Offshore Environmental Studies Program

Fiscal Years 2011-2013 Studies Development Plan

Pacific OCS Region

U.S. Department of the Interior
Bureau of Ocean Energy Management, Regulation and Enforcement
Pacific OCS Region
Camarillo, CA
2010

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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 the change in the status of the Region from a frontier to a mature oil and gas producing area (prelease to postlease emphasis), and, finally, with the implementation of the Energy Policy Act of 2005 and the responsibility for the OCS renewable energy program.

Existing production and development activities on 43 producing oil and gas leases offshore southern California will continue. Annual production from these leases is currently about 63,000 bbls of oil per day and 130 MMCF of natural gas per 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 discusses the activities anticipated on producing leases.

The need for information to regulate future renewable energy projects that may be proposed and implemented in the Pacific OCS Region is reflected in this plan. These energy projects will require studying areas outside southern California as interest and resource potential for wind and wave energy facilities exist all along the Pacific Coast. For example, the Federal Energy Regulatory Commission has issued several permits for pilot projects within State waters of Washington, Oregon, and California. Hydrokinetic wave energy conversion devices are being tested offshore Oregon.

Alternate uses of existing platforms continue to be discussed. 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 previously proposed for oil and gas platforms have included marine aquaculture and Liquefied Natural Gas (LNG) facilities. When needed, new or updated environmental studies will support the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) decisions with regard to 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 U.S. 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 that area. This plan focuses on the Southern California Planning Area and areas to the north and into Washington State that might experience renewable energy projects.

The information obtained through these studies is important and relevant to decision making. This information fulfills the following criteria:

- The study provides significant new or additional information beyond what is already known.

- The identified study is within the time frames of the Offshore Program.

- The information provides insight into significant processes critical for understanding both natural and anthropogenic changes.

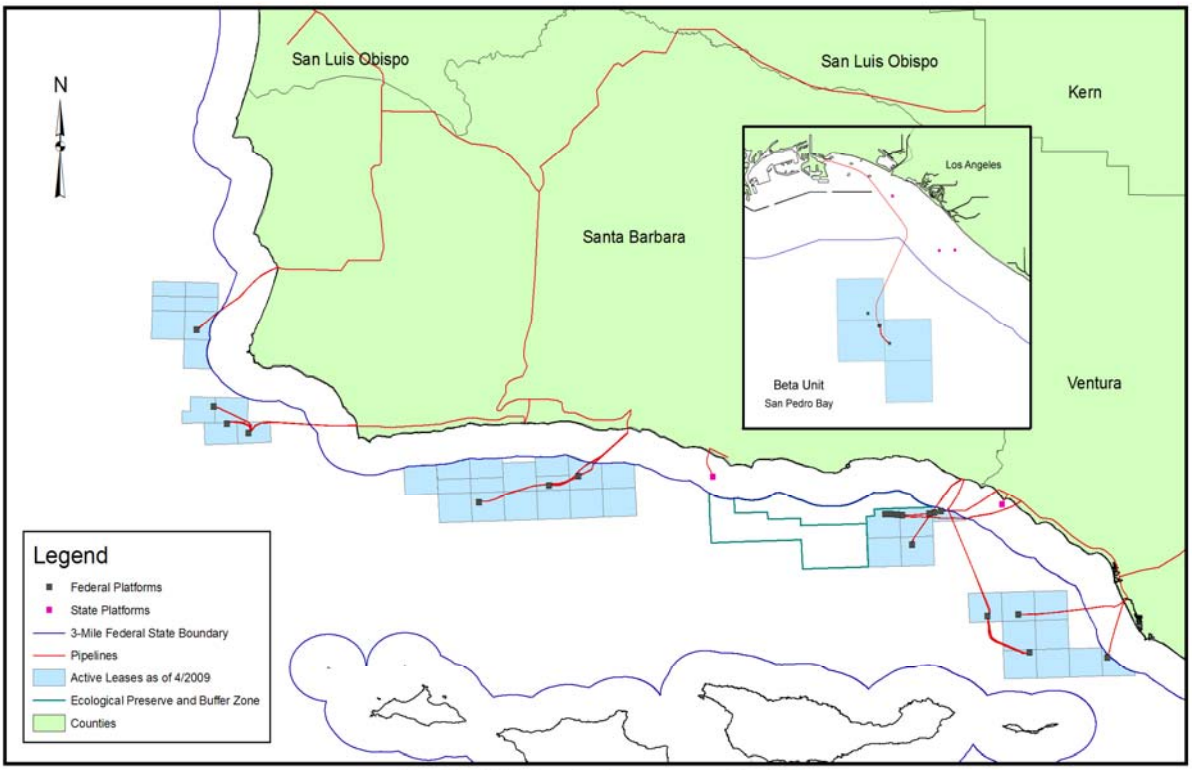
- The issue can be studied within science's present abilities or understanding of experimental methods to acquire the information.

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. Ann Scarborough Bull, Pacific OCS Region at (805) 389-7820. You can also view the Bureau of Ocean Energy Management, Regulation and Enforcement and Pacific OCS Region home pages at www.BOEMREre.gov and http://www.BOEMREre.gov/omm/pacific/index.htm, respectively, for additional information.

1.2 Maps of the Pacific OCS Region—Active Leases, Oil and Gas Planning Areas, and Resource Potential for Renewable Energy

