

**Offshore Environmental
Studies Program**

**Fiscal Year (FY) 2004 – 2006
Annual Studies Plan
Pacific OCS Region**

**U.S. Department of the Interior
Minerals Management Service
Pacific OCS Region
Camarillo, CA**

2003

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1.1 Introduction to the Region

The Environmental Studies Program in the Pacific Outer Continental Shelf (OCS) Region started in 1974. The Program has evolved with changes in the geographic areas of concern and study, in the emphasis of disciplines highlighted for research, and in the emphasis of oil and gas activities from prelease activities to post lease activities. In particular, this annual plan reflects the great uncertainty of new oil and gas activity in the region by reducing the number of new studies proposed and focusing on ongoing operations and future decommissioning activities. This plan complements and reinforces the Environmental Studies National Strategic Plan.

Existing production and development activities and development of known resources on 43 existing producing leases in Southern California will continue for many years. Decommissioning plans for some of the older facilities could be received by the Region within the next 5 years. Future exploration and development activities, however, on the 36 undeveloped leases are highly controversial and uncertain. The projected OCS activities section of this report more fully discusses the activities we anticipate on existing leases.

This document presents a strategy for the Pacific Outer Continental Shelf (OCS) Region. It does not apply to the entire Pacific OCS Region, which stretches from the United States-Mexico border to the border with Canada and includes Hawaii, but rather to the Southern California Planning Area (see map inset, figure 1). This plan focuses on the information needed primarily for existing oil and gas production activities and future oil and gas facility decommissioning for the Southern California Planning Area, especially the Santa Barbara Channel and the Santa Maria Basin.

The identified information is considered important and relevant to decision making. We consider this information important and appropriate to propose because it fulfills the following criteria:

- # The study provides significant new or additional information beyond what is already known;
- # The identified study is within the financial scope and time frames of the Program;
- # The information provides insight into significant processes critical for understanding both natural and anthropogenic changes;
- # The issue can be studied within science's present abilities or understanding of experimental methods to gain the information.

The studies funded by the Pacific OCS Region emphasize two themes and reflect the great uncertainty of new oil and gas activity in the region:

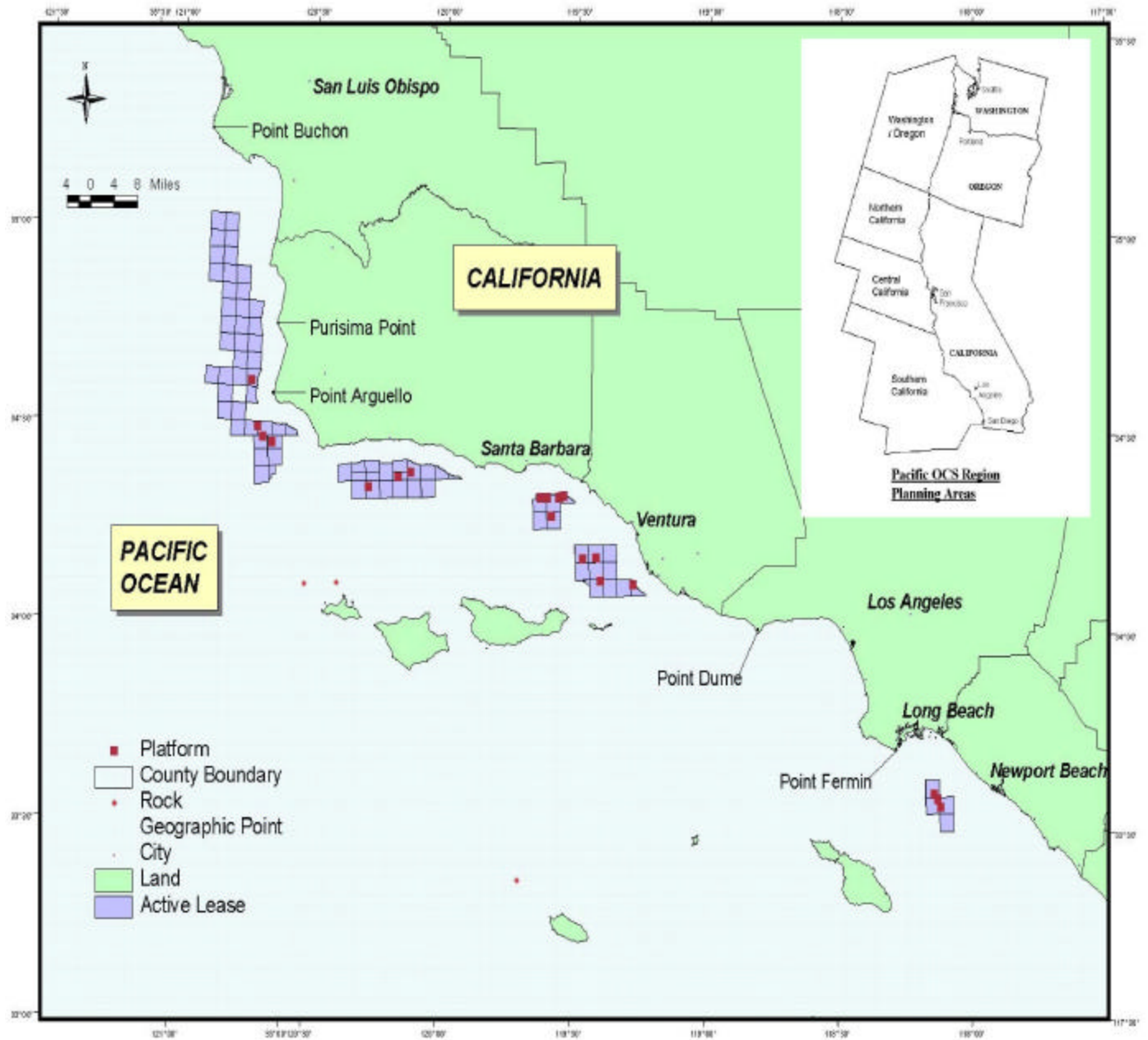
1. Learning more about the potential environmental effects of existing oil and gas production activities. These are focused in the three areas where production occurs: Santa Barbara Channel, Santa Maria Basin, San Pedro Shelf. This includes monitoring (long-range programs of regular measurements) of

certain aspects of the intertidal environment adjacent to ongoing oil and gas operations, and fostering partnerships with other Federal, State, and local government agencies involved in monitoring research.

