**Offshore Environmental Studies Program**

# Fiscal Years 2012-2014 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**
**2011**

# TABLE OF CONTENTS

# 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 change in the geographic areas of concern and study, in the emphasis of disciplines highlighted for research, with change in the status of the Region from a frontier to a mature oil and gas producing area (prelease to postlease emphasis), with the implementation of the Energy Policy Act of 2005 and the responsibility for the OCS renewable energy program, and finally, with the formation of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) and State of Oregon OCS Renewable Energy Task Force.

Existing production and development activities on 43 producing oil and gas leases offshore southern California will continue. Annual production from these leases is currently over 60,000 bbls of oil per day and 128 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 deepwater wind and wave energy facilities exist all along the Pacific Coast and offshore Hawaii. For example, the Federal Energy Regulatory Commission has issued several permits for pilot projects within State waters of Washington, Oregon, and northern 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 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 in regards to early planning for possible environmental studies related to renewable energy projects that may occur in that area. For renewable energy studies, this plan focuses on all Pacific OCS Planning Areas offshore Washington, Oregon, and California, and includes the Hawaii OCS that might experience renewable energy projects. Studies related to oil and gas in the Southern California Planning Area support decisions for activities on existing producing leases.

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.

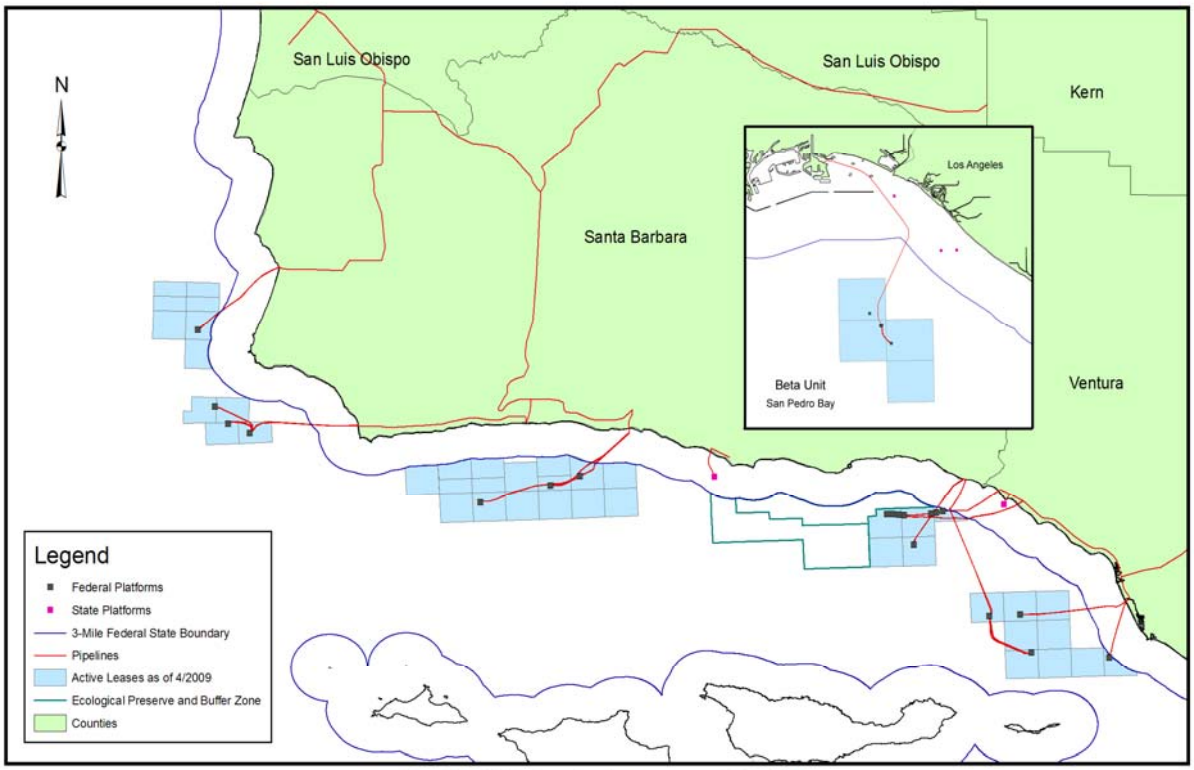
- The issue can be studied within science's present abilities or understanding of experimental methods to acquire the information.