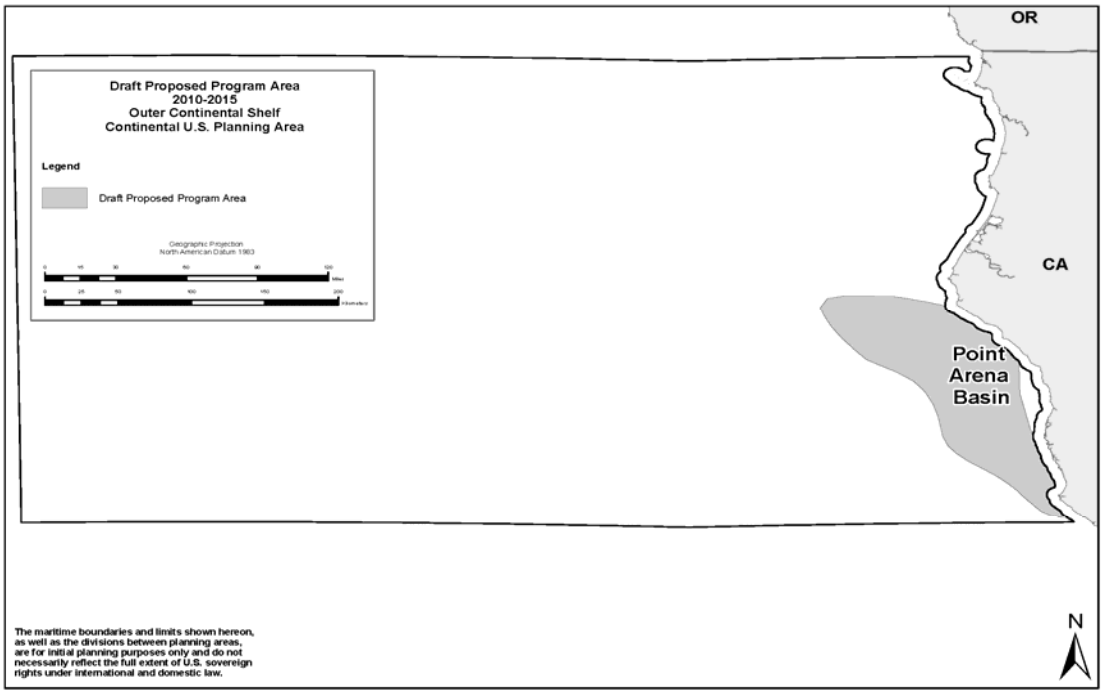
Active Leases in Southern California



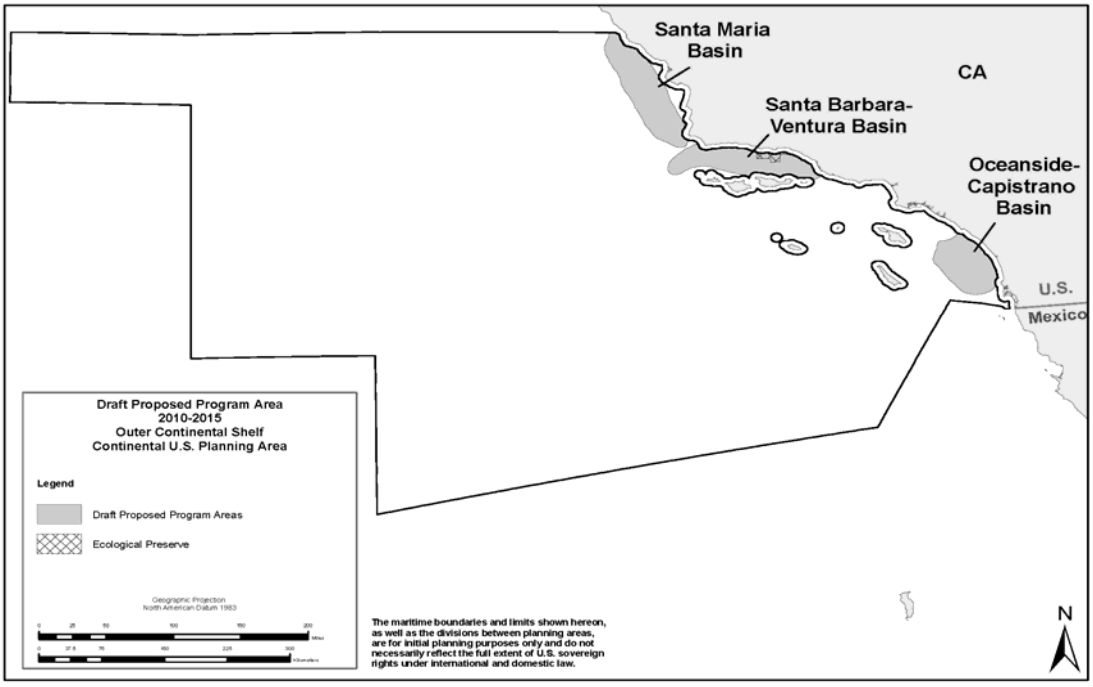
Pacific OCS Region Leases and Facilities

