Offshore Environmental Studies Program

Fiscal Years (FY) 2007 – 2009 Studies Development Plan

Pacific OCS Region

U.S. Department of the Interior
Minerals Management Service
Pacific OCS Region
Camarillo, CA
2006

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SECTION 1.0 PROGRAMMATIC OVERVIEW

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 change in the status of the area from frontier to a mature producing area (pre-lease to post-lease emphasis).

Existing production and development activities on 43 producing leases offshore southern California will continue for many years. Annual production from these leases is currently 78,000 bbls/day and 200 MMcf/natural gas /day. It is expected that production from the majority of these facilities will continue for many years. The projected OCS activities section of this report fully discusses the activities we anticipate on producing leases.

This annual plan reflects a new addition to the Environmental Studies Program: the need for information to regulate future renewable energy projects and alternate uses of existing platforms that may be proposed and implemented in the Pacific OCS Region. As the Region has matured, and as developed oil and gas field production has peaked and entered declines, new and innovative ideas for the use of traditional oil and gas platforms have emerged. New uses proposed for oil and gas platforms have included marine aquaculture and Liquefied Natural Gas (LNG) facilities. New or updated environmental studies will support MMS decisions with regard to such innovative and non-traditional uses of offshore facilities. The plan complements and reinforces the Environmental Studies National Strategic Plan.

This document presents a strategy for the Pacific OCS Region. It applies to the entire Region, which stretches from the United States-Mexico border to the border with Canada. It includes Hawaii, only in regards to the earliest planning for possible environmental studies related to renewable energy projects that may occur in the planning area. The plan focuses on the portions of the Southern California Planning Area with ongoing oil and gas activities. This includes the Santa Barbara Channel, the Santa Maria Basin and San Pedro Shelf (see Figures 1.21, 1.22, 1.23).

The information obtained through these studies is important and relevant to decision making. We consider this information appropriate to obtain 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 Offshore 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 acquire the information.

The level of future OCS oil and gas activities and the introduction of renewable energy projects offshore the Pacific Coast will dictate changes in the strategy. Findings from current or future research may also affect the strategy and cause other avenues of research to be incorporated.

If you have any questions regarding this Pacific OCS Region Environmental Studies Development 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 Maps of Planning Area