2. Gaining more information on what environmental effects may result from the partial or complete removal of oil and gas platforms and other offshore facilities currently in place,

Changes in future OCS oil and gas activities may dictate changes in the strategy. Findings from current or future research may also change the strategy and cause other avenues of research to be incorporated.

If you have any questions regarding this Pacific OCS Region Environmental Studies Plan, please contact Dr. Fred Piltz, Pacific OCS Region at (805) 389-7850 or Mary Elaine Dunaway at (805) 389-7848. You can also view the Minerals Management Service and Pacific OCS Region home pages at www.mms.gov for additional information.



1.2 Map of Planning Area

1.3 Projected OCS Activities

Prelease

We anticipate no lease sales for this planning area under the MMS Comprehensive Leasing Program for 2002 – 2007 nor are any projected for the future.

Postlease

The Southern California Planning area contains

- X 79 active oil and gas leases
- X 600 million barrels of oil in proved reserves on existing leases
- X Up to one billion barrels in unproved reserves on existing leases

There are 43 producing leases in the Southern California Planning Area with 23 oil and gas platforms in Federal waters. These leases currently produce 90,000 barrels of oil per day and 200 million cubic feet of natural gas per day. The presence of the oil industry in the Southern California Planning Area is projected to diminish over the next decade or so, although present oil and gas production levels could be sustained during much of that same period.

There are 36 undeveloped leases in the Southern California Planning Area. The future of these leases is uncertain. These leases are currently under directed suspensions by order of the Federal Court, preventing any activities. If these leases are developed in the future, oil reservoirs in some units can be developed from existing platforms with extended-reach drilling technology. Extended-reach drilling from a platform can be used to significantly enlarge the area from which a given platform produces oil. Therefore, improvements in extended-reach drilling technology can reduce the number of platforms that would be needed to produce the projected volume of oil.

Decommissioning activities will become an increasingly important part of this Region's activities in the future. Within the next 5 years, decommissioning plans could be received for several existing OCS platforms in Federal waters offshore California. Decommissioning activities related to associated onshore facilities and offshore pipelines are also expected to increase.

Studies proposed are needed to support existing operations and future decommissioning activities in the Pacific OCS Region. Several of the studies proposed will synthesize state-of-the-art information for regional analysts in an era of reduced staff and budgets. Studies identified highlight critical information gaps and are geared to allow MMS analysts to effectively permit and regulate the oil and gas industry in ongoing production and decommissioning projects.

1.4 Identification of Information Needs

The main areas of information needs fall into the following categories:

a. Supporting existing oil and gas production activities.

Biological Monitoring

In support of ongoing production, there is a continued need to monitor the shoreline plant and animal populations proximal to producing facilities. Intertidal biology requires continued study so that potential or real effects from oil and gas operations (including oil spills) are not erroneously confused with broader regional changes in marine nearshore and coastal ecosystems. Due to overall cutbacks in the studies program, the scope of the monitoring has been reduced for the next 3 years. This reduction will support only the ongoing biannual monitoring, not the comprehensive monitoring nor BLM Baseline site revisits. Because MMS initiated MARINE (the Multi-Agency Rocky Intertidal Network) and continues to work to standardize and publish data collected by multiple entities, this research effort fosters continued partnerships with other Federal, State, and local government agencies and educational institutions involved in monitoring research.

MMS also conducts research at these sites through the inhouse MMS Intertidal team (MINT). MINT biologists collect data at 20 of 24 MMS-funded sites and initiate several related research projects. Current projects being addressed by the team include: 1) obtaining permanent markers at the sites, 2) placing the BLM Baseline Littler and Woodward-Clyde data on GIS, 3) coordinating aerial photographic overflights of MARINE sites with the California Department of Fish and Game, 4) organizing annual Taxonomic Workshops for MARINE field scientists, and 5) publishing the MINT Mussel Recovery Study data. Through MINT, MMS also ensures that biologists are Hazwoper trained and can respond with data and sample collection efforts in the event of an oil spill.

Physical Oceanography

Oceanographic equipment (current meter moorings and support of the National Data Buoy Center (NDBC) meteorological buoys) will be removed in 2004. While the uncertainty about new or increased production led to the elimination of the intensive physical oceanographic measurement program, there continue to be critical gaps in our knowledge of surface currents in the nearshore zone. This information is needed to improve modeling of oil spills from producing facilities and provides needed information in the nearshore areas to support understanding of a broad range of affected biological communities.

b. Understanding environmental impacts of decommissioning Pacific OCS facilities

The likelihood of decommissioning a few POCS offshore facilities before the end of the decade is higher than was thought even a year ago. Decommissioning plans for some of the older facilities could be received by the Region within the next 5 years. The long lead time needed to address environmental issues related to decommissioning deepwater oil and gas platforms means that decommissioning studies will need to be started in 2004 and 2005.

To address this critical need and to leverage funding, we are proposing a **Decommissioning Studies Initiative**. This long-term funding initiative will provide a mechanism for MMS to address study needs with joint funding by industry. This initiative will be carried out in close cooperation with the IDWG (Interagency Decommissioning Working Group). This group of Federal, State and local agencies are reviewing offshore and onshore decommissioning activities, and will be involved in the future in reviewing Federal OCS decommissioning projects. MMS proposes that a team of scientists from represented IDWG agencies be identified as the Quality Review Board (QRB) for this initiative.

Through this initiative, a set amount per year would be funded by MMS and additional funding obtained by industry sources or other agencies. Individual task orders would be proposed by MMS in consultation with the IDWG and industry, and the research would be managed by MMS.