Northern and Southern California Oil and Gas Planning Areas

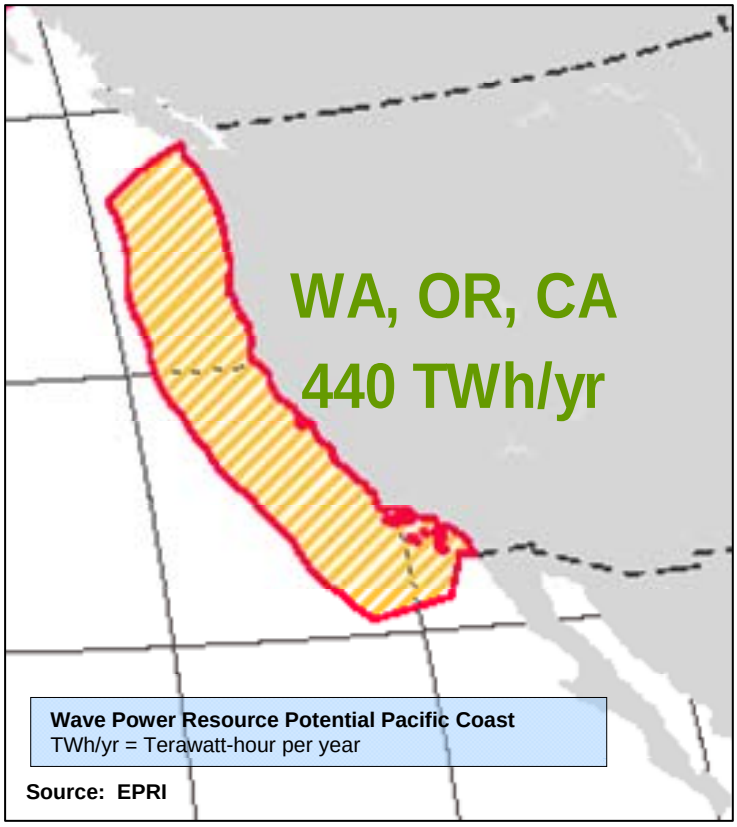
Northern California Planning Area



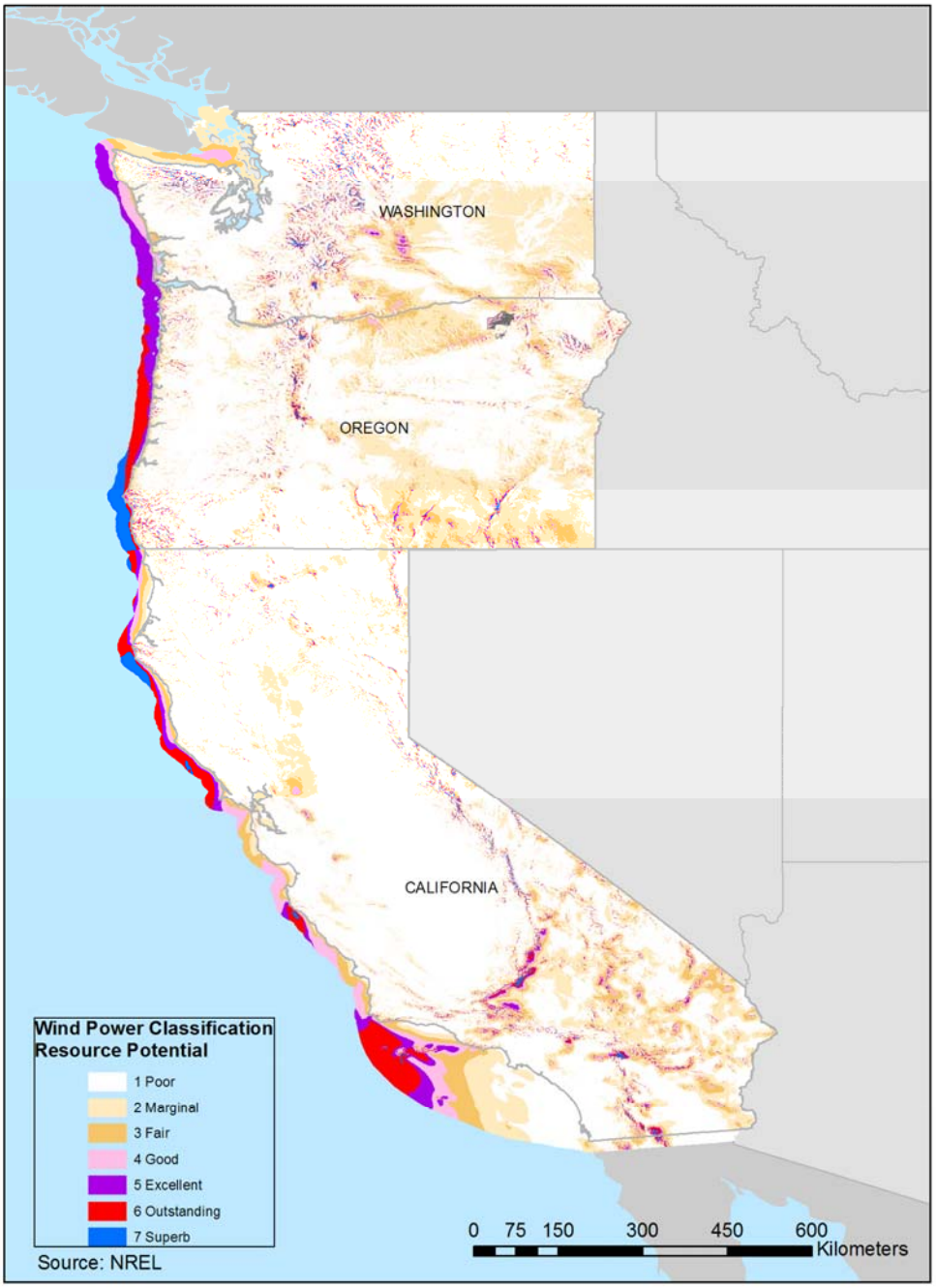
Southern California Planning Area



Resource Potential for Renewable Energy from Wave Power



Resource Potential for Renewable Energy from Wind Power



1.3 Projected OCS Activities

The BOEMRE Environmental Studies Program supports BOEMRE decisions associated with leasing, exploration and development of oil and natural gas, marine minerals, and renewable energy. Often, studies serves needs associated with all three programs.

Oil and Natural Gas

Typically, the OCS oil and gas management program is addressed as prelease and postlease. Prelease activities include development of a 5-year program in which oil and gas lease sales are scheduled. The Pacific Region has not been included in a 5-Year Oil and Natural Gas Leasing Program since 1987 as a result of repeated moratoria. At this point in time, there is no indication that the Pacific OCS Region will be included for leasing in the next Draft Proposed Program for a 5-Year Plan encompassing the years, 2012-2017. The Pacific OCS Region was not included for Scoping or inclusion for potential leasing in the Federal Register Notice announcement for the 5-Year Plan dated, April 2, 2010.

Postlease oil and gas activities are those associated with the development of the 43 producing leases in the Southern California Planning Area. Currently, 23 Federal oil and gas platforms produce approximately 63,000 barrels of oil and 130 MMCF of natural gas per day. This rate could be sustained into the next decade, as Federal lessees continue to focus on the recovery of 300-400 million barrels of oil in proved reserves. Studies identified in this regional plan highlight information gaps and are geared to allow BOEMRE to conduct analyses that support permitting and regulation of the oil and gas industry's ongoing production projects. Continued production at these facilities may present new information needs during the coming decades 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, information from environmental studies was used in the assessment of the environmental effects of power cable repairs in FY 2009 and FY 2010 within the Santa Ynez Unit in Santa Barbara Channel. Platforms in the Santa Ynez Unit are electrically powered from onshore sources via a cable, and BOEMRE used recent data from environmental studies in preparing an Environmental Assessment for that postlease activity. In addition, the BOEMRE recently produced a complex Environmental Assessment that involved formal consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for a revised Development and Production Plan to produce an oil reservoir from an adjacent State lease. Environmental Studies information was crucial to completion of these National Environmental Policy Act documents.

Renewable Energy Activities and Alternate Use of OCS Facilities

The BOEMRE was delegated the responsibility for implementing an OCS renewable energy program with the passage of the Energy Policy Act of 2005. Alternative use of existing OCS facilities is also authorized by this Act. Regulations implementing the Act were published in April 2009, and prospective developers of offshore wind and wave conversion devices have started to develop project proposals on the Pacific OCS. Leasing and permitting OCS renewable

energy development, permitting power cables on the OCS associated with renewable energy, and permitting repurposing of OCS facilities will involve new environmental considerations and, consequently, additional environmental studies.

Marine Minerals Other than Oil and Gas

Opportunities to explore for and develop OCS mineral resources other than oil and gas become increasingly attractive to developers as economic conditions improve. In the future, there may be a need to collect and analyze information in support of potential leasing and development of a marine mining program on the Pacific OCS.