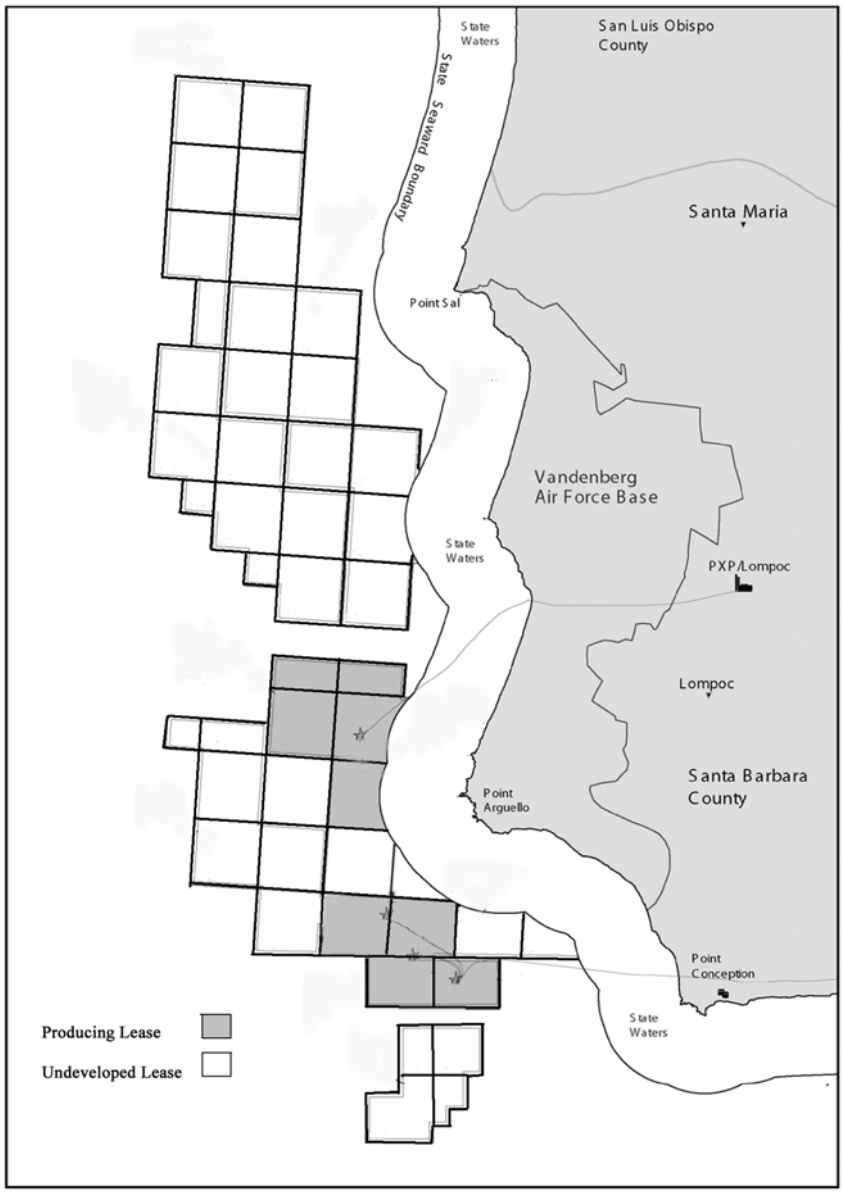

Figure 1.21 Santa Maria Basin Leases

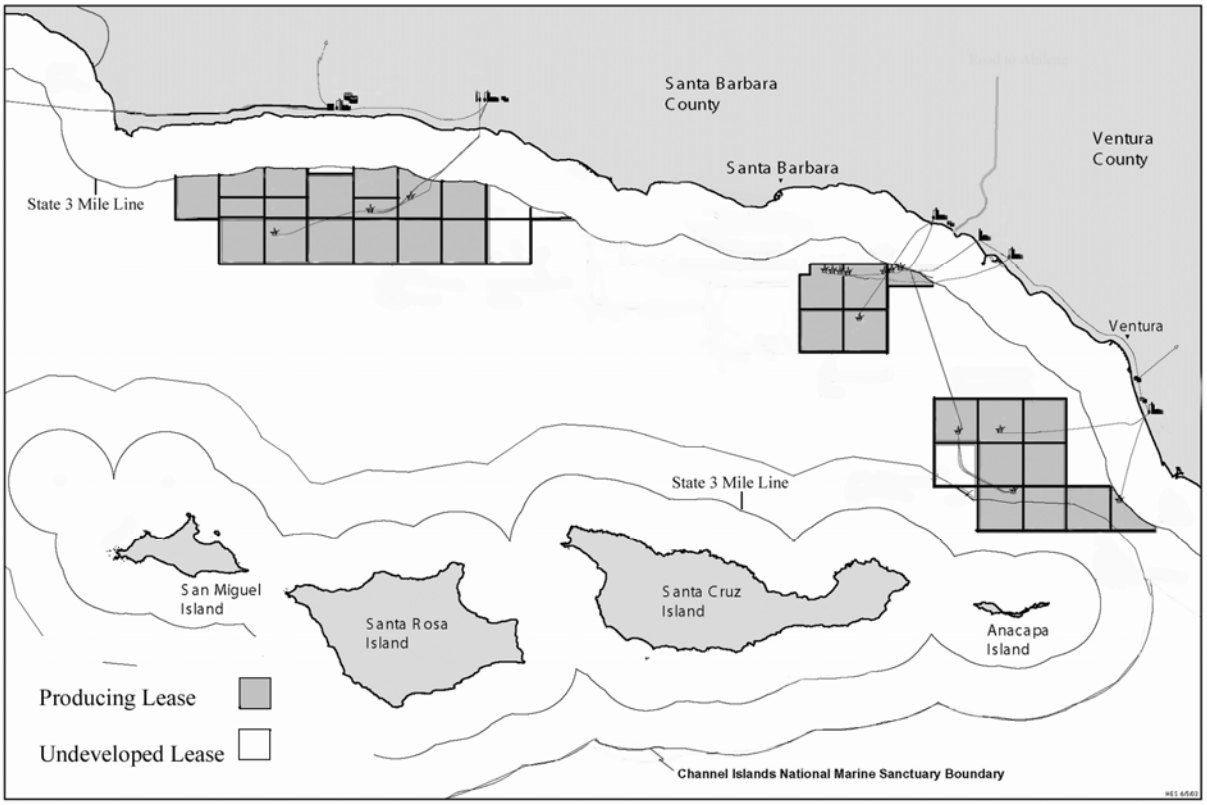

Figure 1.22 Santa Barbara Channel Leases

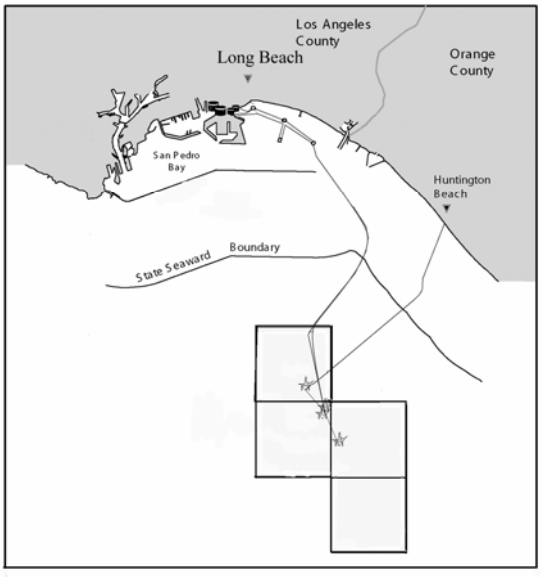

Figure 1.23 San Pedro Bay Leases (all producing leases)

1.3 Projected OCS Activities

Prelease

No lease sales are anticipated for this planning area under the MMS Comprehensive Leasing Program for 2008 – 2012 nor are any lease sales projected for the future.

Postlease

The Southern California Planning area contains

- 43 producing oil and gas leases
- 600 million barrels of oil in proved reserves on existing producing 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 78,000 barrels of oil per day and 200 million cubic feet of natural gas per day; this rate could be sustained into the next decade. Studies identified in this regional plan highlight critical information gaps and are geared to allow MMS to conduct analyses that support permitting and regulation of the oil and gas industry's ongoing production projects. Continued production at these facilities may pose new information needs during the coming decade in order to maintain environmentally safe operations with the existing infrastructure.

