible.

Impacts on Human Resources and Land Use

Land Use and Coastal Infrastructure (Chapters 4.3.1.12.1 and 4.4.3.14.1)

The existing oil and gas infrastructure is expected to be sufficient to handle development associated with a proposed action. A proposed WPA lease sale would not alter the current land use of the area. Accidental events such as oil or chemical spills, blowouts, and vessel collisions would have no effects on land use. Coastal or nearshore spills could have short-term adverse effects on coastal infrastructure requiring cleanup of any oil or chemicals spilled.

Demographics (Chapters 4.3.1.12.2 and 4.4.3.14.2)

Activities relating to a proposed WPA lease sale are expected to minimally affect the analysis area's land use, infrastructure, and demography. These impacts are projected to mirror employment effects that are estimated to be negligible to any one subarea. Baseline patterns and distributions of these factors, as described in Chapter 3.3.3, are expected to maintain. Changes in land use throughout the analysis area are expected to be contained and minimal. The OCS-related infrastructure is in place and will not change as a result of a proposed action. Current baseline estimates of population growth for the analysis area show a continuation of growth, but at a slower rate. Accidental events such as oil or chemical spills, blowouts, and vessel collisions would have no effects on the demographic characteristics of the Gulf coastal communities.

Economic Factors (Chapters 4.3.1.12.3 and 4.4.3.14.3)

Should a proposed WPA lease sale occur, there would be only minor economic changes in the Texas, Louisiana, Mississippi, and Alabama subareas. A proposed action is expected to generate less than a 1 percent increase in employment in any of these subareas. This demand will be met primarily with the existing population and available labor force. There would be very little to no economic stimulus in the Florida subareas.

While a proposed WPA lease sale will not significantly impact the analysis area, OCS activities from past and future OCS lease sales will continue to occur and impact the analysis area. In other words, even if a proposed action were not held, there would still be impacts from past and future OCS lease sales on the analysis area. The OCS-related impacts will continue even in the absence of a proposed action. In addition, the lack of a proposed action could lead to reduced employment in affected sectors.

The opportunity costs (employment and revenues) associated with oil-spill cleanup activities is expected to be temporary and of short duration. It is not expected to exceed 1 percent of baseline employment for any subarea within the analysis area. A large oil spill resulting from the proposed actions would acutely threaten shoreline recreational beaches for up to 30 days. After that, natural processes such as weathering and dispersion significantly change the nature and form of the oil to the point that it is unlikely to be a major threat to beach recreational resources and activities.

Environmental Justice (Chapters 4.3.1.12.4 and 4.4.3.14.4)

Because of the presence of an existing extensive and widespread support system for the OCS-related industry and associated labor force, the effects of a proposed action in the WPA are expected to be widely distributed and little felt. In general, who will be hired and where new infrastructure might be located is impossible to predict. Impacts related to a proposed action are expected to be economic and have a limited but positive effect on low-income and minority populations. Given the existing distribution of the industry and the limited concentrations of minority and low-income peoples, a proposed action sale is not expected to have a disproportionate effect on these populations. A proposed action is not expected to have disproportionate high/adverse environmental or health effects on minority or low-income people.

Considering the low likelihood of an oil spill and the nonhomogeneous population distribution along the Gulf of Mexico region, accidental spill events associated with a proposed action are not expected to have disproportionate adverse environmental or health effects on minority or low-income people.

2.4.1.3. Mitigating Measures

2.4.1.3.1. Topographic Features Stipulation

The topographic features of the Western Gulf provide habitat for coral-reef-community organisms (Chapter 3.2.2.3). Oil and gas activities resulting from the proposed actions could have a severe, even lethal, impact on or near these communities if the Topographic Features Stipulation is not adopted and such activities were not otherwise mitigated. The DOI has recognized this problem for some years, and since 1973 stipulations have been made a part of leases on or near these biotic communities; impacts from nearby oil and gas activities were mitigated to the greatest extent possible. This stipulation would not prevent the recovery of oil and gas resources but would serve to protect valuable and sensitive biological resources.