The introduction of renewable energy projects and the level of future oil and gas activities offshore the Pacific OCS Region 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 BOEMRE and Pacific OCS Region home pages at www.boemre.gov and http://www.boemre.gov/omm/pacific/index.htm, respectively, for additional information.

## 1.2 Maps of the Pacific OCS Region—Active Leases and Resource Potential for Renewable Energy

**Figure 1.** Active Leases in Southern California




Pacific OCS Region Leases and Facilities

**Figure 2.** Resource Potential for Renewable Energy from Wave Power

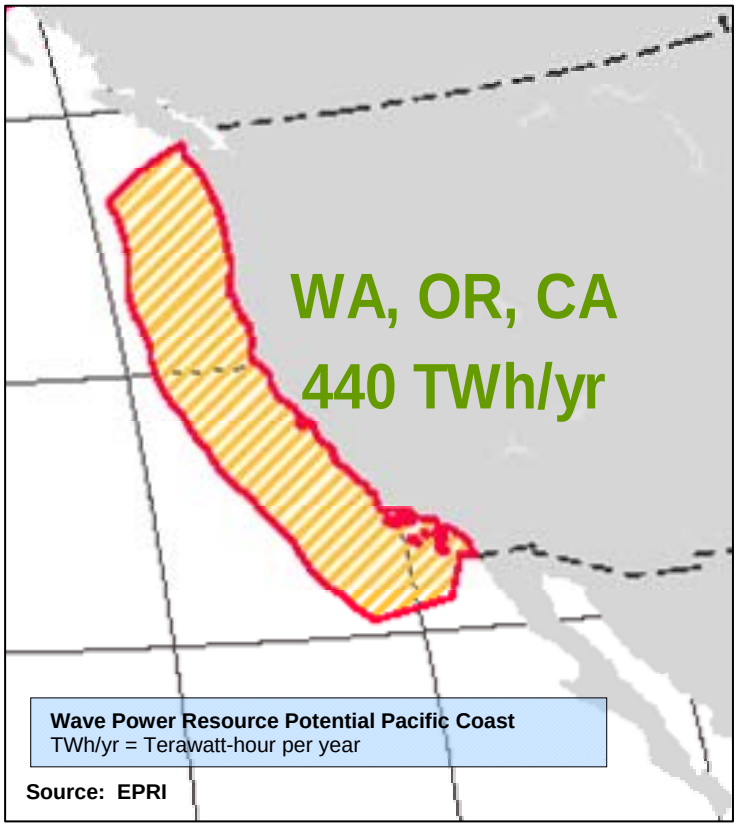


**Figure 3.** Resource Potential for Renewable Energy from Wind Power

## 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.

### 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 deepwater wind and wave energy 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. Several renewable energy developments for the Pacific Region occurred in Fiscal Year 2010.

The Governor of Oregon, in a letter dated December 1, 2010, requested the formation of a BOEMRE-sponsored Federal-State task force with the State of Oregon to address the use of the ocean for renewable energy development. The Oregon-focused task force will support and enhance the regional planning that is taking place through the partnership that the three west coast states have with BOEMRE; this partnership is called the West Coast Governors' Agreement on Ocean Health. Secretary Salazar accepted the request on December 30, 2010, and the Pacific Region is finalizing a charter outlining the purpose, membership, and planned functions of the task force. The first task force meeting was held in Portland, OR, March 31, 2011.

The City and County of San Francisco informed the Pacific Region on December 9, 2010, that they will submit a request for an OCS wave energy lease offshore San Francisco in early-to-mid 2011. The City and County have completed a few site-specific environmental studies that will assist them in planning the project and a preliminary technical design study is underway. They have a goal to generate 100 percent of the City's electricity from renewable sources by 2020.

In a letter dated July 7, 2010, researchers at the University of Hawaii, through the U.S. Department of Energy, Hawaii National Marine Renewable Energy Center, expressed an interest in obtaining an OCS research lease or grant to support renewable energy research at the Makai Pier test site on the Island of Oahu. They have a strong interest in conducting marine renewable energy research at the test site where they plan to deploy a series of wind, wave and tidal current devices. The establishment of a consolidated Federal/State marine technology testing site could foster collaborative research endeavors by government agencies and attract funding from private sector firms seeking to test innovative systems and prototype wave and wind energy equipment in shallow and deepwater environments.