MMS management of studies is strongly supported by the IDWG and by industry. The agencies on the IDWG have indicated that they are confident in the unbiased, quality science-based studies managed by MMS. MMS has met with the California Artificial Reef Enhancement (CARE), a private organization promoting Rigs to Reef Program off California and jointly funded by the oil and gas industry and sportfishing industry, and they are prepared to jointly fund studies with MMS in FY 2004.

This Decommissioning Studies Initiative mechanism will allow MMS to be responsive to the ongoing need of MMS and the IDWG in answering key questions about the environmental impacts of decommissioning. Many of the Pacific OCS platforms are twice and three times as large as platforms that have been decommissioned worldwide to date and are located in water depths exceeding 400 feet; beyond the depth of previously decommissioned platforms. The impacts of these decommissioning operations are not well understood and sparsely studied.

MMS will work with industry and agencies to develop future studies for decommissioning. An IDWG workshop is planned for Fall 2003 to identify research needs (in addition to the studies discussed below) and to discuss joint funding and other cooperative efforts. Below is a discussion of the topics MMS believes are the most critical in assessing impacts from removal of facilities in the Pacific OCS Region. Several of these are proposed as new tasks in FY 2004 (see study profile).

Shell Mounds

The size, composition and biology of the shell mounds that accumulate under OCS facilities continues to generate concern about potential contaminants and the role the mounds play in local and regional benthic ecology. The shell mounds found under recently decommissioned California State platforms have undergone study by the State, and several issues have emerged. It is not known whether the platforms can be removed without causing serious environmental impacts or if it is detrimental to the environment to remove the shell mounds. Issues include: 1) possible release of chemicals from the drilling mud discharges into the environment and subsequent uptake by the biological community, and 2) significant reduction of important fisheries and other invertebrate communities that populate the mounds or depend upon them for food. More information about the size and composition of shell mounds and the dependent biological

communities under OCS facilities is needed to address these issues so that proper environmental mitigation and alternatives can be proposed. MMS currently is funding an effort to map many of the OCS shell mounds and has done pilot studies to evaluate methods to survey the dependent biological communities. The next step is to conduct pilot surveys of the biological communities under platforms where extensive mounds have been located. The Pacific OCS Region has identified the need for chemical studies of the shell mounds; this need is put forward as a potential topic for research in 2005/2006.

Rockfish

Considerable effort has been expended to assess the remaining stocks of regional rockfish populations, a significant commercial and recreational fishery in southern California, and to determine their density and diversity at platforms. This basic information is being synthesized now and is expected to be released later this year. Based on our preliminary review of this synthesis data, several strategic biological issues remain in the Pacific OCS platform reefing debate. First, it is very important to define the ecological performance and role that platforms off California may play in the rebuilding and recovery of regional rockfish populations. Evaluation of the performance of rockfish populations at platforms compared to those at natural reefs is being addressed in a new start for 2003 which will assess reproductive potential, growth rates, and mortality rates of several key rockfish species. The second issue is to determine what regional rockfish recruitment might have been, and might be in the future, if the platforms were not, and are not, present. The third issue relates to rockfish movement patterns and fidelity to offshore platforms. It is suspected that many of the species have strong site fidelity but empirical evidence is needed for the species found at the platform sites. Remaining issues relate to a determination of how important platforms are as a source for local fish stocks, or whether they act as sinks that attract and support isolated stocks but do not produce offspring that populate the regional natural reefs. Older platforms may be the structures that will be decommissioned first, but they are not among those that have been surveyed for the abundance and species composition of rockfishes. In future years, our focus may need to include a basic survey of the fish assemblages at these older structures.

Fish Assemblages at OCS Platforms Nearing Decommissioning

Several platforms in Federal waters offshore California are nearing the end of their useful life cycles and may be removed in the next few years. This has already happened in state waters. Researchers have completed collecting data on fish assemblages around a small number of platforms. It is clear from these studies that platforms off California may play a vital role in the recovery of regionally depleted fishery populations. Recent meetings with industry have identified the platforms which will likely be the first structures decommissioned on the Pacific OCS. These older structures are not among those that have been surveyed for the abundance and species composition of fishes. In future years, our focus may need to include a basic survey of the fish assemblages at these older structures. Such a survey could be expanded to include an examination of the biota associated with the platform's shell mounds. This research would address some of the scientific questions focusing on the platforms most likely to be removed in the near future. The Pacific Region requires these data and information in order to make informed decisions about potential use of platforms in the future on a case-by-case basis.

Update Biological Information

The focus of the Environmental Studies Program in the Pacific OCS Region has been in the Santa Barbara Channel and Santa Maria Basin. The basic biological information off the San Pedro Shelf, where four OCS facilities are sited, is dated (what was collected dates to the late 1970's) and may not provide an adequate foundation to conduct environmental reviews of ongoing DPP revisions nor provide an adequate foundation for revising industry requirements to collect data for decommissioning. Recent side scan sonar data collected by the USGS in State and Federal waters indicates that biological communities that were previously unknown may be present in the general vicinity of the platforms. This study will fill a regional data gap; operators would be required to conduct individual site specific biological surveys for specific future DPP revisions or decommissioning projects as needed.

Impacts of Current and New Technologies

Pacific OCS facilities are some of the deepest and heaviest permanent structures in the world. The industry is still trying to develop new methods to allow their safe removal. Even the relatively shallow-water platforms of the Pacific OCS would be considered deepwater facilities elsewhere in the U.S. and the world. The environmental impacts of the new technologies are not understood or known. A summary of knowledge of what has been done to date with comparable facilities worldwide is needed, specifically to identify the environmental impacts, mitigation strategies and their individual successes and failures, will help the Pacific OCS Region analyze the potential impacts of new deepwater removal techniques and guide developing strategies and updating regulations for decommissioning over the next few years.

Marine Mammals

Of interest to MMS in the Gulf of Mexico and Pacific OCS Region is refining our ability in the field to reduce the potential of noise impacts to marine mammals. Several models have been put forward to better address potential impacts and to improve mitigation. One large difference between the Pacific and Gulf of Mexico Regions is that in the Pacific Region, pinniped populations, in addition to cetaceans, could be affected by decommissioning activities. By coordinating efforts, it is expected that both regions can reduce costs but still obtain the information needed for their individual regions. Because some of the models are still under development and require groundtruthing, specific studies are proposed as topics for 2005/2006.