1.4 Identification of Information Needs

The main areas of information needs for FY 20011-2013 fall into the following categories:

Supporting potential renewable energy and existing oil and gas leasing, exploration, and production activities:

Social Science

With increasing interest in renewable energy resource development, particularly in areas outside the area currently developed for oil and gas, additional information needs will have to be addressed. This information is also expected to support decisions on oil and gas, should Pacific OCS Planning Areas be included on a future 5-Year oil and gas leasing program. An inventory and analysis of submerged cultural resources will be needed for environmental assessment and mitigation of potential adverse affects to these resources. The study "Inventory and Analysis of Archaeological Site Occurrence on the Pacific OCS" will address the issue. This is required under Section 106 of the National Historic Preservation Act and Executive Order 11593, which require that Federal agencies must apply the National Register Criteria to properties that may be affected by an undertaking.

Biology

The study "DOI Partnership: Distinguishing between Human and Natural Causes of Changes in Kelp Forests Using Long-term Data from DOI Monitoring Programs" will allow BOEMRE to better analyze ecosystem-level changes in the environment. Successful integration of biologic, geologic, and oceanographic information will allow prediction of regional consequences from events occurring within a limited spatial scale. Such predictive capability is important in OCS permitting, mitigation, and decommissioning decisions related to offshore oil and gas and renewable energy activities.

Concerns about the effects of electromagnetic fields of power cables that will be associated with new renewable energy projects on the Pacific Coast will be addressed in the study "Renewable Energy *in situ* Power Cable Observations" as well as the ongoing effort to analyze existing literature on the topic. Actual field measurements in the new study will allow BOEMRE to make decisions with regard to siting and possible mitigation of power cable effects.

The southern sea otter, *Enhydra lutris nereis*, is exceptionally vulnerable to oil spills and may interact with offshore manmade facilities (foraging, haul-out, sheltering). This species is listed as threatened under the Endangered Species Act. In the past 5 years, the southern sea otter population has significantly expanded its range down the coast of California into areas of existing oil and gas production and potential renewable energy production. The BOEMRE needs to understand where and how southern sea otters are using habitat near manmade structures in order to calculate risks to otters in environmental analysis of OCS activities. The study "Southern Sea Otter Range Expansion and Habitat Use and Interaction with Manmade Structures" will provide BOEMRE with this information. Observations of otters in the vicinity of natural oil seeps, coupled with ongoing research by U.S. Geological Survey (USGS) and funded by BOEMRE (fingerprinting seep oils), would also inform BOEMRE of the possible source of oil on any otters that should become oiled. The BOEMRE has previously funded extensive sea otter studies in the region and will seek partnership opportunities for this study with the U.S. Fish and Wildlife Service (USFWS) as well as USGS.

Information Management

The "West Coast Marine Renewable Energy Planning Guidebook" will provide a critical step in planning renewable energy projects offshore California, Oregon, and Washington. This effort is closely tied to the West Coast Governors' Agreement on Ocean Health and will be needed by BOEMRE, the States, and others in order to rationally plan for projects and avoid or minimize user conflicts. This study builds upon several ongoing efforts including a multiple-use study being conducted by BOEMRE headquarters.

1.5 BOEMRE Pacific Region New Starts for FY 2010 and Ongoing Studies Table

Table 1. Pacific Region New Starts for FY 2010 and Ongoing Studies

Program Lead	Planning Area	Start FY	Discipline	Study Title
NEW STARTS				
BOEMRE	SC	10	HE	Regional Importance of Manmade Structures as Rockfish Nurseries
BOEMRE	NC/CC/SC	10	HE	BOEMRE MARINe–Multiagency Rocky Intertidal Network
BOEMRE	SC	10	HE	Completion of Fish Assemblage Surveys around Manmade Structures and Natural Reefs off California
BOEMRE	SC	10	HE	Habitat Mapping in the Santa Barbara Channel
BOEMRE	NC/O/WA	10	MM	Marine Mammal and Seabird Surveys of Potential Renewable Energy Sites Offshore Northern California, Oregon, and Washington

BOEMRE	O/WA	10	HE	Survey of Benthic Communities near Potential Renewable Energy sites Offshore Oregon and Washington
BOEMRE/BAA/NOPP	All	10	SS	Renewable Energy Visual Impacts
Note: The procurement of any study is contingent upon availability of funding				
ONGOING STUDIES				
Fates & Effects				
BOEMRE	All	09	FE	Effects of EMF from Transmission Lines on Elasmobranchs and Other Marine Species
BOEMRE	SC	06	FE	Investigation of PCB and PAH Contaminants in Samples of Platform Resident Fish
BOEMRE	SC	05	FE	Volume and Chemistry of Natural Seeps in the Santa Barbara Channel
Habitat and Ecology				
BOEMRE	SC	09	HE	MINT – BOEMRE Intertidal Team
BOEMRE	SC	07	HE	Continuation of Fish Assemblages Associated with Platforms and Natural Reefs in Areas Where Data are Non-existent or Limited
BOEMRE	SC	08	HE	Spatial and Seasonal Variation in Biomass and Size Distribution of Juvenile Fishes Associated with a Petroleum Platform
Information Management				
Marine Mammals and Protected Species				
BOEMRE	SC	07	MM	Shorebird Survey of Ventura County
BOEMRE/BRD	CC/SC	07	MM	Comprehensive Relational Database and Web Page for Seabirds, Marine Mammals, Fish, Fisheries and Human Uses off Southern California
Physical Oceanography				
BOEMRE	SC	08	PO	Relationship of Inner Shelf Currents to Large Scale Dynamics
Social Sciences & Economics				
Multidisciplinary				
BOEMRE	SC	07		Environmental Mitigation Monitoring
Other (Research Partnerships)				
BOEMRE Technology Assessment and Research Program (TAR)				
Cooperative Ecosystem Studies Unit; Oregon State University (OSU)				

National Oceanographic Partnership Program (NOPP); e.g., Protocols for Baseline Studies and Monitoring for Ocean Renewable Energy and Renewable Energy Visual Evaluations.
Federal Interagency Agreements: e.g., U.S. Geological Survey/ Biological Resources Division, Columbia Environmental Research Center, Western Fisheries Research Center, Menlo Park Coastal and Marine Geology Center
Discipline Codes AQ = Air Quality FE = Fates & Effects HE = Habitat & Ecology IM = Information Management MM = Marine Mammals and Protected Species PO = Physical Oceanography SS = Social Sciences
Planning Area Codes Southern California = SC Central California = CC Northern California = NC Oregon = O Washington = WA All = NC/CC/SC/O/WA/Hawaii http://www.BOEMREre.gov/eppd/sciences/esp/profiles/pacific.htm

SECTION 2.0 PROPOSED STUDY PROFILES

2.1 Introduction

Study Descriptions of Ongoing Studies may be found on the web at http://www.BOEMREre.gov/eppd/sciences/esp/profiles/pacific.htm and a list of significant completed studies by the Pacific OCS Region may be found at http://www.BOEMREre.gov/omm/pacific/enviro/Studies/studies.htm and http://www.BOEMREre.gov/omm/pacific/enviro/studies-accomplishments-2009.htm.