The Topographic Features Stipulation was formulated based on consultation with various Federal agencies and comments solicited from the States, industry, environmental organizations, and academic representatives. The stipulation is based on years of scientific information collected since the inception of the stipulation. This information includes various Bureau of Land Management/MMS-funded studies of topographic highs in the Gulf of Mexico; numerous stipulation-imposed, industry-funded monitoring reports; and the National Research Council (NRC) report entitled *Drilling Discharges in the Marine Environment* (1983). The location and lease status of the blocks affected by the Topographic Features Stipulation are shown on Figures 2-1, 2-6, and 2-7.

The requirements in the stipulation are based on the following facts:

- (a) Shunting of the drilling effluent to the nepheloid layer confines the effluent to a level deeper than that of the living components of a high-relief topographic feature. Shunting is therefore an effective measure for protecting the biota of high-relief topographic features (Bright and Rezak, 1978; Rezak and Bright, 1981; NRC, 1983).
- (b) The biological effect on the benthos from the deposition of nonshunted discharge is mostly limited to within 1,000 m of the discharge (NRC, 1983).
- (c) The biota of topographic features can be categorized into depth-related zones defined by degree of reef-building activity (Rezak and Bright, 1981; Rezak et al., 1983 and 1985).

The stipulation establishes No Activity Zones at the topographic features. A zone is defined by the 85-m bathymetric contour (isobath) because, generally, the biota shallower than 85 m are more typical of the Caribbean reef biota, while the biota deeper than 85 m are similar to soft-bottom organisms found throughout the Gulf. Where a bank is in water depths less than 85 m, the deepest “closing” isobath defines the No Activity Zone for that topographic feature. Within the No Activity Zones, no operations, anchoring, or structures are allowed. Outside the No Activity Zones, additional restrictive zones are established where oil and gas operations could occur, but where drilling discharges would be shunted.

The stipulation requires that all effluents within 1,000 m of banks containing an antipatharian-transitional zone be shunted to within 10 m of the seafloor. Banks containing the more sensitive and productive algal-sponge zone require a shunt zone extending 1 nmi and an additional 3-nmi shunt zone for development only.

Exceptions to the general stipulation are made for the Flower Garden Banks and the low-relief banks. Because the East and West features of the Flower Garden Banks have received National Marine Sanctuary status, they are protected to a greater degree than the other banks. The added provisions at the Flower Garden Banks require that (a) the No Activity Zone be based on the 100-m isobath instead of the 85-m isobath and be defined by the “1/4 1/4 1/4” system (a method of defining a specific portion of a block) rather than the actual isobath and (b) there be a 4-Mile Zone instead of a 1-Mile Zone in which shunting is required. Although Stetson Bank was made part of the Flower Garden Banks National Marine Sanctuary in 1996, it has not as yet received added protection that would differ from current stipulation requirements. Low-relief banks have only a No Activity Zone. A shunting requirement would be counterproductive because it would put the potentially toxic drilling muds in the same water depth range as the features associated biota that are being protected. Also, the turbidity potentially caused by the

release of drilling effluents in the upper part of the water column would not affect the biota on low-relief features as they appear to be adapted to high turbidity. Claypile Bank, which is a low-relief bank that exhibits the *Millepora*-sponge community, has been given the higher priority protection of a 1,000-Meter Zone where monitoring is required.