SECTION 2.0 Proposed Study Profiles

2.1 Introduction

There are few new studies proposed for the Pacific OCS Region in this annual plan; but many studies already in progress will continue to produce reports into 2004 and 2005. These may be consulted in the following:

Profiles of on-going studies can be viewed on the Internet at the MMS agency web site <http://www.mms.gov/eppd/sciences/esp/profiles/index.htm>.

Older studies reports may be viewed at <http://mmspub.mms.gov:81/>

The Pacific OCS Region's web site, <http://www.mms.gov/omm/pacific/index.htm>; contains descriptions of major elements of the regional study program and links to additional sites.

2.2 Profiles of Regional Studies Proposed for the FY 2004 NSL

Table A lists proposed studies and their rankings for FY 2004. Following the table are profiles of the proposed studies.

Table A

PROPOSED STUDIES and RANKINGS for FY 2004

| TITLE | DISCIPLINE | INFORMATION NEEDS ADDRESSED | Regional Ranking | PAGE # ASP |
|--|-----------------------|--|------------------|------------|
| <u>MARINE Monitoring of Rocky Intertidal Sites Adjacent to Oil and Gas Platforms In the Southern California Bight</u> | Biology | Study will continue monitoring of 24 of 70 established MARINE rocky intertidal sites and publish peer-reviewed papers. Information generated provides basis for evaluating potential impacts to the shoreline from OCS operations. | 1 | 11 |
| <u>Decommissioning Studies Initiative Benthic Invertebrate Communities of Shell Mounds</u> | Varied | Information will be used to predict the impact of decommissioning Pacific OCS platforms on the environment. | 2 | 13 |
| Fate of Juvenile Rockfishes Summary of Knowledge of World-Wide Decommissioning Projects San Pedro Shelf Biological Communities Platform Fish Residence Time | | Drifter study provides data needed to link near shore currents with known patterns in the Channel for greatly improved modeling of active oil spills from OCS facilities. | 3 | 16 |
| <u>The Relationship of Inner-Shelf Surface Currents to the Large-Scale Characteristic Flow Patterns of the Santa Barbara Channel</u> | Physical Oceanography | Study funds inhouse biologists conducting research at rocky intertidal sites. Information will be used to assess impacts to the intertidal from ongoing oil and gas operations. | 4 | 18 |
| <u>MINT (MMS Intertidal) Inhouse Study</u> | Biology | Study maps sea floor areas adjacent to future decommissioning sites | 5 | 20 |
| High-Resolution Multibeam Seafloor Mapping and Bottom Characterization of the Santa Barbara Channel and Off Point Conception and Long Beach, CA | Physical Oceanography | | | |

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2004-2006

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: MARINE Monitoring of Rocky Intertidal Sites Adjacent to OCS Oil and Gas Platforms in Southern California

Cost Range: (in thousands)

Period of Performance: FY 2004-2006

Description:

Background Biannual monitoring of 70 established rocky intertidal sites by MARINE and its partners now extends from Washington to Baja California. MMS initiated monitoring in Santa Barbara County in 1991; MMS actively funds monitoring of 24 sites along the mainland adjacent to OCS platforms. Through MMS's involvement in MARINE, the sampling protocol has been standardized across the west coast making it the largest long-term monitoring program on the west coast. Data has been collected at MMS sites since 1991; data on the adjacent Channel Islands has been collected since the early 1980's. Three panels of scientists advise MARINE on a voluntary basis funded by their individual institutions. A Steering Panel makes recommendations on the scope of the research and ensures data collected meets management objectives; a Science Panel peer-reviews the questions being asked and technical issues related to the data collected; a Database Panel provides expertise on database development. Several accomplishments were made over the past two years:

- All 70 sites were monitored biannually.
- 50 sites were monitored using the comprehensive protocol in the same calendar year so that broad characterizations outside the established plots can be made.
- A subset of BLM Baseline sites were revisited and monitored using the Littler protocols on both the mainland and island sites.
- A common database has been developed and will be completed by Summer 03.
- Standardized protocols for scoring data and for optional species monitoring have been adopted.
- Voucher collections have been initiated for placement in California and at the Smithsonian.
- A UCLA post-doc is being hired to assist the MARINE Science Panel in jointly publishing a series of peer-reviewed papers analyzing the broad dataset.
- The MMS-hosted MARINE website is currently being updated. Photos of the species monitored, publications; thumbnails of the trends of each species monitored, and a manual documenting standardized protocols for sampling and scoring data, site maps and other information will also be available on the website.
- Several papers have been published and presented at technical conferences

In addition to funding by each of the sponsors to continue monitoring at each MARINE site, additional joint funding for MARINE includes \$2-300,000 in FY 04/05 from the National Park Service for preparing complete inventories of southern California species. Historic voucher specimens and current vouchers will be examined and revisions made to update. Continued partial funding of MMS-funded technicians by PISCO working at UC Santa Cruz and shared funding of transportation costs by PISCO provide direct funding at MMS-funded sites. New Regional Water Quality Control Board funding to support collection and tissue analysis of mussels at paired MARINE sites along the Central coast is estimated at \$40,000/year for 5 years. Other MARINE partners continue to support ongoing monitoring of the remaining 46 sites.

Objectives This study will provide for the continued monitoring of the 24 rocky intertidal sites on the mainland shore immediately adjacent to OCS facilities. Continued support for a post-doc for an additional year to continue peer-review publication of the large MARINE dataset and overall coordination of MARINE is included. Information generated provides the basis for evaluating impacts to the shoreline from OCS activities including accidental oil spills.

Methods Sites are monitored biannually by teams of field biologists, including the MMS MINT team. Barnacles, mussels, seastars, black abalone, surfgrass, limpets, turf weed, rock weed and other algae are either photographed in fixed plots in the field, or measured and counted in irregular, circular or band plots. The sampling protocols are standardized across MARINE and are used by all MARINE field teams. Data is placed in a common database and is reviewed and published by the Science Panel.