Studies are needed to address and monitor the environment adjacent to the existing facilities. For example, environmental studies information was used in analysis for the replacement of a power cable to the Santa Ynez Unit (Santa Barbara Channel) offshore platforms. These platforms are electrically powered from onshore sources via a cable. The cable needed to be replaced and the MMS used recent data from environmental studies in preparing an Environmental Assessment (NEPA document) for that post lease activity.

Several alternate uses of oil and gas facilities have been proposed recently including use of an OCS facility as a base for marine aquaculture operations and as a receiving port for Liquefied Natural Gas (LNG).

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 decisions concerning ongoing drilling and production operations, there is a continued need to monitor the shoreline plant and animal populations proximal to producing facilities. Production from many of these facilities is expected to continue for a number of years. MMS needs to monitor environmental impacts and to maintain a readiness along the shoreline to address potential impacts, including those that may result from accidents from OCS production for the duration of operations.

The MMS focus on intertidal biology is due to the high variability of these systems and their proximity to OCS production. Continued study of resources is needed so that broader regional changes in marine nearshore and coastal ecosystems are not confused with real or potential effects from oil and gas operations (including oil spills).

Mitigation monitoring will continue under this plan to study effective mitigation measures for proposed projects and, to facilitate this objective, study the effects of actual mitigation measures that are implemented in the region for offshore operations.

b. Continue to obtain information in advance of potential future decommissioning.

A study of the fish assemblages on pipelines continues in this plan as a carry over from the previous fiscal year.

SECTION 2.0 PROPOSED STUDY PROFILES

2.1 Introduction

Study Descriptions of Ongoing Studies may be found on the web at http://www.mms.gov/eppd/sciences/esp/profiles/pacific.htm. Four new studies are proposed for FY 07.

Ongoing Operations Support Studies:
Three new studies supporting ongoing operations are proposed for FY 2007.

> Environmental Mitigation Monitoring: This is a continuation of a successfully implemented study initiated in 1997.
>
> MARINe: This study continues the rocky shore monitoring program that MMS has conducted since 1997.
>
> Update of Summary of Knowledge: Areas of Ongoing Production: This study will provide an up-to-date summary of environmental conditions that MMS will use for to review ongoing operations.

Decommissioning Studies:
One new decommissioning study is identified for MMS funding in FY 2007.

> Continuation of Fish Assemblages Associated with Platforms Concentrating in Areas Where Data Are Limited. This study continues a highly successful survey of fish assemblages at Pacific platforms. The initial studies revealed that the platforms harbor populations of regional importance to depleted species. Since the State of California has engaged MMS to discuss potential State legislation to allow for Rigs to Reefs on a case-by-case basis, it is critical to have this information for decision-making. The goal of this research is to determine the species and patterns of fish assemblages around platforms where data are limited.

2.2 Profiles of Studies Proposed for the FY 2007 NSL

Table 1. Pacific OCS Region Studies Proposed for the FY 2007 NSL

Page #SDP	Discipline	Title	Regional Ranking
11	FE	Environmental Mitigation Monitoring	1
13	HE	MARINe	2
15	HE	Update of Summary of Knowledge: Areas of Ongoing Production	3
17	HE	Continuation of Fish Assemblages Associated with Platforms Concentrating in Areas Where Data Are Limited	4

HE = Habitat and Ecology
IM = Information Management
FE = Fates and Effects
AQ = Air Quality
MM = Marine Mammals and Protected Species
PO = Physical Oceanography
SS = Social Science

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007-2009

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: Environmental Mitigation Monitoring

MMS Information Need(s) to be Addressed: Environmental mitigation monitoring data (see examples of potential types in methods section below) would be used by the MMS to evaluate MMS-imposed specific requirements (environmental mitigation measures and project conditions) of OCS oil and gas operations. Information from environmental mitigation monitoring studies will aid the development of more feasible and scientifically defensible mitigation measures and project conditions for future oil and gas operations.

Cost Range: (in thousands) $ **Period of Performance:** FY 2007 – FY 2011

Description:

Background: An integral part of implementing the OCS Lands Act requires MMS to conduct environmental reviews and prepare environmental documents such as environmental impact statements (EIS) and environmental assessments (EA). During the past decades, the Pacific OCS Region has issued permits for numerous oil and gas activities. MMS carefully analyzed these projects and included required environmental mitigation measures and associated permit conditions in environmental documents developed for those projects. Review of the success of the spectrum of environmental mitigation employed in the Region will enable MMS to improve environmental protection and further ensure oil and gas activities proceed in an environmentally sound and timely manner.

The study is a continuation of two studies of the same name that were designed to evaluate the effectiveness of environmental mitigation required of Pacific OCS oil and gas operations: a field analysis segment that was conducted between 1997 and 2001 and another that was conducted between 2002 and 2006. The evaluations consist of field monitoring and observations of Pacific OCS Region oil and gas operations.

Objectives: The study goals are to observe, sample, and/or monitor for mitigation measure effectiveness requirements (MMS regulations, Lease Sale Stipulations, National Environmental Policy Act (NEPA) requirements, and non-MMS agency requirements, etc.) imposed on OCS oil and gas operations in the Pacific OCS Region. In many cases, experimental approaches to measuring mitigation effectiveness will be used. The type of data collected will depend on specific environmental mitigations either in place or proposed for future operations.