The stipulation reads as follows:

Topographic Features Stipulation
(Western Planning Area)

- (a) No activity including structures, drilling rigs, pipelines, or anchoring will be allowed within the listed isobath (“No Activity Zone”) of the banks as listed below.
- (b) Operations within the area shown as “1,000-Meter Zone” shall be restricted by shunting all drill cuttings and drilling fluids to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom.
- (c) Operations within the area shown as “1-Mile Zone” shall be restricted by shunting all drill cuttings and drilling fluids to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom. (Where there is a “1-Mile Zone” designated, the “1,000-Meter Zone” in paragraph (b) is not designated.) This restriction on operations also applies to areas surrounding the Flower Garden Banks National Marine Sanctuary, namely the “4-Mile Zone” surrounding the East Flower Garden Bank and the West Flower Garden.
- (d) Operations within the area shown as “3-Mile Zone” shall be restricted by shunting all drill cuttings and drilling fluids from development operations to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom.

The banks and corresponding blocks to which this stipulation may be applied in the Western Gulf are as follows:

| Bank Name | Isobath (m) | Bank Name | Isobath (m) |
|--|-------------|--------------------------------------|-------------|
| Shelf Edge Banks | | Low Relief Banks² | |
| West Flower Garden Bank (defined by ¼ ¼ ¼ system) | 100-120 | Coffee Lump | 70 |
| East Flower Garden Bank (defined by ¼ ¼ ¼ system) | 100-130 | 32 Fathom Bank | 52 |
| MacNeil Bank | 86-94 | Claypile Bank ³ | 50 |
| Rankin Bank | 85 | South Texas Banks⁴ | |
| Geyer Bank | 85 | Dream Bank | 78-82 |
| Elvers Bank | 85 | Southern Bank | 80 |
| Bright Bank ¹ | 85 | Hospital Bank | 70 |
| McGrail Bank ¹ | 85 | North Hospital Bank | 68-70 |
| Rezak Bank ¹ | 85 | Aransas Bank | 70-72 |
| Sidner Bank ¹ | 85 | South Baker Bank | 70-84 |
| Parker Bank ¹ | 85 | Baker Bank | 70-74 |
| Appelbaum Bank | 85 | South Texas Low-Relief Banks | |
| Midshelf Banks | | Mysterious Bank | 74-86 |
| 29 Fathom Bank | 64 | Blackfish Ridge | 70 |
| Stetson Bank | 52 | Big Dunn Bar | 65 |
| | | Small Dunn Bar | 65 |

¹CPA bank with a portion of its “1-Mile Zone” and/or “3-Mile Zone” in the WPA.

²Low-Relief Mid Shelf Banks—only paragraph (a) applies.

³Claypile Bank—only paragraphs (a) and (b) apply. In paragraph (b), monitoring, rather than shunting, of the effluent is required at Claypile Bank to determine the effect on the biota.

⁴South Texas Banks—only paragraphs (a) and (b) apply.

Effectiveness of the Lease Stipulation

The purpose of the stipulation is to protect the biota of the topographic features from adverse effects due to routine oil and gas activities. Such effects include physical damage from anchoring and rig emplacement and potential toxic and smothering effects from muds and cuttings discharges. The Topographic Features Stipulation has been used on leases since 1973 and has effectively prevented damage to the biota of these banks from routine oil and gas activities such as anchoring. Monitoring studies have demonstrated that the shunting requirements of the stipulation are effective in preventing the muds and cuttings from impacting the biota of the banks. The stipulation, if adopted for the proposed actions, will continue to protect the biota of the banks, specifically as discussed below.

The stipulation provides different levels of protection for banks in different categories as defined by Rezak and Bright (1981). The categories and their definitions are as follows:

- Category A: zone of major reef-building activity; maximum environmental protection recommended;
- Category B: zone of minor reef-building activity; environmental protection recommended;
- Category C: zone of negligible reef-building activity, but crustose algae present; environmental protection recommended; and
- Category D: zone of no reef-building or crustose algae; additional protection not necessary.

Mechanical damage resulting from oil and gas operations is probably the single most serious impact to benthic habitat. Complying with the No Activity Zone designation of the Topographic Features Stipulation should completely eliminate this threat to the sensitive biota of WPA topographic features from activities resulting from the proposed actions.