Renewable Energy and Oil and Gas Operations Support Studies:

One study deferred from FY 2010 and four new studies supporting potential and ongoing activities are proposed for FY 2011. These studies are:

Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific OCS

DOI Partnership: Distinguishing Between Human and Natural Causes of Changes in Nearshore Ecosystems Using Long-term Data from DOI Monitoring Programs

West Coast Marine Renewable Energy Planning Information Study

Renewable Energy *in situ* Power Cable Observation

Southern Sea Otter Range Expansion and Habitat Use and Interaction with Manmade Structures – This study would be considered for funding under the agreement on collaboration for the OCS with USGS Biological Resources Division (USGS/BRD)

2.2 FY 2011 Table

Table 2. Pacific OCS Region Studies Proposed for the Fiscal Year 2011 NSL

Page #	Discipline	Title	Rank
15	SS	Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific OCS	1
17	HE	DOI Partnership: Distinguishing Between Human and Natural Causes of Changes in Nearshore Ecosystems Using Long-term Data from DOI Monitoring Programs	2
19	HE	Renewable Energy *in situ* Power Cable Observation	3
21	MM	Southern Sea Otter Range Expansion and Habitat Use and Interaction with Manmade Structures	4

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

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2011–2013

Region: Pacific Region

Planning Area(s): Washington/Oregon/All California

Title: Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific OCS

BOEMRE Information Need(s) to be Addressed: Development of energy and mineral resources on the Outer Continental Shelf off the west coast of the United States is expected to continue, whether as a result of the opportunity for development of renewable energy resources created by the Energy Policy Act of 2005, the possible inclusion of areas off California on a 5-Year Oil and Natural Gas Leasing Program, or proposals by developers for exploiting strategic mineral resources. Therefore, a complete understanding of known and potential submerged cultural resources, as well as an understanding of potential visual impacts to coastal historic properties will be crucial for environmental assessment and mitigation of potential adverse affects to these resources. The study "Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific OCS" will address the issue. This information is necessary under Section 106 of the National Historic Preservation Act and Executive Order 11593, which require that Federal agencies must apply the National Register Criteria to properties that may be affected by a Federal undertaking.

Cost Range: (in thousands) $600-$650 **Period of Performance:** FY 2011-2013

Description:

Background: It's been over twenty years since any type of archaeological study has been completed on the Pacific OCS for BOEMRE. The study *Archaeological Resource Study: Morro Bay to Mexican Border,* completed in 1987, evaluated potential submerged archaeological resources along the southern coast of California; and the study *California, Oregon and Washington Archaeological Resource Study,* volumes I through VI, completed in 1990, assessed potential submerged archaeological resources from Morro Bay, California, north to the Canadian border. Since that time, there have been a number of significant archaeological discoveries along the Pacific coast, including both historic shipwrecks and submerged prehistoric sites.

Additionally, an assessment of the potential for visual impacts from offshore energy development to coastal properties that are either listed on, or eligible for listing on the National Register of Historic Places has never been conducted along the Pacific coast. These properties include historic structures, historic archaeological sites, and prehistoric archaeological sites. The Pacific Coastline is lined with many historic properties that potentially could be impacted visually. The determination of adverse impacts to historic properties (either physical or visual) is a requirement of Section 106 of the NHPA. The basis for making the determination of whether a

property is adversely impacted depends upon the description within the property listing or the archaeological and historic assessment of the property. If within the description the rationale for listing the property or its potential eligibility includes the visual aspects of its surroundings, then the property may be adversely impacted by visual disruption. Analyses under the National Environmental Policy Act will be made as to whether visual impacts could affect the revenue from the property. In particular where a property is open to the public for a fee, a concern is whether visitation of the property would be affected by an altered visual experience. The first step in making this evaluation is to determine which properties are open to the public and what level of visitation occurs.

As a result, there is a critical need to update baseline studies, identify areas where inundated prehistoric sites might be located, develop a digital database of known and reported submerged cultural resources, and a digital database of coastal historic properties along the Pacific OCS. A similar effort is nearing completion for the Atlantic OCS (GM-08-10 and GM-09-10).

Objectives: While remote sensing surveys will be required of permitees for all offshore activities within the area of potential effect, an inventory of potential submerged archaeological resources developed by the proposed study will help guide decisionmakers in developing appropriate mitigation strategies and best management strategies for targets located by remote sensing; the development of an effective survey strategy is contingent upon knowing the nature of these resources and where they most likely may be located.

The objectives of this study are to develop digital inventories of known, reported, and potential submerged archaeological sites for the Pacific OCS, similar to what has been developed for the Atlantic and Gulf of Mexico Regions, and listed or potentially eligible coastal properties that could be impacted through BOEMRE-permitted undertakings.

The proposed study will develop an inventory of historic shipwrecks, emphasizing the use of primary historic sources; assess areas of the Pacific OCS for prehistoric site potential and develop a model for where prehistoric sites might be expected; recommend appropriate survey methodology in order to detect and avoid impacts to such resources; and develop an inventory of coastal historic properties. The database and survey strategy should incorporate the entire West Coast of the United States.

Methods: Using the previous two Pacific Region studies as a baseline, the proposed study will synthesize data collected over the past 20 years to develop an inventory of historic shipwrecks emphasizing the use of original sources; assess areas of the OCS for prehistoric site potential by evaluating current theories on prehistoric settlement patterns, paleo-shorelines, sea level rise, and regional geology; and synthesize this information to recommend an appropriate survey methodology in order to detect and avoid impacts to archaeological resources. The database will be developed using the same format as the current GOMR and Atlantic shipwreck databases and should link to a Geographic Information System (GIS) compatible to the existing BOEMRE GIS.