In a letter dated July 26, 2010, the Natural Energy Laboratory of Hawaii Authority (NELHA) expressed interest in obtaining an OCS research lease or grant to support the establishment of a continuous Federal/State marine science and technology research corridor offshore of their Keahole Point facility on the Island of Hawaii. The NELHA intends to request that the State of Hawaii extend NELHA's ocean use corridor to the 3-mile limit. Obtaining an OCS lease contiguous with their existing use corridor would establish a consolidated ocean test area and encourage collaborative research endeavors by both Federal and State government entities. They hope the consolidated offshore test area would attract funding and investment opportunities to test wind, wave, current, and ocean thermal energy conversion plants and prototypes in shallow and deep seawater environments.

**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. On July 14, 2008, President George W. Bush lifted the executive withdrawal of OCS lands from consideration for oil and gas leasing. The President also called for Congress to lift the annual moratorium and enact legislation to allow states to determine what happens off their coast and provide for sharing of revenues with those states that want to proceed with development. On September 30, 2008, the long-running leasing moratoria enacted annually as part of the Department of the Interior's (DOI) appropriations legislation was discontinued by Congress. However, the Pacific OCS Region was not included for leasing in the Preliminary Revised Program for 2012-2017, which was announced by the President and the Secretary on March 31, 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 over 60,000 barrels of oil and 128 MMCF of natural gas per day. This rate could be sustained for the next several years, as Federal lessees continue to focus on the recovery of approximately 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 2010 within the Santa Ynez Unit in the Santa Barbara Channel, and future installation of a power cable and pipeline within the Beta Unit off Long Beach, California. Many platforms in the Pacific Region are electrically powered from onshore sources via a cable, and BOEMRE is using recent data from environmental studies in preparing environmental assessments for that postlease activity. Environmental studies information was crucial to completion of these National Environmental Policy Act documents.

**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 2012-2014 fall into the following categories:

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

Biology

The erection and operation of offshore deepwater wind turbines and other renewable energy devices may have a variety of effects on seabirds, most of which will vary by species based on their behavior at sea. Since its inception, the Pacific Region has gathered a large amount of information on Pacific seabirds. The study "Developing and Applying a Vulnerability Index for Scaling the Possible Adverse Effects of Offshore Renewable Energy Projects on Seabirds on the Pacific OCS" will provide a means to rank and assess the vulnerability of specific seabird species on the Pacific OCS based on the habits and activities of birds at sea. The proposed study will increase the understanding of the flight behavior of seabirds and provides a means to rank and assess the vulnerability of specific seabird species on the Pacific OCS based on these habits and activities. This information coupled with existing information on distribution and abundance can provide a means to assess and advise site selection for offshore renewable energy projects in a manner that minimizes adverse effects to seabirds.

Offshore oil and gas production platforms provide underwater habitat for a variety of fishes in the waters off southern California. With the recent passing of the 2010 Marine Resources Legacy Act artificial reef program in California, it has become critical to understand the environmental benefits of a partial removal of decommissioned platforms because specific ecological criteria must be satisfied to utilize the program. The study "Biological Productivity of Fish Associated with Offshore Oil and Gas Structures in the Pacific OCS" will determine the patterns of fish standing stock and productivity associated with oil and gas production platforms so that BOEMRE can specify any site-specific survey requirements to industry or other interested parties when they propose decommissioning.

Ultimately, offshore oil and gas platforms will be removed; however, California sea lions and Pacific harbor seals use these platforms as resting and foraging areas. The study "Characterizing and Quantifying Sea Lion and Seal Use of Offshore Man-made Structures in California" will gather information on these species that BOEMRE will use for environmental review and permitting associated with facility decommissioning. The study will provide

initial information on the species interactions with these structures that should contribute to our understanding of how they may interact with renewable energy facilities being considered for the Pacific coast.

Fates and Effects

The OCS platforms offshore of California are located in close proximity to the shoreline where important biological resources are present. Activities from offshore oil and gas drilling have the potential to directly affect these shoreline habitats, especially in the event of an accidental oil spill. The "Pacific Region Intertidal Sampling and Monitoring (PRISM) Study" will monitor shorelines across the four counties that border producing OCS oil and gas facilities. Long-term data about natural and anthropogenic perturbations in the rocky intertidal habitat will be collected in a manner that enables BOEMRE to determine effects from OCS operations and accidental oil spills.