Several other impact-producing factors may threaten communities associated with topographic features. Vessel anchoring and structure emplacement result in physical disturbance of benthic habitat and are the most likely activities to cause permanent or long-lasting impacts to sensitive offshore habitats. Recovery from damage caused by such activities may take 10 or more years (depending on the maturity of the impacted community). Operational discharges (drilling muds and cuttings, produced waters) may impact the biota of the banks due to turbidity and sedimentation, resulting in death to benthic organisms in large areas. Recovery from such damage may take 10 or more years (depending on the maturity of the impacted community). Blowouts may cause similar damage to benthic biota by resuspending sediments, causing turbidity and sedimentation, which could ultimately have a lethal impact on benthic organisms. Recovery from such damage may take up to 10 years (depending on the maturity of the impacted community). Oil spills will cause damage to benthic organisms if the oil contacts the organisms; such contact is unlikely except from spills from blowouts. There have been very few blowouts in the Gulf. Structure removal using explosives can result in water turbidity, redeposition of sediments, and explosive shock-wave impacts. Recovery from such damage could take more than 10 years (depending on the maturity of the impacted community). The above activities, especially bottom-disturbing activities, have the greatest potential to severely impact the biota of topographic features. Those activities having the greatest impacts are also those most likely to occur. The proposed actions, without benefit of the Topographic Features Stipulation or comparable mitigation, are expected to have a severe impact on the sensitive offshore habitats of the topographic features.

The biota of low-relief banks and the turbidity of the water are such that protective measures to restrain drilling discharges are not warranted for these features.

The stipulation provides an added measure of protection for Claypile Bank, requiring both No Activity and 1,000-Meter Zones. Claypile Bank is the only low-relief bank that is known to contain the *Millepora*-sponge community. This assemblage is categorized by Rezak and Bright (1981) as a Category B community (minor reef-building activity) worthy of increased protection; therefore, monitoring will be required within the 1,000-Meter Zone. Any impacts from drilling will thereby be documented so that further protective measures could be taken. Due to the low relief of the bank (5 m), shunting would be counterproductive.

The stipulation requires that all drill cuttings and drilling fluids within 1,000 m of high-relief topographic features categorized by Rezak and Bright (1981) as Category C banks (negligible reef-building activity) be shunted into the nepheloid layer; the potentially harmful materials in drilling muds would be trapped in the bottom boundary layer and would not move up the banks where the biota of concern are located. Surface drilling discharge at distances greater than 1,000 m from the bank is not expected to adversely impact the biota.

The stipulation protects the remaining banks (Category A and B banks—major and minor reef building) with even greater restrictions. (Appelbaum Bank is categorized as Category C; however, it contains the algal-sponge community, which is indicative of Category A banks. Therefore, it carries a Category A bank stipulation.) Surface discharge will not be allowed within 1 nmi of these more sensitive banks. Surface discharges outside of 1 nmi are not expected to adversely impact the biota of the banks. However, when multiple wells are drilled from a single platform (surface location), typical during development operations, extremely small amounts of muds discharged more than 1 nmi from the bank may reach the bank. In order to eliminate the possible cumulative effect of muds discharged from numerous wells outside of 1 nmi, the stipulation imposes a 3-Mile Zone within which shunting of development effluent is required. The stipulation results in increased protection to the East and West features of the Flower Garden Banks. Shunting would be required within a 4-Mile Zone.

The surface discharge of drilling muds and cuttings resulting from exploratory wells within the 3-Mile Zone is not expected to reach or affect the biological resources located within the No Activity Zone for three main reasons: (1) the biological effect on the benthos from the deposition of nonshunted discharge is mostly limited to within 1,000 m of the discharge (NRC, 1983); (2) exploration usually requires the drilling of one to four wells per site as opposed to more than five in the case of development; and (3) a significantly lower volume of exploration drilling discharges is expected per site since development usually requires the drilling of several additional wells over greater distances to reach potential reservoirs. The requirement to shunt drilling discharges within the 3-Mile Zone during development drilling is in response to the strong recommendation by FWS.