Importance to MMS This information allows MMS to directly assess impacts to the coastline from OCS operations. It also fosters continued partnerships with local, State and Federal government agencies involved in monitoring research and the data is actively used by many entities for planning shoreline projects, marine protected areas, and reserves. It helps fulfill MMS's mandate to monitor the marine and coastal environment adjacent to OCS operations as described in the OCS Lands Act.

Products: Website updated trends of species across Southern and Central California, peer-reviewed publications on significant regional trends, reports for local, State and Federal decision makers on the health of the shoreline. Decision makers across the State are very interested in MARINE data in the establishment and monitoring of multiple marine protected areas and reserves.

Date Information Required: Information will used immediately to assess impacts from a spill from OCS facilities if and when a spill occurs. Information is being used by multiple agencies to make decisions about marine protected areas, reserves, planning and permitting activities along the coast.

Revised date: 2/03

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2004-2006

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: Decommissioning Studies Initiative

Cost Range: (in thousands)

Period of Performance: FY 2004-2006

Description:

Background The focus of this Initiative is the study of potential environmental impacts due to decommissioning OCS facilities off California, many of which are in exceptional water depths. The Pacific Region faces a variety of environmental information needs related to decommissioning and possible creation of artificial reefs from oil and gas platforms. These needs fall within a range of research topics such that an umbrella study modeled on the Coastal Marine Institutes is appropriate to provide a single source to seek leverage funds from industry and other agencies. This program provides for joint funding for decommissioning studies while maintaining MMS management of the science. While we have obtained initial support from industry for this joint industry/MMS venture, a workshop scheduled later in FY 03 will outline future research of common interest and detail matching commitments from industry and other agencies.

Objectives The purpose of the Initiative is to provide the MMS with high-quality focused studies of key questions regarding the effects of decommissioning facilities in the OCS offshore California. Specific information needs will be procured as Task Orders under this Initiative. Tasks identified for the first 2 years of funds under the Initiative include (abbreviated titles): Benthic Invertebrate Communities of Shell Mounds; Fate of Juvenile Rockfishes; Summary of Knowledge of World-wide Decommissioning Projects; San Pedro Shelf Biological Communities; and Platform Fish Residence Time.

Methods A wide range of methods will be used in these investigations depending upon the particular task. In some cases such as the summary of knowledge of world-wide decommissioning projects, methods involve literature searches and contacts with operators specializing in offshore oil removal. Tasks related to understanding benthic resources and the relationship of rockfishes to oil and gas platforms will use well accepted methods of acoustic fish tagging, Remotely Operated Vehicle (ROV) surveys, and analyses of fish otoliths.

Importance to MMS The program serves MMS's mission in several ways. It provides MMS with the mechanism to accomplish tasks under the MMS in the Offshore Minerals Management – Strategic Initiative No. 9: Develop and Implement a Plan for Decommissioning Pacific OCS Facilities. The program allows flexibility to study unanticipated issues as they arise in meetings with other agencies and industry. The modest funding level and leveraging with industry and other agencies allows MMS to sponsor needed

research that might not be possible otherwise. Of major importance to MMS and other agencies is the fact that MMS will be managing the studies to ensure that the science is of the highest quality. Finally, MMS is the lead agency with regard to analyzing industry proposals to decommission oil and gas platforms. A solid understanding of the technology now in use and that which may be used in the future for deep-water structures is required to analyze future decommissioning projects. A solid understanding of the potential environmental impacts from these technologies is needed to prepare sound environmental analysis documents.

Products: Products include peer-reviewed articles, detailed reports, photos and videotape data.

Date Information Required: The Pacific Region is engaging in discussions now about decommissioning with affected local, State and Federal entities. These discussions will benefit directly from information gained by this study and will allow MMS to proceed with writing requirements, regulations and conduct initial review over the next 2 years, and with preparing environmental assessments of draft project proposals expected by 2007.

Revised date: 3/03

DECOMMISSIONING STUDIES INITIATIVE--TASKS IDENTIFIED FOR FY 2004

TASK 1: Benthic Invertebrate Communities on Shell Mounds Surrounding Oil and Gas Platforms in the Santa Barbara Channel and Santa Maria Basin

Objectives: The objectives are: (1) Document the assemblages of large invertebrates on shell mounds associated with deep-water platforms; (2) Investigate bathymetric and spatial patterns of abundance in the most common species and taxa; (3) Compare species assemblages among platforms; (4) Investigate the relationship between the abundance of various invertebrates and those of the more common fishes to determine if significant and previously undetected associations exist; (5) Compare the density and adult size of seastar populations on the mounds with information on populations from natural reefs and soft bottom habitats in the southern California bight; and (6) Using the available feeding and reproductive ecology of the species, hypothesize trophic and recruitment relationships.

TASK 2: Assessing the Fate of Juvenile Rockfishes at an Offshore Platform and Natural Reef in the Santa Barbara Channel, California

Objectives This study has several objectives designed to determine the importance of a platform as a nursery ground by estimating the proportion of young rockfishes that, if a platform did not exist, would survive to settle out at a natural reef. These objectives are: (1) Characterize the larval and early juvenile fish assemblages during rockfish recruitment at a platform and at a natural reef site(s) in the Santa Barbara Channel; (2) Evaluate the degree to which the pattern of surface circulation identified by ongoing CODAR studies can account for temporal and spatial variation in recruitment to both sites; (3) Using CODAR data identify the direction and distance of pathways from the platform to natural reefs during rockfish recruitment; and (4) Determine what percent of rockfish larvae would likely die before reaching the natural reefs, if the rockfish did not encounter and settle at the platform

TASK 3: Summary of Knowledge of World-wide Decommissioning Projects: Environmental Issues, Mitigation Applied and Success of Mitigation in Alleviating Impacts

Objectives This study will: 1) Provide detailed information on the environmental issues identified during removal of both shallow and deepwater platforms world-wide; 2) Document mitigation used and the effectiveness of the mitigation in alleviating identified impacts through detailed case-studies of several identified decommissioning projects; and 3) Relate these to the environment offshore California

TASK 4: Regional Survey of Biological Communities on the San Pedro Shelf

Objectives The objective of the study is to update the basic biological information in the San Pedro Shelf area. Characterization of benthic communities, fishes, marine mammals and seabirds, and sediment chemistry are included in the study.