The study "Nocturnal Surveys for Ashy Storm-Petrels and Xantus's Murrelets at Offshore Oil Production Platforms, Southern California" will help to determine how artificial lighting on oil and gas platforms in the Santa Barbara Channel is affecting these two special-status seabird species. The BOEMRE will use the data generated for environmental review of oil and gas and renewable energy projects proposed in the area and, if needed, will identify mitigation to minimize impacts to seabirds from artificial lighting.

The BOEMRE needs to evaluate cumulative impacts from OCS operations on affected key biological communities and be able to assess impacts from accidents such as oil spills. The BOEMRE has collected several decades of long-term monitoring data but BOEMRE managers need the long-term monitoring data brought into a framework conducive to making program-wide decisions. Indices for rocky intertidal habitat condition would help achieve this goal, but none have been produced. The goal of the study "Condition of the Rocky Shoreline" is to develop these indices and produce a report that ranks the condition of rocky intertidal areas in a way that is predictable and comparable.

### 1.5 BOEMRE Pacific Region New Starts for FY 2011 and Ongoing Studies Table

The following table contains the list of New Starts and Ongoing Studies managed by the Pacific OCS Region. Descriptions of Ongoing Studies may be found on the web at http://www.boemre.gov/omm/pacific/enviro/Enviro-Studies/Current-Environmental-Studies.pdf. A list of significant completed studies by the Pacific OCS Region may be found at http://www.boemre.gov/omm/pacific/enviro/Enviro-Studies/completed-environmental-studies.htm and a discussion of highlights and accomplishments of the Pacific Environmental Studies Program is available at http://www.boemre.gov/omm/pacific/enviro/studies-accomplishments-2009.htm.

**Table 1.** Pacific Region New Starts for FY 2011 and Ongoing Studies

| Program Lead | Planning Area | Start FY | Discipline | Study Title |
|---|---|---|---|---|
| ***NEW STARTS*** | | | | |
| BOEMRE | All | 11 | SS | Inventory and Analysis of Coastal and Submerged Archaeological Site Occurrence on the Pacific OCS |
| BOEMRE/ NPS/USGS | SC | 11 | HE | DOI Partnership: Distinguishing Between Human and Natural Causes of Changes in Nearshore Ecosystems Using Long-term Data from DOI Monitoring Programs |
| BOEMRE/ BRD | SC | 11 | MM | Southern Sea Otter Range Expansion and Habitat Use and Interaction with Manmade Structures (BOEMRE/USGS OCS funded) |
| BOEMRE | NC/CC/SC | 11 | All | Membership in California Cooperative Ecosystem Studies Unit |
| ****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/ USGS | SC | 06 | FE | Fate Volume and Chemistry of Natural Seeps |
| BOEMRE/ USGS | SC | 06 | FE | Volume and Chemistry of Natural Seeps in the Santa Barbara Channel |
| ***Habitat and Ecology*** | | | | |
| BOEMRE | SC | 10 | HE | Regional Importance of Manmade Structures as Rockfish Nurseries |
| BOEMRE | NC/CC/SC | 10 | HE | MMS MARINe–Multiagency Rocky Intertidal Network |
| BOEMRE | SC | 10 | HE | Completion of Fish Assemblage Surveys around Manmade Structures and Natural Reefs off California |
| BOEMRE/ BRD | SC | 10 | HE | Habitat Mapping in the Santa Barbara Channel |
| BOEMRE/ CESU | O/WA | 10 | HE | Survey of Benthic Communities near Potential Renewable Energy sites Offshore Oregon and Washington |
| BOEMRE | SC | 09 | HE | MINT – MMS Intertidal Team |