The stipulation would prevent damage to the biota of the banks from routine oil and gas activities resulting from the proposed actions, while allowing the development of nearby oil and gas resources. The stipulation would not protect the banks from adverse effects of an accident such as a large blowout on a nearby oil or gas operation.

2.4.1.3.2. Military Areas Stipulation

A standard military warning areas stipulation has been applied to all blocks leased in military areas in the Gulf of Mexico since 1977. Figure 2-5 shows the military warning areas in the Gulf of Mexico. This stipulation would be a part of any lease resulting from the proposed actions. The stipulation reads as follows:

Military Areas Stipulation

(a) *Hold and Save Harmless*

Whether compensation for such damage or injury might be due under a theory of strict or absolute liability or otherwise, the lessee assumes all risks of damage or injury to persons or property, which occur in, on, or above the OCS, to any persons or to any property of any person or persons who are agents, employees, or invitees of the lessee, its agents, independent contractors, or subcontractors doing business with the lessee in connection with any activities being performed by the lessee in, on, or above the OCS, if such injury or damage to such person or property occurs by reason of the activities of any agency of the United States Government, its contractors or subcontractors, or any of its officers, agents, or employees, being conducted as a part of, or in connection with, the programs and activities of the command headquarters listed in Table 2-1.

Notwithstanding any limitation of the lessee's liability in Section 14 of the lease, the lessee assumes this risk whether such injury or damage is caused in whole or in part by any act or omission, regardless of negligence or fault, of the United States, its contractors or subcontractors, or any of its officers, agents, or employees. The lessee further agrees

to indemnify and save harmless the United States against all claims for loss, damage, or injury sustained by the lessee, or to indemnify and save harmless the United States against all claims for loss, damage, or injury sustained by the agents, employees, or invitees of the lessee, its agents, or any independent contractors or subcontractors doing business with the lessee in connection with the programs and activities of the aforementioned military installation, whether the same be caused in whole or in part by the negligence or fault of the United States, its contractors, or subcontractors, or any of its officers, agents, or employees and whether such claims might be sustained under a theory of strict or absolute liability or otherwise.

(b) Electromagnetic Emissions

The lessee agrees to control its own electromagnetic emissions and those of its agents, employees, invitees, independent contractors or subcontractors emanating from individual designated defense warning areas in accordance with requirements specified by the commander of the command headquarters listed in Table 2-1 to the degree necessary to prevent damage to, or unacceptable interference with Department of Defense flight, testing, or operational activities, conducted within individual designated warning areas. Necessary monitoring control and coordination with the lessee, its agents, employees, invitees, independent contractors, or subcontractors, will be effected by the commander of the appropriate onshore military installation conducting operations in the particular warning area; provided, however, that control of such electromagnetic emissions shall in no instance prohibit all manner of electromagnetic communication during any period of time between a lessee, its agents, employees, invitees, or independent contractors, or subcontractors and onshore facilities.

(c) Operational

The lessee, when operating or causing to be operated on its behalf, boat, ship, or aircraft traffic in the individual designated warning areas, shall enter into an agreement with the commander of the individual command headquarters listed in Table 2-1, upon utilizing an individual designated warning area prior to commencing such traffic. Such an agreement will provide for positive control of boats, ships, and aircraft operating into the warning areas at all times.

Effectiveness of the Lease Stipulation

The hold harmless section of the military stipulation serves to protect the U.S. Government from liability in the event of an accident involving the lessee and military activities. The actual operations of the military and the lessee and its agents will not be affected.

The electromagnetic emissions section of the stipulation requires the lessee and its agents to reduce and curtail the use of radio, CB, or other equipment emitting electromagnetic energy within some areas. This serves to reduce the impact of oil and gas activity on the communications of military missions and reduces the possible effects of electromagnetic energy transmissions on missile testing, tracking, and detonation.