Revised Date: September 24, 2010

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2011–2013

Region: Pacific OCS Region

Planning Area: Southern California

Title: DOI Partnership: Distinguishing Between Human and Natural Causes of Changes in Kelp Forests Using Long-term Data from DOI Monitoring Programs

BOEMRE Information Need(s) to be Addressed: Monitoring and predicting the potential impacts of OCS oil and gas and renewable energy production on nearshore ecosystems requires an ability to distinguish between changes caused by natural processes and those caused by human activities. This is often hampered by the lack of long-term data to describe natural variation. In southern California, two Department of the Interior monitoring programs that focus on kelp forest communities have the potential to provide considerable insight into the patterns and causes of change in kelp forest ecosystems. Analysis of these datasets (which span 25+ years) will enable scientists and managers to evaluate possible impacts from offshore oil and gas and renewable energy activities and develop options to mitigate these impacts. This is especially important to BOEMRE in light of global climate change and the need to understand the cumulative impacts of multiple projects on the OCS.

Cost Range: (in thousands) $200-$250 **Period of Performance:** FY 2011-2013

Description:

Background: Due to the inherent connectivity of the marine environment, a number of activities related to outer continental shelf (OCS) oil and gas and renewable energy production can adversely affect nearshore habitats. These activities may include: (1) alteration of habitat through the installation, maintenance, and/or removal of platforms, pipelines, cables, and other structures; (2) release of contaminants into the marine environment by oil spills and discharges; (3) decreased water quality via sediment disturbance during anchoring, dredging, etc.; and (4) onshore activities that result in erosion or spillage into the nearshore environment.

The BOEMRE requires information about the sensitivity and resilience of biological habitats to disturbance to perform environmental analyses. Understanding the natural dynamics of nearshore ecosystems requires comprehensive long-term data that span a wide range of environmental conditions in areas potentially impacted by OCS energy activities. Such data exist for kelp forest communities located in the Southern California Bight that are monitored regularly by two Department of the Interior Bureaus (USGS and National Park Service). A lack of funding and staff for analyses has caused these data to be under-utilized.

Giant kelp forests have been designated Habitat Areas of Particular Concern (a subset of Essential Fish Habitat) for groundfish by the Pacific Fishery Management Council and as

environmentally sensitive habitats by the State of California. Attributing change in kelp forest systems to human activities, however, can be difficult because kelp forests undergo large and abrupt fluctuations in size and species composition in response to a variety of predictable (e.g., seasonal) and unpredictable (e.g., disease, large waves) natural events. Longer-term studies that encompass the wide range of environmental conditions experienced by kelp forests are uncommon and those that exist have tended to focus on a single species or guild,

Objectives: The objective of this study is to provide detailed community analyses using long-term data to improve our understanding of the causes and consequences of change in giant kelp forest ecosystems so that managers may detect and evaluate possible impacts from offshore oil and gas and renewable energy activities, and develop options to mitigate these impacts. In addition, identification of patterns in these datasets will aid in predicting potential ecosystem impacts due to climate change and advancing adaptive management, both of which are goals central to DOI stewardship responsibilities.

Methods: Long-term data on the kelp forest communities of San Nicolas Island that include data from subtidal and surface sea otter and kelp canopy information and the Channel Islands National Park subtidal kelp information will be combined and analyzed to determine: (1) the influence of short and long-term climate oscillations on the abundance, species composition, and trophic structure of kelp forest communities; (2) resilience of the community to varying levels of disturbance; and (3) the periodicity (and, if possible, causes) in shifts of community state. Anticipated products for the proposed work include peer-reviewed scientific publications and compiled data and metadata archived in an accessible format that facilitates future syntheses and environmental analyses required under the National Environmental Policy Act. Funds will support the analysis of existing data collected by the USGS and National Park Service (NPS). The USGS has been collecting data on the abundance of macroalgae, benthic invertebrates and fishes at six kelp forest sites around San Nicolas Island since 1980. The NPS has been collecting similar data at 16 sites within the Channel Islands National Park since 1982. These two databases are very compatible in terms of their content, time period, and methods of data collection. The general approach will be to conduct detailed comparative time series analyses. Importantly, both data sets encompass two of the largest El Niño events ever recorded (1982-83 and 1997-98). Moreover, differences in environmental conditions among islands and among sites within islands (owing to different current regimes and exposures) provide a wide range of environmental conditions over which natural changes in kelp forest communities can be assessed.

Revised date: September 24, 2010

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2011–2013

Region: Pacific

Planning Area(s): All

Title: Renewable Energy *in situ* Power Cable Observation

BOEMRE Information Need(s) to be Addressed: The BOEMRE requires information concerning the level of impacts of electromagnetic field (EMF) on some marine species. Submarine transmission cables that power offshore oil platforms in the Pacific Region provide an opportunity to assess potential behavior and reaction of electromagnetic sensitive species to industry activities. The information will be applicable to all renewable energy power cable EMF considerations and will determine effectiveness of the commonly proposed mitigation of cable burial.

Cost Range: (in thousands) $700-$850 **Period of Performance:** FY 2011-2014

Description:

Background: Renewable energy technologies, for the foreseeable future, will be focused on the generation of electricity. In all cases, we expect the individual devices will be interconnected with power cables to transmit the electricity to a platform or gathering site, and a single cable will connect the entire facility to shore. The power cable will transmit either alternating current or direct current. If the cable uses alternating current, it will generate both electric and magnetic fields. Proper shielding can block electric fields but not magnetic fields, which, in turn, can induce secondary electric fields. One of the potential impacts from energized power cables may be the local attraction or repulsion of electrosensitive species to the EMF. Several economically important species and as well as species' crucial habitat are in the immediate area of the existing cables. These species include, but are not limited to, the thresher shark, *Alopias macrourus*, the angel shark, *Squatina squatina*, and the longnose skate, *Raja rhina*, whose nursery ground is in the area nursery ground

Submarine transmission cables that power offshore oil platforms in the Pacific Region provide a unique opportunity to assess potential behavior and reaction of electromagnetic sensitive species to industry activities. Knowledge gained from this study will be directly applicable to renewable energy projects in any OCS planning area. In the Pacific Region, there are two identical power cables, several miles long, located in the same corridor on the seafloor within the Santa Ynez Unit offshore Southern California Planning Area. Both of these cables use the industry standards of the power cables that will be used for connecting devices (35 KV) within renewable energy installations. These cables were emplaced concurrently by the manufacturer. One cable is unenergized and disconnected from the grid, and one cable is energized. The energized power cable will be compared to the unenergized cable to determine potential impacts from electromagnetic fields while controlling for habitat contributed by the cable structure.