| | | | | |
|---|---|---|---|---|
| BOEMRE | SC | 08 | HE | Spatial and Seasonal Variation in Biomass and Size Distribution of Juvenile Fishes Associated with a Petroleum Platform |
| ***Information Management*** | | | | |
| BOEMRE/ BAA/NOPP | WA/O/NC | 11 | IM | Bayesian Integration for Marine Spatial Planning and Renewable Energy Siting |
| ***Marine Mammals and Protected Species*** | | | | |
| BOEMRE/ USGS | NC/O/WA | 10 | MM | Seabird and Marine Mammal Surveys off the Northern California, Oregon, and Washington Coasts |
| BOEMRE | SC | 07 | MM | Shorebird Survey of Ventura County |
| ***Physical Oceanography*** | | | | |
| ***Social Sciences & Economics*** | | | | |
| BOEMRE/ BAA/NOPP | All | 10 | SS | Renewable Energy Visual Impacts |
| ***Multidisciplinary*** | | | | |
| BOEMRE | SC | 07 | | Environmental Mitigation Monitoring |
| BOEMRE/ BAA/NOPP | WA/O/NC | 11 | All | Protocols for Baseline Studies and Monitoring for Ocean Renewable Energy |
| ***Other (Research Partnerships)*** | | | | |
| BOEMRE Technology Assessment and Research Program (TAR) | | | | |
| Cooperative Ecosystem Studies Unit (CESU); Oregon State University (OSU) | | | | |
| Broad Agency Announcement (BAA), 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 (BRD), Columbia Environmental Research Center, Western Fisheries Research Center, Menlo Park Coastal and Marine Geology Center, National Park Service (NPS) Channel Islands National Park | | | | |
| **Discipline Codes**<br>AQ = Air Quality FE = Fates & Effects HE = Habitat & Ecology<br>IM = Information Management MM = Marine Mammals and Protected Species<br>PO = Physical Oceanography SS = Social Sciences | | | | |
| **Planning Area Codes**<br>Southern California = SC Central California = CC<br>Northern California = NC Oregon = O<br>Washington = WA<br>All = NC/CC/SC/O/WA/Hawaii<br>http://www.boemre.gov/omm/pacific/enviro/enviro_studies.htm | | | | |

## 1.6 Approved Studies for FY 2011 on Hold Pending Funding Availability

With the expectation of increased funding to support studies related to the Deepwater Horizon Oil Spill, renewable energy and expanding information needs, the 2011-2013 SDP as distributed to the Committee included many more studies than usual. By the time the 2011 NSL was ready for managerial approval, the funding increase still was undecided. To prepare for all funding eventualities and to streamline the approval process, the approved FY 2011 NSL included two basic tiers of studies: 1) new starts with funding allocated that could be moved into the procurement queue with the money available (shown in Table 1 above), and 2) new studies on hold, pending the addition of financial resources (shown in Table 2 below). As of this writing, no additional funds have been provided to advance the studies on hold. The studies on hold will be considered for funding in FY 2012 along with the new studies proposed in this plan. There is one study on hold in the Pacific Region.

**Table 2.** Pacific Studies Approved for FY 2011 on Hold Pending Funding Availability

| NSL # | Title |
|---|---|
| PC-11-03 | Renewable Energy in situ Power Cable Observation |

# SECTION 2.0 PROPOSED STUDY PROFILES

## 2.1 Introduction

A list of significant recently completed studies by the Pacific OCS Region may be found at http://www.boemre.gov/omm/pacific/enviro/Enviro-Studies/completed-environmental-studies.htm and a discussion of highlights and accomplishments of the Pacific Environmental Studies Program is available at http://www.boemre.gov/omm/pacific/enviro/studies-accomplishments-2009.htm.

**Renewable Energy and Oil and Gas Operations Support Studies:**

Six new studies supporting potential and ongoing activities are proposed for FY 2012. These studies are:

Developing and Applying a Vulnerability Index for Scaling the Possible Adverse Effects of Offshore Renewable Energy Projects on Seabirds on the Pacific OCS

Biological Productivity of Fish Associated with Offshore Oil and Gas Structures on the Pacific OCS

Pacific Region Intertidal Sampling and Monitoring (PRISM) Study

Nocturnal Surveys for Ashy Storm-Petrels and Xantus's Murrelets at Offshore Oil Production Platforms, Southern California

Condition of the Rocky Shoreline

Characterizing and Quantifying Sea Lion and Seal Use of Offshore Man-made Structures in California

## 2.2 FY 2012 Table

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

| Page # | Discipline | Title | Rank |
|---|---|---|---|
| 15 | MM | Developing and Applying a Vulnerability Index for Scaling the Possible Adverse Effects of Offshore Renewable Energy Projects on Seabirds on the Pacific OCS | 1 |
| 17 | HE | Biological Productivity of Fish Associated with Offshore Oil and Gas Structures on the Pacific OCS | 2 |
| 19 | FE | Pacific Region Intertidal Sampling and Monitoring (PRISM) Study | 3 |

| | | | |
|---|---|---|---|
| 21 | FE | Nocturnal Surveys for Ashy Storm-Petrels and Xantus's Murrelets at Offshore Oil Production Platforms, Southern California | 4 |
| 23 | FE | Condition of the Rocky Shoreline | 5 |
| 25 | MM | Characterizing and Quantifying Sea Lion and Seal Use of Offshore Man-made Structures in California | 6 |