The operational section requires notification to the military of oil and gas activity to take place within a military use area. This allows the base commander to plan military missions and maneuvers that will avoid the areas where oil and gas activities are taking place or to schedule around these activities. Prior notification helps reduce the potential impacts associated with vessels and helicopters traveling unannounced through areas where military activities are underway.

This stipulation reduces potential impacts, particularly in regards to safety, but does not reduce or eliminate the actual physical presence of oil and gas operations in areas where military operations are conducted. The reduction in potential impacts resulting from this stipulation makes multiple-use conflicts most unlikely. Without the stipulation, some potential conflict is likely. The best indicator of the overall effectiveness of the stipulation may be that there has never been an accident involving a conflict between military operations and oil and gas activities.

2.4.1.3.3. Naval Mine Warfare Area Stipulation

This stipulation will apply to Mustang Island Area, East Addition, Blocks 732, 733, and 734. (Mustang Island Area, East Addition, Block 733 was leased in August 1994.) The Navy has identified these blocks as needed for testing equipment and for training mine warfare personnel. The MMS and the Navy have entered into a formal agreement (signed June 20, 1994, by the MMS and July 15, 1994, by the Navy) that these blocks could be offered for lease with a special stipulation.

The stipulation reads as follows:

Naval Mine Warfare Area Stipulation

- (a) The placement, location, and planned periods of operation of surface structures on this lease during the exploration stage are subject to approval by the Regional Director (RD), Minerals Management Service, Gulf of Mexico Region, after the review of the operator's Exploration Plan (EP). Prior to approval of the EP, the RD will consult with the Commander, Mine Warfare Command, in order to determine the EP's compatibility with scheduled military operations. No permanent structures nor debris of any kind shall be allowed in the area covered by this lease during exploration operations.
- (b) To the extent possible, sub-seafloor development operations for resources subsurface to this area should originate outside the area covered by this lease. Any above-seafloor development operations within the area covered by this lease must be compatible with scheduled military operations as determined by the Commander, Mine Warfare Command. The lessee will consult with and coordinate plans for above-seafloor development activities (including abandonment) with the Commander, Mine Warfare Command. The Development Operations Coordination Document (DOCD) must contain the locations of any permanent structures, fixed platforms, pipelines, or anchors planned to be constructed or placed in the area covered by this lease as part of such development operations. The DOCD must also contain the written comments of the Commander, Mine Warfare Command on the proposed activities. Prior to approval of the DOCD, the RD will consult with the Commander in order to determine the DOCD's compatibility with scheduled military operations.

For more information consultation, and coordination, the lessee must contact:

Commander, Mine Warfare Command
325 Fifth Street, SE, Corpus Christi, Texas 78419-5032
Telephone: (512) 939-4895

Effectiveness of the Lease Stipulation

The Naval Mine Warfare Area Stipulation will eliminate potential impacts from multiple-use conflicts on these blocks.

For exploration activities, the stipulation requires consultation with the Commander, Mine Warfare Command, prior to approval of any EP. Prior coordination will determine the compatibility of the proposed exploration operations with scheduled military operations and help mitigate potential impacts between surface structures and scheduled military activities.

For development activities, the stipulation requires that both sub-seafloor and above-seafloor development operations must be compatible with scheduled military operations. Consultation and coordination prior to approval of any DOCD will help mitigate potential impacts between development operations and military activities on these blocks.

2.4.1.3.4. Law of the Sea Convention Royalty Payment Stipulation

This stipulation will be included in leases beyond the United States (U.S.) Exclusive Economic Zone (EEZ) in the area formerly known as the Western Gap.