Methods: The Santa Barbara Channel and the Santa Maria Basin will be the primary focus of the environmental mitigation monitoring, with a secondary focus on the San Pedro Basin. Methodology consists of actual mitigation monitoring to determine the environmental effectiveness of mitigation placed upon projects. Examples of potential future field monitoring studies in conjunction with Pacific OCS Region projects of opportunity could include, 1) bio-chemical profiling of shell mounds in the vicinity of the platforms to determine the feasibility of deep water compliance with debris removal; 2) subsea well abandonment studies in the Santa Barbara Channel (e.g., remotely operated vehicle (ROV) site clearance surveys, trawling testing, and sediment and ocean transport); 3) continued studies of the concentration and dilution rates with distance of produced water plumes at representative OCS oil and gas platforms; and 4) collecting drilling discharges and sediment transport samples in the vicinity of hardbottom areas to determine effectiveness of mitigations to protect those resources. The type of data collected will be determined by Pacific OCS Region environmental management and scientists as specified by the particular project and would depend on the specified approval conditions.

Revised Date: January 18, 2006

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007 – 2009

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: MARINe (Multi-Agency Rocky Intertidal Network)

MMS Information Need(s) to be Addressed: Ongoing monitoring of rocky intertidal sites adjacent to OCS production facilities allows MMS to directly assess potential and/or real impacts to the coastline from OCS operations. Potential impacts to the shoreline are of particular concern because OCS operations are located very close to shore. Public concern with these impacts has a considerable effect on the program. With these data, MMS can directly assess impacts to shoreline resources from OCS activities by differentiating between naturally caused impacts and other anthropogenic impacts including impacts from OCS oil and gas production and accidental oil spills. The study implements MMS's OCS Lands Act mandate to monitor the marine and coastal environment adjacent to OCS operations.

Cost Range: (in thousands) - $ **Period of Performance:** FY 2007-2009

Description:

Background: MMS and its 40 partners in MARINe biannually monitor 80 established rocky intertidal sites across California using a standardized field protocol and share a common database (www.MARINe.gov). This study provides funding to monitor all 24 MMS long-term monitoring sites adjacent to OCS operations. MMS continues to participate actively in the management and oversight of MARINe, to access the data critical to our ongoing operations, and to fulfill our responsibility to monitor OCS platforms and pipeline operations.

Over the past two years, several significant changes have been documented at MARINe sites. The most significant of these occurred at a location in central California that became publicly accessible after being under private ownership for decades. In that case, MARINe documented significant declines in key species after the site was open to the public for only a few months. Scientists predict that the loss in that one single season would require 20 years to recover (P.Raimondi, 2005). Black abalone, throughout the area affected by withering foot syndrome, are still at the low levels (5% of the original population in the late 1980's and early 1990's) along much of the coastline. While the areal extent affected by withering foot syndrome disease has leveled off, new evidence of the disease is still being found at MMS sites in San Luis Obispo County. For many years, miles of coastline continued to be affected and the numbers of abalone fell drastically. It appears that the decline in abalone numbers continues due to a combination of loss of animals from withering foot coupled with an absence of recruitment. Evidence of withering foot syndrome was most recently observed at Point Sierra Nevada and Piedras Blancas in northern San Luis Obispo County. It seems

unlikely the black abalone will recover. No impacts have been identified from oiling over the recent past, either from OCS or non-OCS operations.

One of the benefits of MARINe, which is a large network of biologists in the field monitoring a huge stretch of coastline, was realized in summer 2004 when sick seastars were found at Santa Cruz Island. Within days, biologists along the coast were able to determine the extent of the illness and confirm the presence or absence of illness in the population along remaining sections of coast and conclude that this was a fairly isolated event. Biologists will continue to check for evidence of wasting disease in the seastar populations during routine MARINe monitoring. Knowing where population changes occur on a broad scale helps MMS to determine whether oil and gas activities are affecting the environment or whether the changes are in response to another impact agent.

Partnerships are also fostered with local, State and Federal government agencies involved in monitoring research. The data is actively used by many entities for planning shoreline projects, marine protected areas, and reserves.

MMS has completed the report "Monitoring of rocky intertidal resources along the central and southern California mainland: comprehensive report (1992-2003) for San Luis Obispo, Santa Barbara, Ventura, Los Angeles and Orange Counties" (Raimondi, 2005) which describes changes specifically at MMS sites. Additionally, the MARINe Science Panel has published three peer-reviewed papers this year incorporating data from all MARINe sites. Additionally 30 publications and reports have been published by MARINe members regarding these sites, and 29 presentations have been given at conferences presenting MARINe data to the public.

Objectives: This study will provide for the continued monitoring of 24 rocky intertidal sites on the mainland shore immediately adjacent to OCS facilities. Information generated will provide the basis for evaluating impacts to the shoreline from OCS activities, especially accidental oil spills. Management and coordination of MARINe and database tasks are included so that MMS has access to the data needed for management decisions.

Methods: Sites are monitored biannually by 5 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.