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 2012-2014**

**Region:** Pacific OCS Region

**Planning Area(s):** All

**Title:** Developing and Applying a Vulnerability Index for Scaling the Possible Adverse Effects of Offshore Renewable Energy Projects on Seabirds on the Pacific OCS

**BOEMRE Information Need(s) to be Addressed:** The BOEMRE will likely receive proposals to develop offshore renewable energy projects on the Pacific OCS. While data exist on the distribution of seabirds on the Pacific OCS, there is little information regarding the effects that offshore Pacific coast renewable energy development will have. The proposed study increases the understanding of the flight behavior of seabirds and provides a means to rank and assess the vulnerability of specific seabird species on the Pacific OCS based on the habits and activities of birds at sea. This information coupled with existing information on distribution and abundance can provide a means to assess and advise site selection for renewable energy project in a manner that minimizes adverse effects to seabirds.

**Cost Range:** (in thousands) $400-$600 **Period of Performance:** FY 2012-2015

**Description:**

Background: One of the most pressing issues in marine and coastal research is determining the likely impact of offshore renewable energy projects on marine resources. The eastern Pacific near the coast of the western United States, and Hawaii and its surrounding waters, support many breeding seabirds and a variety of other bird species that migrate to or through these regions. A number of species of conservation concern occur in the Pacific Region, including several listed as threatened or endangered under the Endangered Species Act. The erection of offshore wind turbines or installation of wave hydrokinetic arrays may affect birds in several ways, including the risk of collision with the blades and other parts of the structure, and the displacement of individuals from otherwise suitable habitat. While data on the distribution and abundance of seabirds can advise the selection of locations for renewable energy projects, the habits and activities of birds at sea should be taken into account because vulnerability to effects will vary between species.

Understanding seabird flight characteristics is critical to evaluating the risk of collisions with blades and other parts of structures. While the design aspects of seabird flight have been investigated in detail, we still lack basic information about the height at which seabirds fly, as well as their flight directions with respect to prevailing wind directions. H. T. Harvey & Associates possess data on the flying behavior of seabirds gathered over approximately 50 cruises during 20 years of at-sea surveys conducted along the west coast of the US, spanning the Pacific Ocean from pole to pole, and from the coast to Hawaii (1976-2006), with the major portion of data from the California Current (1985-2006). While some of these data have been analyzed, data on flight height as a function of wind speed and species of bird have not. Once the flight behavior data is analyzed, developing a sensitivity index for seabirds for

the Pacific Region of BOEMRE will aid in evaluating the risks of offshore renewable energy development to the diversity of seabirds occupying this region.

Objectives: 1) Support the analysis of seabird flight behavior to inform the design, operations, and siting of offshore renewable energy projects; 2) develop a wind farm and wave array sensitivity index for seabirds on the Pacific OCS and off Hawaii; 3) apply the index to areas where offshore renewable energy development is most likely to occur; 4) summarize seabird vulnerability on digital maps with a grid size that matches offshore survey data; 5) develop levels of concerns that could act as a basis for selection of offshore renewable energy sites; 6) prepare a synthesis report that summarizes the analyses and findings; and 7) submit a modified version of the report to a peer-reviewed publication.

Methods: Generalized linear models will be used, including logistic regression, to test hypotheses regarding the flight height of seabird species and the potential effects of environmental variables (e.g., wind velocity, sea state). Indirect gradient analysis using non-metric multidimensional scaling and cluster analysis may aid in initially identifying patterns of behavior, and suggest options for constrained ordination techniques. Data on bird and wind velocities will be explored using statistical methods for circular distributions.

The index will be developed by ranking key vulnerability factors as Garthe and Hüppop (2004) did when scaling the possible effects of offshore renewable energy on seabirds in Europe. The factors they chose included flight maneuverability, flight altitude, percentage of time flying, nocturnal flight activity, disturbance by ship and helicopter traffic, flexibility in habitat use, biogeographical population size, adult survival rate, and threat and conservation status. These factors should be evaluated for relevance to evaluating seabirds in the Pacific Region and can be supplemented with others that would help refine the index (e.g., attraction to artificial lights; likelihood of resting on artificial structures rather than avoiding them).