We will compare species densities among cable treatments to determine attraction/repulsion of electrosensitive species to energized and unenergized power cables. Data from the on-going EMF Synthesis Study NSL-PC-08-08 will determine the sampling width for the present cable biological survey transects. Data from the on-going Completion of Fish Assemblage Survey NSL PC-10-03 study will be used for habitat assemblage comparisons. Contemporaneously with the biological surveys, we will measure EMF emissions along both cables.

Objectives: The objectives of this study are to determine: 1) the strength, spatial extent, and variability of EMF's along both energized and unenergized cables; 2) whether electrosensitive species that are regional important such as sharks and rays respond (attraction/repulsion) to the EMF's of an *in situ* power transmission cable; 3) differences among fish communities associated with cable habitat and fish communities in natural habitats obtained from other BOEMRE-funded studies; and 4) the effectiveness of the commonly proposed mitigation of cable burial.

Methods: The evaluation would initially involve multiple cable surveys and EMF measurement, followed by a comparison of species at both cables to determine potential impacts from electromagnetic fields while controlling for habitat contributed by the cable structure.

1) Conduct fish surveys using the *Delta* submersible, a 4.6 m, 2-person vessel, operated by Delta Oceanographics of Oxnard, California along cable transects about two meters from the substrata. Conduct transects along both cables and in proximate habitat near the cables;
2) During all transects document (a) species; (b) estimated total length; (c) its distance and position relative to the cables and proximate habitat;
3) Measure EMF's using existing equipment;
4) Determine electrosensitive species response (attraction/repulsion) to the EMF's of an energized and unenergized, *in situ*, power transmission cable; and,
5) Using data from 4, analyze effectiveness of the commonly proposed mitigation of cable burial.

Revised Date: September 24, 2010

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2011–2013

Region: Pacific OCS Region

Planning Area: Southern California

Title: Southern Sea Otter Range Expansion and Habitat Use and Interaction with Manmade Structures.

BOEMRE Information Need(s) to be Addressed: The southern sea otter, *Enhydra lutris nereis*, is exceptionally vulnerable to oil spills and may interact with offshore manmade facilities (foraging, haul-out, sheltering). This species is listed as threatened under the Endangered Species Act. In the past 5 years, the southern sea otter population has significantly expanded its range down the coast of California into areas of existing oil and gas production and potential renewable energy production. The BOEMRE needs to understand where and how southern sea otters are using habitat near manmade structures in order to calculate risks to otters in environmental analysis of OCS activities. Observations of otters in the vicinity of natural oil seeps, coupled with ongoing research being done by USGS and funded by BOEMRE(fingerprinting seep oils) would inform BOEMRE of the possible source of oil on any otters that potentially become oiled.

Cost Range: (in thousands) $300-$400 **Period of Performance:** FY 2011-2014

Description: This Study should be considered for funding under the agreement for OCS with USGS/BRD.

Background: The southern sea otter was listed as threatened primarily because of its small population size and the risk of oil spills. Since listing, the southern sea otter population has gradually increased its size and range. Approximately 2,800 sea otters now inhabit the coastline from Half Moon Bay to Santa Barbara. Within the past 5 years, about 100 sea otters have been routinely observed in the Point Conception area, adjacent to active oil and gas facilities, natural oil and gas seeps, and areas of potential renewable energy production. Very little is known about their daily activity patterns and habitat use in this area. Information gained from this study, coupled with ongoing research being done by USGS and funded by BOEMRE, such as ongoing studies that fingerprint seep oils, would inform BOEMRE of the possible source of oil on any otters that potentially become oiled. The BOEMRE has previously funded extensive sea otter studies in the region and will seek partnership opportunities for this study with the USFWS as well as USGS. The study will allow for a comparative analysis between the southern California area and other areas of the Pacific coast where data have been collected or are in the process of being collected.

Objectives: Research objectives include 1) identification of important sea otter resting and foraging areas adjacent to man-made structures; 2) delineation of movement patterns along the southern California coast; and, 3) assessment of sea otter distribution and behavior in the vicinity

of man-made structures and natural oil and gas seep areas (e.g., Coal Oil Point, Santa Barbara County).

Methods: Up to 20 sea otters per year will be captured on the southern California coast over a 2-year period. Each animal will be implanted with a VHF radio tag and a time-depth recorder using well established techniques developed by the USFWS and the USGS. Geospatial tags may be considered and used if they are developed and approved for use in sea otters by the time this study is initiated. Geospatial data of sea otter and existing data of known seep locations would be examined for potential contact.

In addition, several steps and samples will be taken while the animals are in-hand to determine physiological body condition. These include basic body measurements and condition observations, samples of blood, tissue, pelt, and possibly urine. The samples will be appropriately stored and archived for later use.

Tagged animals will be tracked for a 2-year period from land and air on a weekly basis with periodic intensive survey periods designed to determine daily movement and activity patterns in relationship to oil and gas facilities and naturally occurring oil seeps. In the third year of the project, some of the tagged sea otters will be recaptured to recover their time-depth-recorders for more detailed analysis of their activity patterns.

Revised date: September 24, 2010

2.3 FY 2012 Table

Table 3. Pacific OCS Region Studies Proposed for the Fiscal Year 2012 NSL

Page #	Discipline	Title
25	MM	Characterizing and Quantifying Sea Lion and Seal Use of Offshore Oil and Gas Platforms in California
27	HE	Influence of Pacific Offshore Platforms on Marine Fish Ecology

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan 2012–2014

Region: Pacific OCS Region

Planning Area: Southern California

Title: Characterizing and Quantifying Sea Lion and Seal Use of Offshore Oil and Gas Platforms in California

BOEMRE Information Need(s) to be Addressed: Ultimately, offshore oil and gas platforms in California will be removed. California sea lions, *Zalophus californianus*, and, to a lesser extent, Pacific harbor seals, *Phoca vitulina*, use these platforms as resting and foraging areas. Both species are protected by the Marine Mammal Protection Act (MMPA). The BOEMRE needs to characterize and quantify the use of these areas by sea lions and seals for environmental review and permitting requirements associated with decommissioning of facilities. This study will also contribute to our understanding of sea lion and seal interactions with other offshore structures including renewable energy facilities being considered for the Pacific coast.