Revised Date: January 18, 2006

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007-2009

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: Update of Summary of Knowledge: Areas of Ongoing Production

MMS Information Need(s) to be Addressed: Oil and gas drilling and production from existing Pacific OCS leases will continue for at least 20 more years. Proposals for drilling and producing resources in State waters from platforms in Federal waters are also circulating. Regulations at 30 CFR 250.284(a) "Oil and Gas and Sulfur Operations in the Outer Continental Shelf – Plans and Information" require periodic review of approved DPP's to determine if there are significant changes in available information and onshore or offshore conditions affecting, or affected by the development or production activities being conducted pursuant to the plans. To perform these periodic and project reviews, MMS Pacific OCS Region scientists rely on environmental documentation written for previous Pacific OCS lease sales, platforms, pipelines, the undeveloped leases, environmental studies and other available documents and reports. Because many of these reports are no longer current, to insure that the information on which MMS relies for decisions – ongoing and new projects and for the consideration of alternate use and renewable energy projects, an updated summary of the current status of the marine and coastal environment and potential newly developed mitigations is needed.

Cost Range (in thousands): $ **Period of Performance:** FY 2007 - 2009

Description:

Background: The MMS Pacific OCS Region continues to be a significant source of oil and gas for the nation. Activity offshore California continues on existing leases and will include additional drilling into existing fields using new drilling and recovery technologies, possible drilling into two fields in State of California tidelands from existing oil and gas platforms in Federal waters, and potential renewable energy and alternate use projects in the offshore area. The Region requires a complete, updated analysis for both offshore and onshore areas that builds upon the body of work in the area. For example, an historical perspective, through 1985, of the commercial and sport fisheries offshore California was completed for the MMS Pacific Region studies program in 1989. This document, MMS 89-0073, has proved to be useful during analysis of the potential impacts of OCS activities on fishers and fisheries. There are numerous reports on the commercial and sport fishers and fisheries, and information on regulations and restrictions from the Pacific Fishery Management Council. While regulations, fishing restrictions, fishers, and fishing methods have rapidly changed over the past 20 years, a concise summary of this information is lacking.

Objectives: The objective of this study is to produce an updated summary of knowledge which contains a complete description of the status of marine and coastal environments and living resources. This will be coupled with updated generic analyses of the potential effects of oil and gas operations, and accidents which could accompany production of oil and gas offshore California. Finally, a goal is to identify mitigations that have been found to be effective in reducing impacts and include analyses of the effectiveness of contemporary mitigation measures on potential effects of oil and gas operations.

Methods: The methods to be used in this study are traditional literature reviews and effects analyses based upon both observational and experimental published research. The study will build upon previous environmental documents and MMS studies. The final document will be reviewed by a Science Review Board and will constitute the end product resulting from this study. A specific task within this study is to review and compile, from 1985-2005, the past and presently available reports and information on commercial and sport fishers and fisheries offshore California from Morro Bay to Laguna Beach. In the course of the study, the investigators will speak to recognized knowledgeable persons such as Dr. Craig Fusaro, Joint Oil/Fisheries Liaison Officer, and John Richards, Sea Grant Extension Officer. The study will review, from 1985-2005, the past and existing regulations, laws, and policies regarding these fisheries. The document should include the trends and changes that have occurred and relate their importance to OCS activities.

Revised date: January 18, 2006

ENVIRONMENTAL STUDIES PROIGRAM: Studies Development Plan 2007-2009

Region: Pacific OCS Region

Planning Area: Southern California

Title: Continuation of Fish Assemblages Associated with Platforms Concentrating in Areas Where Data Are Limited

MMS Information Need(s) to be Addressed: The fate of spent offshore platforms off California has been a subject of considerable debate, much of which is focused on the potential importance of the fish populations at these facilities. Data gaps concerning the fish assemblages exist at some of the oldest facilities yet these facilities may be the first to be decommissioned. Knowledge of the potential importance of the population at platforms to the depleted Pacific rockfish stocks is essential for fully evaluating the various options proposed for decommissioning California's offshore oil platforms.

Cost Range (in thousands): $ **Period of Performance:** FY 2007 - 2010

Description:

Background: It is recognized that knowledge of fish assemblages inhabiting OCS facilities is fundamental to determining the effects of decommissioning on fish populations. Since 1995 the Biological Resources Division (BRD) of the U. S. Geological Survey, the Minerals Management Service, and most recently the California Artificial Reef Enhancement Program, have provided funding to conduct research on the fishes that live around the platforms and on natural rock outcrops of central and southern California. The goal of this research was to determine the patterns of fish assemblages around both platforms and outcrops. A major synthesis of this work was published in 2003 and has been well received. The MMS Decommissioning Workshop recommended this present study to build upon the prior MMS/BRD work where data is non-existent or limited. The largest data gap exists for the oldest structures that have not been examined for their associated fish or invertebrate assemblages. Information from these platforms would provide a broader understanding of the regional populations so that specific requirements can be identified for industry when decommissioning their lines. This necessary research involves broad scale surveys at numerous oil/gas platforms and natural reefs concentrating on facilities in the Santa Ynez and Beta Units and off Summerland CA.

Objectives: Research objectives include 1) characterizing the fish assemblages around platforms where data is limited or non-existent and on nearby natural reefs, and 2) describing the spatial and temporal patterns of fish diversity, abundance and size distribution among habitat types.