TASK 5: Residence Time at Offshore Petroleum Platforms by Characteristic Fish Species

Objectives Rockfish will be captured tagged and monitored using acoustic tags and monitoring equipment to determine their residence time and site fidelity. The objectives of this study are to: (1) Capture and implant acoustic transmitters in a sufficient number of rockfish surrogate species at two platforms in the Santa Barbara Channel; (2) Strategically place four acoustic monitors whose detection areas overlap around the platforms; (3) Retrieve, download, and service acoustic monitors on a quarterly basis; and (4) Determine the residence time, site fidelity, and movement patterns of the implanted fish.

ENVIRONMENTAL STUDIES PROGRAM: ANNUAL STUDIES PLAN FY 2004-2005

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: The Relationship of Inner-Shelf Surface Currents to the Large-Scale Characteristic Flow Patterns of the Santa Barbara Channel

Cost Range (in thousands):

Period of Performance: FY 2004 – 2005

Description:

Background The MMS has entered into a series of Cooperative Agreements (CA) with the Scripps Institution of Oceanography, University of California (1991 to 2004) to study the oceanic circulation in the Santa Barbara Channel (SBC) and Santa Maria Basin (SMB). This work was done in response to recommendations by the National Research Council (NRC, 1989 and 1990), through initial guidance by several workshops conducted in 1990 and seven Quality Review Board meetings held during the conduct of the overall study. A combined fieldwork-observation analysis and numerical modeling effort supported by these CAs has led to tremendous advances in our understanding of the regional basin-scale circulation in this area of active leases. Seeking an understanding of the circulation inshore of the 100 m isobath (approximately 2 km offshore) is not an objective under the present CA. Under the present CA, all modeling work will end in September 2003 and all analysis of field observations in 2005.

Objectives To determine the characteristic patterns of circulation over the northern SBC inner-shelf (≤ 2 km offshore), how they relate to the SBC basin-scale patterns reported by Winant et al. (2002), and to determine what are the dominant forcing mechanisms?

Methods A Lagrangian drifter study is proposed to map surface currents over the inner-shelf of the northern SBC. Drifters follow the movement of “tagged” water parcels, and thus give the combined spatial and temporal evolution of the flow field. Drifters are a much more economical solution to sampling than deploying numerous current-measuring moorings over the inner-shelf. The recently developed Lagrangian “Microstar” drifter is proposed for the observational phase of the project. The Microstar is a drifting buoy that obtains its position with the Global Positioning System (GPS) system and transmits data to shore in near real-time via a digital, data-only, terrestrial cellular messaging system. The drifter is named for its ability to resolve small time and space scales and its tri-star drogue design. The GPS tracking system allows the small-scale fluctuations that are typical of near-shore flow fields (10’s of minutes, 10’s of meters) to be properly resolved. (More traditional Argos tracked drifters, as used in the SBC-SMB CCS, have spatial errors of up to a kilometer and update their position only a few times each day.) Tests show the Microstar drifter follows water to within 0.1% of the wind speed, or within 2 cm s^{-1} for 20 m s^{-1} winds, similar to the SBC-SMB CCS drifters. The spatial accuracy, high frequency sampling rate, and near real-time cellular communications system allows drifter position to always be known within

~10 m. Drifters can thus be retrieved with great ease, and subsequently re-deployed. This “catch-and-release” scheme provides an extremely cost effective way of performing drifter studies as the instruments are no longer considered “expensive”. This new drifter data will be combined with current and wind data from the presently operating SBC-SMB monitoring program and the SBC-SMB CCS drifter data set to determine, through analysis, how the inshore characteristic flow regimes relate to the previously established basin scale flow regimes, and their dominant forcing mechanisms. Deployment of the drifters is planned to coincide with the final year of the Scripps instrumentation deployment.

Importance to MMS Presently, the MMS lacks understanding of the surface current patterns in the important near-shore area of the SBC concerning movement of spilled oil: the northern SBC inner shelf (shelf area \leq 2km offshore). The information provided by this study will allow the calculation of MMS OSRA and NOAA GNOME oil spill trajectory based on actual wind and current data (rather than wind-based estimates) in this area of complex oceanographic processes and highly sensitive natural resources. The resultant greater accuracy in oil spill trajectories is required for decision making concerning offshore oil production projects in the SBC. This information will also be used to make more informed and scientifically defensible assessments used in the preparation of the required NEPA documents: environmental impact statements, environmental assessments, and records of decisions. This study also fosters continued partnerships with EPA and SCCWRP’s Bight ’03 monitoring as this effort will allow the ability to track pollutant runoff into the Southern California Marine System. The study is strongly endorsed by Bight ’03 scientists.

Products: Papers describing the surface circulation in the northern SBC inner shelf in terms of the previously described objectives will be submitted to peer-review journals, and statistical surface current maps will be constructed for use in MMS oil spill risk assessment efforts.

Date Information Required: The data collection phase of this study must begin in early FY 2004 (October 2003) in order to obtain measurements simultaneous with those taken during the final year of the SBC-SMB Monitoring Program. This information will be used in FY 2006 MMS environmental documents supporting decisions concerning production and decommissioning projects.

Revised Date: 3/03

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2004-2006

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: MINT (MMS Intertidal Team) Inhouse Study

Cost Range: (in thousands) \$150

Period of Performance: FY 2004-2008

Description:

Background The MMS Intertidal team assists the MARINE effort at MMS funded sites by collecting data at 20 of 24 sites, providing expertise in the development of sampling protocols, and in special projects at MMS-funded sites which compliment the MARINE effort. Since the motile invertebrate protocol was adopted by MARINE, field effort by MINT team members are essential to completion of the sampling at the sites. MINT also conducts independent research and conducted a mussel recovery study at four northern California sites for a decade. MINT also serves as a response arm for the MMS oil spill effort. MINT biologists are trained and prepared to respond in the field during an event to document resources prior to oiling and to provide ground assistance to response efforts on the shoreline.