Law of the Sea Convention Royalty Payment Stipulation

If the U.S. becomes a party to the 1982 Law of the Sea Convention (Convention) prior to or during the life of a lease issued by the U.S. on a block or portion of a block located beyond the U.S. EEZ and subject to such conditions that the Senate may impose through its constitutional role of advice and consent, then the following royalty payment lease provisions will apply to the lease so issued, consistent with Article 82 of the Convention:

1. The Convention requires payments annually by coastal States party to the Convention with respect to all production at a site after the first five years of production at that site. Any such payments will be made by the U.S. Government and not the lessee.
2. For the purpose of this stipulation regarding payments by the lessee to the U.S., a site is defined as an individual lease whether or not the lease is located in a unit.
3. For the purpose of this stipulation, the first production year begins on the first day of commercial production (excluding test production). Once a production year begins it shall run for a period of 365 days whether or not the lease produces continuously in commercial quantities. Subsequent production years shall begin on the anniversary date of first production.
4. If total lease production during the first five years following first production exceeds the total royalty suspension volume(s) provided in the lease terms, or through application and approval of relief from royalties, the following provisions of this stipulation will not apply. If after the first five years of production but prior to termination of this lease, production exceeds the total royalty suspension volume(s) provided in the lease terms, or through application and approval of relief from royalties, the following provisions of this stipulation will no longer apply effective the day after the suspension volumes have been produced.
5. If, in any production year after the first five years of lease production, due to lease royalty suspension provisions or through application and approval of relief from royalties, no lease production royalty is due or payable by the lessee to the U.S., then the lessee will be required to pay, as stipulated in paragraph 9 below, Convention-related royalty in the following amount so that the required Convention payments may be made by the U.S. Government as provided under the Convention:
 - a. In the sixth year of production, one percent of the value of the sixth year's lease production saved, removed, or sold from the leased area;
 - b. After the sixth year of production, the Convention-related royalty payment rate shall increase by one percent for each subsequent year until the twelfth year and shall remain at seven percent thereafter until lease termination.
6. If the U.S. becomes a party to the Convention after the fifth year of production from the lease, and a lessee is required, as provided herein, to pay Convention-related royalty, the amount of the royalty due will be based on the above payment schedule as determined from first production.

For example, U.S. accession to the Convention in the tenth year of lease production would result in a Convention-related royalty payment of five percent of the value of the tenth year's lease production, saved, removed, or sold from the lease. The following year, a payment of six percent would be due, and so forth as stated above, up to a maximum of seven percent per year.

7. If, in any production year after the first five years of lease production, due to ease royalty suspension provisions or through application and approval of relief from royalties, lease production royalty is paid but is less than the payment provided for by the Convention, then the lessee will be required to pay to the U.S. Government the Convention-related royalty in the amount of the shortfall.
8. In determining the value of production from the lease if a payment of Convention-related royalty is to be made, the provisions of the lease and applicable regulations shall apply.
9. The Convention-related royalty payment(s) required under paragraphs 5 through 7 of this stipulation, if any, shall not be paid monthly but shall be due and payable to MMS on or before 30 days after the expiration of the relevant production lease year.
10. The lessee will receive royalty credit in the amount of the Convention-related royalty payment required under paragraphs 5 through 7 of this stipulation, which will apply to royalties due under the lease for which the Convention-related royalty accrued in subsequent periods as non-Convention related royalty payments become due.
11. Any lease production for which the lessee pays no royalty other than a Convention-related requirement, due to lease royalty suspension provisions or through application and approval of relief from royalties, will count against the lease's applicable royalty suspension or relief volume.
12. The lessee will not be allowed to apply or recoup any unused Convention-related credit(s) associated with a lease that has been relinquished or terminated.