Methods: A multiple-year fish survey of platforms and nearby natural outcrops concentrating

on geographic areas where data is non-existent or limited.
At Platforms and Natural Outcrops within SCUBA Depth:
1) Conduct scuba surveys of the upper 30 m of these platforms, along with surveys of relatively shallow natural outcrops.
At Platforms and Natural Outcrops below SCUBA Depth:

1) Conduct fish surveys using the Delta submersible, a 4.6 m, 2-person vessel, operated by Delta Oceanographics of Oxnard, California along belt transects about two meters from the substrata. 2) Make transects around the bottom of the platform and around each set of cross beams to a mini-mum depth of 20–30 m (66–100 ft.) below the surface. 3) Conduct belt transects to sample the shell mounds and natural rock outcrops. During all transects document (1) species (if known); (2) estimated total length; (3) the habitat it occupied (e.g., rock, sand, mud, cobble, boulder); (4) its position relative to the substrate (e.g., in crevice, on reef crest, on slope, above structure); and (5) the distance of the fish from that substrate.

Revised date: May 11, 2006

2.3 Profiles of Studies Proposed for the FY 2008 NSL

Table 2. Pacific OCS Region Studies Proposed for the FY 2008 NSL

Page #SDP	Discipline	Title
20	PO	Bottom Currents in the Santa Barbara Channel
22	HE	Spatial and Seasonal Variation in the Biomass and Size Distribution of Juvenile Fishes Associated with a Petroleum Platform off the California Coast
24	HE	Investigation of PCB and PAH Contaminants in Archived Samples of Platform Resident Fish
26	HE	Summary of Knowledge of World-wide Decommissioning Projects: Environmental Issues, Mitigation Applied and Success of Mitigation in Alleviating Impacts

HE = Habitat and Ecology
IM = Information Management
FE = Fates and Effects
AQ = Air Quality
MM = Marine Mammals and Protected Species
PO = Physical Oceanography
SS = Social Science

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007 – 2009

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: Bottom Currents in the Santa Barbara Channel

MMS Information Need(s) to be Addressed: There is insufficient information available about the bottom current speeds and direction in areas of OCS oil and gas development and production activities that is critical in reviewing oil spill response plans submitted by operators and in predicting the trajectories of potential spills from pipelines. Specifically, documentation of the bottom currents which exist both nearshore and offshore along the pipeline routes are needed to verify recently modeled bottom currents.

Cost Range: (in thousands) $ **Period of Performance:** FY 2007-2008

Description:

Background: The pipeline infrastructure in the Pacific OCS Region has experienced several problems in the past. These have included spans created beneath pipelines and one significant oil spill generated from a pipeline break in 1997. MMS contracted with Leo Oey of Princeton University to develop a model of near-bottom currents in the Santa Barbara Channel. The progress report released in mid 2005 indicates that, based on this model, the highest bottom currents anticipated, at least in the Point Arguello and eastern Santa Barbara Channel regions, are 0.10 to 0.50 meters per second (approx 0.5 to 1 knot). Unfortunately, very little data exist to validate the model. While these may be viewed as comparatively strong bottom currents, MMS scientists believe that these estimates may still be low based on qualitative information gleaned from field work conducted offshore using ROV's and manned submersibles to conduct biological surveys and pipeline surveys. ROV and manned submersible operators working routinely on and near OCS pipelines believe that they encounter currents in the 1-2 knot range at various portions of the lines, especially off Point Conception and near the Platform Grace pipeline (pers. com J.Kowalishen, Divecom 2006 and M.Love, UCSB). They believe the higher currents may be linked to local topography, such as channels, which may focus the bottom currents.

Accurate bottom current data will assist MMS in determining appropriate mitigation requirements for the operator to ensure safe pipeline procedures are followed either for ongoing operations or to assess potential impacts to biological resources from an accidental spill. Applications for new pipelines for LNG facilities for which MMS is required to prepare and issue pipeline rights-of-way also benefit from actual bottom current data that are available to verify modeled current predictions. MMS needs this information to review pipeline designs for the proposed pipelines and to review and prepare potential oil spill trajectories.

Objectives: To obtain site-specific bottom current data in the eastern Santa Barbara Channel that can be used to verify bottom current model predictions.

Methods: Current measuring equipment would be deployed in the eastern Channel in at least two water depths to evaluate bottom current conditions, with special focus on the region around the pipeline from Grace to shore. One methodology could employ upward-looking ADCPs measuring currents in 2 m bins from about 5 m above the bed to 90 m. In addition, near-seabottom wave orbital velocities and the pressure fluctuations associated with these waves could be measured for 20 m every 9 hours. Other parameters that will be measured include the near-bed temperature and salinity of the water. The instrument will be deployed for a minimum of 2 years. Standard methods will use the measured current and wave profiles to extrapolate the field near the sea bed. Separate current meters may also be deployed at intervals along the pipeline to provide adequate information about the currents nearshore and offshore. Other localized studies of sediment size and transport may also be identified depending on the initial results of the experiment in order to provide an understanding of the potential sediment transport and near bottom trajectories of oil spills from pipelines.