Over the next five years the MINT team plans to direct their efforts to two main areas: archival activities and ongoing monitoring at MMS-funded sites. Archival efforts include several separate projects. MINT is interested in ensuring that the long-term sites are archived properly. MINT plans to conduct several pilot efforts in cooperation with other MARINE partners to determine the most appropriate method to document the sites on a regional basis. Traditional aerial photos from helicopters, fixed wing aircraft, new technologies such as blimp and balloon photography will be investigated. MINT plans to complete the placement of permanent markers at the sites through the BLM Geodetic Survey and place the data on GIS layers. MINT also plans to oversee archiving of the BLM Littler data (maps and video) as well as placement of this important information on a GIS layer for use by multiple agencies in planning marine protected areas along the California shoreline. As in the previous two years, MINT plans to host annual Taxonomic Workshops to ensure that the multiple MARINE field teams remain trained on the identification of species and have opportunities to discuss problematic identifications.

Objectives To monitor the health of rocky intertidal resources adjacent to active OCS production facilities.

Methods Biologists photograph permanent photoplots of mussels, barnacles, anemones, and algal species such as Silvetia and Endocladia. Black abalone are counted and measured in irregular plots, seastars are counted and measured in plots or band transects; percent cover of surfgrass is estimated using line transects, and owl limpets are measured and counted in circular plots. Motile invertebrates are counted and measured in each photoplot. Panoramic photos of the sites are taken from identified reference bolts.

Importance to MMS The OCS Lands Act requires that MMS monitor the coastline adjacent to ongoing oil and gas operations so that MMS can properly assess the effect of operations on coastline resources. Since Pacific OCS platforms are located very close to the coastline, activities from OCS facilities can directly affect shoreline resources. The data collected by MINT assists spill response decision makers by providing information about resources in the area and by providing the ability to analyze the data in context with the natural environment. Ongoing interaction of the MINT team biologists with academics, local, State and Federal agency biologists has proved invaluable. It enhances MMS's credibility as a scientific agency. Some of the most far reaching benefits of the effort may be the enhanced relationships and synergism amongst sampling agencies.

Products: Joint reports with the University of California are produced every three years. GIS layers of archived data from maps, permanent coordinates and photos will be made available either on the public MARINE website or on the password protected MARINE site to MARINE partners. Voucher collections will likely be housed both at the Smithsonian and U.C. Berkeley.

Data Information Required: This is an ongoing effort and the decisions affected by this study occur as long as production occurs on Pacific OCS facilities.

Revised Date: 3/10/03

ENVIRONMENTAL STUDIES PROGRAM: ANNUAL STUDIES PLAN FY 2002-2004

Region: Pacific OCS Region

Planning Area: Southern California

Type: USGS BRD

Title: High-Resolution Multibeam Seafloor Mapping and Bottom Characterization of the Santa Barbara Channel and Off Point Conception and Long Beach, CA

Cost Range (in thousands):

Period of Performance: FY 2004 – 2005

Description:

Background. A major question in the decommissioning and platform reefing debate deals with the issues of how important a platform may be in supplying both hard substrate and fish habitat. A new study funded by MMS POCSR to be entitled “Ecological Performance of OCS Platforms as Fish Habitat off California” will begin sometime in FY 2003 and should help to answer the questions concerning fishes. In 2001, a pilot study was conducted to put in perspective the relative importance of a single platform in supplying hard substrate to its immediate environment. The study (Love, et al., in-press) determined that Platform Hidalgo, north of Point Conception, is of major importance to the local reef system and to the population of reef fishes. It was estimated from blueprints that Platform Hidalgo supplied 22,950 m² of structure. This compared to 26,714 m² of natural reef. Thus Hidalgo comprised about 46% of the hard surface in its local area (within 2 miles of the platform). Its important to note that Platform Hidalgo, likely, has the most natural reefs in its vicinity of any platform offshore California. That would make it of relatively less importance as reef habitat than would a platform that has no reefs nearby. Water depths and locations for the Pacific OCS platforms range from less than 100 to deeper than 1,000 ft and several hundred miles apart along the coast of California. As each POCS platform is different and hard bottom locations are scattered or unknown in the region, the area surrounding each platform should be examined.

The purpose of this study is to determine the location and amount of hard substrate within the Santa Barbara Channel, near some platforms off Point Conception, and near platforms off Long Beach, CA. The MMS will use the information in any environmental assessment done for future platform decommissioning. MMS scientists will also use this information to analyze cumulative impacts of decommissioning platforms to the local and regional fish populations and fisheries.

Objectives: The objectives of this study are: 1) to provide a habitat interpretative map that discriminates and computes the area of various habitats (mud, cobble, and boulder fields, etc.) and shows the dimensions of the mussel mounds surrounding offshore platforms on the Pacific OCS; (2) to provide a document that scientists can use to estimate the contribution of hard substrate from offshore platforms to the region.

Methods: Multibeam imaging was used to conduct the pilot study and should be used in this effort. Multibeam imaging produces accurate maps of depth and habitat-type. The high-resolution sea bottom mapping will be conducted on a 25-day cruise. Data collection will be accomplished with a multibeam system using equipment such as a Kongsberg Simrad EM1002 multibeam echo sounder (MBES). This is the only high-resolution MBES that simultaneously records both a calibrated acoustic backscatter and the water depth. The acoustic backscatter data helps predict the type of sediments found at the seafloor by extrapolating ground truth sediment information obtained with core and grab samples. This will allow for maps to be produced that show sediment information superimposed on the bathymetry. The USGS will supervise the data collection aboard the ship and will perform all data processing.