Effectiveness of the Lease Stipulation

Adoption of this stipulation in future Western Gulf of Mexico lease sales in the current 5-Year Program, i.e., Sales 187, 192, 196, and 200, would ensure that blocks beyond the U.S. Exclusive Economic Zone (EEZ) in the area formerly known as the Western Gap would be offered consistent with both U.S. law (the OCSLA and the Truman Proclamation asserting U.S. dominion over our OCS to its farthest exploitable reach) and provisions of the 1982 Law of the Sea Convention, which is internally recognized, but not acceded to by the U.S. The Convention balances the extension of coastal Nation control over the natural resources of the continental margin seaward of 200 mi with a modest obligation on such Nations to share revenues from successful mineral development seaward of 200 mi. This proposed stipulation specifies royalty payment provisions that would facilitate the U.S. Government's ability to make any payment required by the Convention. It has continually been adopted for annual Western Gulf of Mexico lease sales since 2001.

2.4.2. Alternative B — The Proposed Actions Excluding the Unleased Blocks Near the Biologically Sensitive Topographic Features

2.4.2.1. Description

This alternative would offer for lease all unleased blocks in the WPA, as described for the proposed actions, with the exception of any unleased blocks within the 200 blocks in the WPA that are subject to

the Topographic Features Stipulation. As of June 6, 2002, 118 blocks of the 200 blocks were released. Although the blocks to be excluded contain oil and/or gas resources, this alternative would not change the resource estimate and activity ranges for the overall proposed actions. It is estimated that a proposed action in the WPA could result in the discovery and production of 0.136-0.262 BBO and 0.810-1.440 tcf of gas.

2.4.2.2. Summary of Impacts

The analyses of impacts summarized below and described in detail in Chapters 4.3.2 and 4.4.3 are based on the development scenario, which is a set of assumptions and estimates on the amounts, locations, and timing for OCS exploration, development, and production operations and facilities, both offshore and onshore. A detailed discussion of the development scenario and major related impact-producing factors is included in Chapters 4.1.1, 4.1.2, and 4.4.

The difference between the potential impacts described for Alternative A and those under Alternative B is that under Alternative B no oil and gas activity would take place in the released blocks within the 200 blocks subject to the Topographic Features Stipulation. The assumption that the levels of activity for Alternative B are essentially the same as those projected for the proposed actions leads to the conclusion that the impacts expected to result from Alternative B would be very similar to those described under the proposed actions (Chapter 4.3.1). Therefore, the regional impact levels for all resources, except for the Topographic Features, would be similar to those described under the proposed actions. This alternative, if adopted, would prevent any oil and gas activity whatsoever in the affected blocks; thus, it would eliminate any potential direct impacts to the biota of those blocks from oil and gas activities, which otherwise would be conducted within the blocks.

2.4.3. Alternative C — No Action

2.4.3.1. Description

This alternative is equivalent to cancellation of one or more proposed WPA lease sales scheduled in the proposed *Outer Continental Shelf Oil and Gas Leasing Program: 2002-2007*. The opportunity for development of the estimated of 0.136-0.262 BBO and 0.810-1.440 tcf of gas could have resulted from any proposed action(s) would be precluded or postponed, and any potential environmental impacts resulting from the proposed action(s) would not occur or would be postponed.

2.4.3.2. Summary of Impacts

If Alternative C is selected, all impacts, positive and negative, associated with the proposed actions would not occur. This alternative would therefore result in no effect on the sensitive resources and activities discussed in Chapters 4.3.1 and 4.4.3. The incremental contribution of any of the proposed sales to cumulative effects would not occur, but effects from other activities, including other OCS sales, would remain. Oil-spill risk could increase due to the importation of foreign oil to replace the resources lost through cancellation of any of the proposed actions.

Strategies that could provide replacement resources for lost domestic OCS oil and gas production include a combination of energy conservation; onshore domestic oil and gas supplies; alternative energy sources; and imports of oil, natural gas, and liquefied natural gas. Market forces are assumed to be the predominant factor in determining substitutes for OCS oil and gas. Based on this, increased imports of foreign oil are assumed to be the largest replacement source. Much of this imported oil would enter the United States through the Gulf of Mexico, thus increasing the risks due to tanker spills. Potential alternative energy sources are discussed in the Final EIS for the *Outer Continental Shelf Oil and Gas Leasing Program: 1997-2002*.