Revised Date: January 18, 2006

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007-2009

Region: Pacific OCS Region

Planning Area: Southern California

Title: Spatial and Seasonal Variation in the Biomass and Size Distribution of Juvenile Fishes Associated with a Petroleum Platform off the California Coast

MMS Information Need(s) to be Addressed: The fate of spent offshore oil platforms in California has been a subject of considerable debate, much of which is focused on the potential importance of the platforms as artificial reef systems. Knowledge of the potential importance of platforms to the recruitment and survival of depleted rockfish stocks is essential for fully evaluating the various options proposed for decommissioning California's offshore oil platforms. The MMS Decommissioning Workshop recommended this study to build upon several completed studies that have collected fish data. Several completed and ongoing studies have or are collecting fish data, and this effort will provide MMS with the data to more accurately prepare environmental documents for decommissioning.

Cost Range (in thousands): $ **Period of Performance:** FY 2008 – 2011

Description:

Background: Debates regarding offshore petroleum platform decommissioning have raised questions about how these structures function in replenishing local fish stocks. Eight species of rockfish, including widow, bocaccio, and cowcod, have been declared overfished by NOAA. Of special concern is the bocaccio which has been proposed as a candidate for listing under the Endangered Species Act and the cowcod, which is a species of special concern to the State of California. Because fish populations are usually limited by available energy, recruitment, or habitat, it is important to determine if platforms provide critical habitat for early life history stages. Because fish populations are usually limited by available energy, recruitment, or habitat, it is important to determine if platforms provide critical habitat for early life history stages. Results from MMS funded research during the mid-1990's and early 2000's show that platforms uniquely serve as shallow, offshore habitats that are suitable for recruitment of a number of fish species that also recruit to nearshore natural reefs. Several species, such as bocaccio, widow and blue rockfishes have recruited in far greater numbers to platforms than to most of the natural reefs that have been surveyed. Year after year, researchers from UCSB document hundreds of thousands of young rockfish recruiting in pulses to the platforms off California. Often the incredible numbers and species of juvenile rockfish vary widely over short time periods. The importance of the platforms to these pulses, or if there is a pattern to these pulses, is unknown.

The investigation of the nursery function and recruitment linkage between the reef fish

community and offshore oil and gas platforms has obvious and immediate ecological implications, clear ramifications for MMS, fishery management impacts, and direct applicability to California since it has vertically structured platforms offshore.

The MMS-funded study *Assessing the Fate of Juvenile Rockfish at Offshore Platforms and Natural Reefs in the Santa Barbara Channel* NSL PC-04-02, Agreement Number 1435-01-05-CA-35031 was awarded in FY 2004. That investigation focused on a longitudinal snapshot of the fate of juvenile rockfish if platforms were not present. The present study builds upon that work and would examine how juveniles of the same type species use the habitat while present at platforms. The MMS Decommissioning Workshop recommended this present study to build upon the prior work.

Objectives: The objectives of this investigation are to 1) Determine the pattern of recruitment pulses over 2-3 rockfish recruitment seasons; 2) Determine the effect of water depth on juvenile fish density, size distribution and species composition; and, 3) Ultimately to measure the recruitment value of a platform.

Methods: Complementary sampling methods of visual ROV surveys and quantitative dual beam hydroacoustics on a 24/7 basis will be used to document the assemblage of juvenile fishes over the rockfish recruitment season (May-August) for 2-3 years at Platform Grace. The use of dual beam hydroacoustics and ROV visual surveys are proven sampling methods with established protocols that are used extensively at offshore platforms. The location and depth of Platform Grace in the Pacific lends itself to these techniques. A dual beam hydroacoustic array from Biosonics, Seattle WA, will be used 24/7 in conjunction with daily, visual point count surveys using an ROV to measure the density and size distribution, and to determine species of juvenile fishes associated with a petroleum platform off the California coast.

Revised date: January 18, 2006

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007-2009

Region: Pacific OCS Region

Planning Area: Southern California

Type: N/A

Title: Investigation of PCB and PAH Contaminants in Archived Samples of Platform Resident Fish

MMS Information Need(s) to be Addressed: The fate of spent offshore platforms and pipelines off California has been a subject of considerable debate, much of which is focused on the potential importance of the fish populations at these facilities. The question of contamination and contaminant load in platform resident fish and shellfish continues to arise during discussions with both State and Federal agencies regarding the importance of platform resident populations. Given the recent mercury and PCB alarm concerning these compounds and their harm to humans when concentrated in edible fish tissue, it is timely to determine which contaminants are contained in various tissues of resident fish and shellfish at platforms. Knowledge of the quantity and extent of contaminants in fish and shellfish tissue along with the regional geospatial background is essential for fully evaluating the various options proposed for decommissioning California's offshore oil platforms.

Cost Range (in thousands): $ **Period of Performance:** FY 2008 - 2010

Description:

Background: Despite the fact that the question of contamination and body burden continues to arise during most discussions of resident fish and shellfish at platforms, very little study has been made of this subject. The most common contaminants discharged at platforms are hydrocarbons and trace metals. Given the recent mercury and PCB alarm concerning these compounds and their harm to humans when concentrated in edible fish tissue, it is timely to determine which contaminants are contained in various tissues of resident fish and shellfish at platforms. However the contaminant load must be seen against the background load in the area. The question regarding contamination in platform fish is often debated in discussions of the importance of platform resident populations. Some investigations done during the 1960's and 1970's indicate relatively high levels of zinc in tissue from fish collected at platforms. Work done in 1991 on polycyclic aromatic hydrocarbon (PAH) metabolites in fish bile indicates that fish collected near natural tar seeps, at nearby natural reefs, and at the mainland carry a gradient of PAH's. The contaminants present in platform resident fish and shellfish must be compared to that of the fish in the geospatial background to establish the relative importance of such contaminants given the overall picture of the region. In addition, comparison to the geospatial background will help to isolate the platform contribution to the

contaminant load. The geospatial background is has been developed by the Southern California Coastal Water Research Project (SCCWRP). The SCCWRP data and reports are free and readily available through the Internet at http://www.sccwrp.org.