Importance to MMS: MMS studies indicate that platforms do create habitat for several species of rockfish. The Department of Commerce in January 2000 declared the West Coast rockfish fishery a disaster with extremely small populations remaining. The Pacific Fishery Management Council began to severely restrict fishing for these species in 2002. Also in 2002, one rockfish species known to inhabit POCSR platforms in large numbers was a candidate for listing as threatened under the Endangered Species Act. The removal of a platform, such as Hidalgo, that provides 46% or more of the available local habitat for rockfish would potentially impact this fishery on a regional scale. This study will support the MMS in the environmental analysis of decommissioning projects and in the decision-making process.

Products: A draft and final report along with maps and digitized GIS maps of the sea floor.

Date Information Required: This information is needed for proper analysis and decision-making for increased Pacific OCS oil and gas decommissioning activities in the Santa Maria Basin, Santa Barbara Channel, and off Long Beach, CA.

Revised Date: March 2003

SECTION 3. Topical Areas for Years 2005 and 2006

The Pacific Region has identified the following topical areas related to decommissioning. Additional discussion with industry and the IDWG is needed on many of the topics and a meeting/workshop is being planned for fall 2003.

Areas identified below include several topics being addressed with studies proposed in FY 2004, but additional areas remain which we expect to pursue in FY 2005 and 2006.

Shell Mounds

Studies will be needed to assess the physical and chemical characteristics of shell mounds. Studies of shell mounds left by decommissioned platforms in State waters indicate the need to understand the concentration of certain chemicals and their potential bioavailability in order to assess potential impacts of shell mound removal. The State studies are being completed; their reviews will help design appropriate studies for Federal facilities. One focus would be on looking at potential regional concentration levels and providing sufficient information to design site-specific industry requirements.

Marine Mammals--Protected Species

Twenty-three (23) oil and gas structures currently exist on the Pacific Outer Continental Shelf (OCS). Some of the OCS platforms are approaching the end of their productive life, and the permit-application process for decommissioning could begin during this decade. Within one year of lease termination, the Minerals Management Service (MMS) requires that structures be removed from the OCS and that they be severed at least 15 feet below the seafloor. On the Gulf of Mexico OCS, more than 5,000 structures have been removed; approximately 60 percent of these have been removed using explosive techniques. It is expected that the removal of Pacific OCS Region structures will likely also involve the use of explosives.

The detonation of explosives underwater can result in the injury or death of fish and marine protected species, such as marine mammals, although potential damage can be mitigated. Consequently, MMS requires the best available information regarding the potential impacts of the explosive removal of offshore structures (EROS) on marine mammals. The ability to predict potential effects on marine mammals from these activities will assist MMS in meeting its regulatory obligations and in making decisions to minimize the potential taking of marine mammals while permitting the explosive removal of offshore structures. Several topics have been suggested for EROS-related marine mammal studies that might be proposed for funding in the Pacific Region in FY 2005 (and beyond); these are described below.

Active Marine Mammal Sonar. Currently, mitigation to protect marine mammals (and sea turtles) from potential injury during explosive removals involves the use of visual observations to determine whether animals are present in pre-defined exclusion zones around the structures. However, visual monitoring

techniques are inherently limited by light and weather conditions, and animals more than a few meters beneath the surface are invisible, even from the air. Monitoring could be improved through the use of an active marine mammal sonar system that could detect marine mammals under all environmental conditions. Such a system is currently under development (Stein, 2003). A field study of active acoustic marine mammal sonar would focus on the marine mammal species likely to occur in the vicinity of potential Pacific OCS platform removals and test the system's usefulness as a monitoring tool.

Impact Assessment Modeling. Another research approach would be to model the potential effects of the explosive removal of offshore structures on marine mammals in southern California waters. This is envisioned as a computer-based modeling study involving the integration of two models, a marine shock wave/sound propagation model and a marine mammal impact assessment model. Examples of such models are the marine shock wave/sound propagation model developed for MMS by Applied Research Associates, Inc. (Dzwilewski and Fenton, 2002), and the marine mammal impact-assessment Acoustic Integration Model (AIM) developed by Marine Acoustics, Inc. (Ellison and Frankel, 2003). Objectives of the study would be to incorporate the appropriate parameters (e.g., distribution, behavior, diving) specific to California marine mammal species into the impact assessment model and apply the models using realistic explosive-removal scenarios to predict potential impacts to marine mammals (including mortality, injury, and permanent and temporary hearing loss).

Temporary Threshold Shift. It is known that exposure to loud sound can cause a Temporary Threshold Shift (TTS), the short-term elevation of an animal's hearing threshold at particular frequencies. However, relatively little is known about TTS in marine mammals, particularly in response to impulsive sound such as that produced by underwater explosions. U.S. Navy researchers have recently begun studying TTS in small cetaceans using low-frequency sound sources (Finneran et al., 2000, 2002). A possible study topic relevant to EROS activities in the Pacific OCS Region would be a study of pinniped responses to extremely short, impulsive signals. Information on the levels of pulsed, low-frequency sound that induce TTS in pinnipeds would improve our understanding of the potential impacts of underwater explosions on marine mammals. This, in turn, could lead to improvements in the design of mitigation measures, particularly in the definition of species- or group-specific exclusion zones.

Coastal Marine Institute

A further topic under consideration within the Pacific OCS Region is the need to continue the Coastal Marine Institute initiative with the University of California Santa Barbara at a reduced funding level and narrowly focused on ongoing operations, decommissioning topics and the intern program. The current cooperative agreement runs through FY 2004 (with some reports completing in 2005). This mechanism will be used to fund projects with the University that cannot be funded through the Decommissioning Studies Initiative.

SECTION 4. Literature Cited

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- Finneran, J.J., C.E. Schlundt, D.A. Carder, J.A. Clark, J.A. Young, J.B. Gaspin, and S.H. Ridgway. 2000. Auditory and behavioral responses of bottlenose dolphins (*Tursiops truncatus*) and a beluga whale (*Delphinapterus leucas*) to impulsive sounds resembling distant signatures of underwater explosions. *Journal of the Acoustical Society of America* 108(1):417-431.
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