Cost Range: (in thousands) $150-$250 **Period of Performance:** FY 2012-2014

Description:

Background: Hundreds of sea lions and seals routinely use offshore oil and gas production facilities in California for resting and foraging. Removal of platforms will displace these animals but, perhaps more importantly, decommissioning activities could result in their injury or death. Characterizing and quantifying sea lion and seal use of offshore platforms is a critical component of our analyses and consultations required under the National Environmental Policy Act (NEPA) and the MMPA.

Objectives: We expect to characterize sea lion and seal use of the platforms, including the number of animals present, seasonal use patterns, and age and gender animals in the immediate vicinity of platforms. This information will be used to satisfy information requirements for NEPA and MMPA and identify use patterns that may minimize disturbance or injury of sea lions and seals during decommissioning activities.

Methods: This study will count sea lions and seals using all 23 Pacific OCS oil and gas platforms under a variety of conditions (differing weather states, day versus night, etc.) and seasons. Activity trends would also be documented.

Sea lions resting on platform decks and buoys are relatively easy to count. Monthly observations conducted by boat and/or from the platforms will be made over a 2-year period. Swimming sea lions will also be counted when they are on the surface.

Surveys documenting daily activity patterns of sea lions will be developed in consultation between the Bureau of Ocean Energy Management, Regulation and Enforcement, the National Marine Fisheries Service, Offshore Operators, and prospective researchers and may involve tagging or development of photo ID catalogs of individual animals.

Harbor seal use of platforms will be more difficult to document as this species typically does not haul-out on offshore structures and may sleep for extended periods of time under the platform. Observations may be limited to occasional sightings on the surface or opportunistic observations by SCUBA divers.

Survey methods will be developed, refined, and documented for future assessment of sea lion and seal activity associated with platform decommissioning activities.

Revised date: March 24, 2010

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan 2012–2014

Region: Pacific OCS Region

Planning Area: Southern California

Title: Influence of Pacific Offshore Platforms on Marine Fish Ecology

BOEMRE Information Need(s) to be Addressed: The fate of spent offshore platforms off California continues to be a subject of considerable debate and 15 years of scientific surveys funded by BOEMRE. Much of this work has been focused on the potential importance of the fish populations at offshore platforms. All 23 Federal and one State platform have been surveyed at least once, and many over 10 times. In addition, site-fidelity and transplantation acoustic studies have been completed for fish at several Federal platforms. The BOEMRE needs to have the resulting BOEMRE OCS reports, USGS, and peer-reviewed material compiled in a single source, professionally published reference, to support environmental reviews associated with decommissioning and for public outreach purposes.

Cost Range: (in thousands) $200-$250 **Period of Performance:** FY 2012-2014

Description:

Background: Since 1995, USGS, BOEMRE, and the California Artificial Reef Enhancement Program (CARE) have provided funding to conduct research on the fishes that live around the platforms and on natural rock outcrops of central and southern California. To our knowledge, over the past 15 years, BOEMRE is the only Federal or State agency that has funded research at the offshore platforms. The BOEMRE needs to have the resulting BOEMRE OCS reports, various USGS reports, and peer-reviewed material compiled into a single, professionally published reference to support environmental reviews associated with decommissioning and for public outreach purposes. The goal is to publish a book on the subject of the influence of Pacific offshore platforms on marine fish ecology that has been accomplished through and funded by DOI agencies. A similar effort in the Gulf of Mexico resulted in American Fisheries Society publication "Fisheries Reefs and Offshore Development," which addressed the influence of Gulf of Mexico platforms on marine fish in 2003, http://www.afsbooks.org/x54036xm.

Objectives: Collect and compile the reports and peer-reviewed literature into a single reference book.

Methods: Methods include forming an editorial review board, collecting and compiling the peer-reviewed paper and BOEMRE and USGS reports, as appropriate, and choosing and working with a publisher such as the California University Press or the American Fisheries Society.

Revised date: March 24, 2010

SECTION 3.0 TOPICAL AREAS for FISCAL YEAR 2013

Renewable Energy and Alternate Use

Each of the Pacific Coast States has adopted renewable portfolio standards, and the OCS may be one area that will be tagged for contributing to the States' renewable energy goals. Studies are currently being performed to gather information for future projects along the Pacific Coast – to assess new technology opportunities for offshore California, Oregon, and Washington; identify suitable areas and conditions; and examine regional environmental effects. These include marine mammal and seabird bird surveys, benthic surveys offshore potential renewable energy sites, and updated marine archaeological and cultural sites digitized databases. Additional studies will be needed as renewable energy and alternate use activities increase.

State of the Rocky Shoreline Report

The BOEMRE has been monitoring the rocky coastline adjacent to OCS oil and gas activities since 1991 and participating in the study of a larger network of sites across the Pacific Coast for many years (the Multi-agency Rocky Intertidal Network, MARINe). The BOEMRE has also been leading a sub-committee of MARINe for the past 2 years, tasked with identifying bioindices, or measurements that can be used predictably to determine relative health of a given rocky intertidal site. It is anticipated that once these bioindices are developed, BOEMRE could look at a subset of the larger dataset and develop a ranking of sites that would inform managers about the health of the rocky intertidal communities specifically in the Santa Barbara Channel. This effort would serve to identify potential data gaps and other issues that hinder our ability to assign a "grade" to a site. BOEMRE could use this information to evaluate the cumulative impact from offshore activities on the shoreline and to assess impacts from new activities or accidental oil spills.

Including the Channel Islands in Shorebird/Seabird Surveys

The Pacific OCS Region presently funds a cooperative agreement with California State University Channel Islands to survey shorebirds along the Ventura County coastline. This study provides a long-term data set of shorebird populations and allows BOEMRE to assess real or potential effects of adjacent offshore energy operations on sensitive shorebird species and to better assess the effects of long-term climate change in the region. Similar information for the Channel Islands would be beneficial in the event of an oil spill, and the National Park Service has indicated an interest in partnering with BOEMRE in this effort.

Acquisition of Archival Aerial Kelp Survey Data for Southern California

Kelp plays an important ecological role in structuring nearshore invertebrate and fish communities along southern California. Low altitude, aerial surveys of the kelp beds along the California coast were done by BOEMRE and BLM during the late 1970's and by the State since then. Data from the 1990's and 2000-2008 have been collected and archived by the State of California and private entities. These data are valuable for BOEMRE in assessing the effects of climate change near oil and gas operations and in analyzing the potential effects of placing renewable energy power cables through or around kelp forests and fish and intertidal communities. This future effort will expand upon the FY 2011 DOI Partnership study by incorporating aerial data sets.

SECTION 4.0 LITERATURE CITED

Literature Cited

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