Thus, in order to reach conclusions about the environmental consequences of decommissioning platforms on local and regional fish populations, the sources of fish recruiting to those populations and the general pollution load carried by reproducing adults at platforms must be known. Such information is particularly important when the platforms harbor large numbers of resident reproducing adults and serve as nursery habitat for juvenile fishes that eventually may "spillover" or migrate to natural areas and help to replenish populations that are commercial and recreational fishery resources.

The MMS-funded study *Reproductive Ecology and Body Burden of Resident Fish Prior to Decommissioning*, NSL PC-05-02, Agreement Number 1435-01-05-CA-39315 was awarded in FY 2005. That investigation focuses on heavy metal contamination in fish tissue and will not determine poly-chlorinated biphenyls (PCB's) or PAH contamination. However, samples of tissue from all fishes collected for PC-05-02 were archived at the USGS/BRD, US National Contaminants Laboratory, Columbia Environmental Research Center (CERC), in Columbia, Missouri.

Objectives: 1) Survey and quantify the extent of PCB's and PAH's and/or metabolites in archived tissues of platform resident fish species in relation to the local and regional geospatial background quantity; 2) Compare platform resident body burdens and contamination levels of PCB's and PAH's and/or metabolites to those found in similar size and species of fish and shellfish at various locations away from platforms; 3) Relate the level of PCB's and PAH's and/or metabolite contaminants in platform species to the local and regional geospatial background quantity and variability of contaminants in fish and shellfish.

Methods: 1) Using tissue samples from *Reproductive Ecology and Body Burden of Resident Fish Prior to Decommissioning*, NSL PC-05-02, Agreement Number 1435-01-05-CA-and appropriate techniques, analyze tissue samples for PCB's and PAH's and/or metabolites, 2) Compare the PCB and PAH and/or metabolite contaminant load of platform resident species to the geospatial background of the areas off Point Conception, within the Santa Barbara Channel, and within the San Pedro Basin. The present study will use the same methodology as SCCWRP to determine PCB and PAH and/or metabolite contaminants in fish from platforms and natural areas; therefore, comparison of results from the present study to SCCWRP data is suitable.

Revised date: January 18, 2006

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2007-2009

Region: Pacific OCS Region

Planning Area(s): Southern California

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

MMS Information Need(s) to be Addressed: MMS is the lead Federal 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 robust understanding of the potential environmental impacts from these technologies is needed to prepare sound environmental analysis documents. This summary is needed far in advance of submission of decommissioning plans or projects by the offshore operators.

Cost Range: (in thousands) $ **Period of Performance:** FY 2007-2009

Description:

Background: The focus of this study is the technologies and associated potential environmental impacts due to decommissioning OCS facilities in exceptional water depths. The Pacific Region faces a variety of environmental information needs related to decommissioning of oil and gas platforms. This study was approved for funding in FY 2005 but was deferred for several years until the probability of decommissioning became clearer. We are once again proposing this study in preparation for future decommissioning offshore California.

Objectives: This study will: 1) Provide detailed information on the environmental issues identified during removal of both shallow and deep-water 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.

Methods: Traditional literature search and primary interview 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 platform removal.

Revised date: January 12, 2006

SECTION 3.0 TOPICAL AREAS FOR YEARS 2009

Contribution to Stock

Once studies have been completed which describe the fish assemblages around OCS platforms and pipelines, estimates of their contribution to fish stock will need to be made in order to assess the impact of decommissioning.

Sand and Gravel

California has signed a Memorandum of Understanding with MMS to inventory sand and gravel resources within Federal waters for beach replenishment and stabilization. The State is interested in the distribution of sand and gravel resources, but mapping of those resources is incomplete for many areas offshore California. Further information on the effects of using sand resources are also needed. A study has been proposed in the Headquarters based Sand and Gravel Program Study Development Plan, of the dynamics of sand movement and associated benthic effects on an area offshore San Francisco.

Renewable Energy and Alternate Use

Offshore wind and wave energy may be considered in the future to supplement dwindling oil and gas supplies and provide a renewable energy source. Studies will be needed to consider technical requirements offshore California, identify suitable areas and conditions, and examine regional environmental effects.

SECTION 4.0 Literature Cited

MBC Applied Environmental Sciences. 1989. An Historical Perspective of the Commercial and Sport Fisheries Offshore California Through 1985. U.S. Minerals Management Service, Pacific OCS Region Study MMS 89-0073.

Ramondi, P. 2005. Monitoring Rocky Intertidal Resources Along the Central and Southern California Mainland. Comprehensive Report (1992-2003) for San Luis Obispo, Santa Barbara, Ventura, Los Angeles, and Orange Counties. U.S. Minerals Management Service, Pacific OCS Region Study MMS – 2005-071.