Species evaluated in the index will include all seabirds expected to regularly occur on the Pacific OCS or off Hawaii. At a minimum, these will include species of waterfowl (7), loons (4), grebes (6), albatrosses (3), petrels (6), shearwaters (9), storm-petrels (8), tropicbirds (3), boobies (4), pelicans (1), cormorants (3), frigatebirds (3), phalaropes (2), gulls (11), terns (15), skuas (1), jaegers (3), and alcids (11).

The ranking of each factor for all species will be independently evaluated by a selected group of experts per factor. The experts would be chosen based on their experience with the species in the targeted regions or other areas where the species occur. The sensitivity index calculation would be similar to that identified by Garthe and Hüppop (2004), but may need to be adjusted if factors that were not considered in their index are incorporated. Once species-specific sensitivity indexes are developed, the scores will be integrated with existing distributional data to develop vulnerability maps for areas of potential offshore renewable energy development. An index will be developed based on species density and sensitivity to offshore renewable energy development that will provide sensitivity values for surveyed grid cells at sea.

**Revised date:** March 29, 2011

**ENVIRONMENTAL STUDIES PROIGRAM: Studies Development Plan 2012-2014**

**Region:** Pacific OCS Region

**Planning Area(s):** Southern California

**Title:** Biological Productivity of Fish Associated with Offshore Oil and Gas Structures on the Pacific OCS

**BOEMRE Information Need(s) to be Addressed:** Fish standing stock (biomass) and productivity estimates associated with oil and gas production platforms will provide needed information so that BOEMRE can specify any site-specific survey requirements to industry or other interested parties when they propose decommissioning.

**Cost Range:** (in thousands) $75-$100 **Period of Performance:** FY 2012-2013

**Description:**

Background: In September of 2010, the Governor of California signed into law the California Marine Resources Legacy Act (CMRL Act) which, for the first time on the Pacific Coast, enables a "rigs-to-reefs" program that allows for reefing partially removed, decommissioned OCS oil and gas production platforms, as long as specific ecological criteria are satisfied. Partial removal means cutting the platform off 85 feet (~26 meters (m)) below the sea surface. One pivotal requirement for a proposed reefing project is that a net environmental benefit must be demonstrated for partial removal when compared to full removal. The CMRL Act specifies that the proposed reefed structure must provide for the protection and productivity of fish and other marine life. The State of California provided funding for an independent scientific team to produce a preliminary theoretical framework that estimates the standing stock and annual production of fishes on platforms in the Southern California Bight. Using this theoretical model, estimates for productivity have begun for a few platforms on the OCS. This study requires no field work as the data were acquired via previous BOEMRE studies.

Objectives: Using empirical data from completed and ongoing BOEMRE studies, and building upon the preliminary model approved by the State of California and by BOEMRE as a member of a 15-member Expert Advisory Committee, the goal of this study is to determine the patterns of total standing stock (fish biomass) and fish production at as many Pacific OCS Region platforms as the data will support. Model results will be interpreted to examine the effects of decommissioning options (complete or partial removal). Additionally, platform fish (all species) productivity estimates will be compared to nearby natural reefs for which similar production estimates are available, and will also be compared to production estimates in the literature of other marine and terrestrial ecosystems. Once completed, study results will be published as a BOEMRE OCS Study Report and in a peer-reviewed journal(s).

Methods: A biological model will be further developed based upon existing empirical studies of these platforms to determine for all fish species (1) the standing stock, and (2) the larval production of fishes. This model starts with the current standing stock defined as the total biomass (B) of each species per platform. It then calculates the future production and

standing stocks for all fish species based upon the two platform decommissioning options (complete or partial). The data used for this model were collected during scientific surveys by observers using either submarines or SCUBA to record the frequency and size class of fishes along fixed transect lengths based upon the dimensions of the platform (Love et al. 2003).

*Stock Assessment*
The stock is the amount of biomass for all fish species observed on each platform. The mean biomass density will be calculated for each platform and for each of three depth strata (i.e., lowest 2 m of a platform, 2 m off the bottom to 26 m from the surface, and from 26 m to the surface). The total stock estimate will multiply these depth-zone specific biomass densities by an estimate of the surface area of each depth zone, and summing those estimates for each platform.

*Production Estimate*
Production is the change in biomass over time (Clarke et al. 1946). The total yield (*Y*) is a function of two factors: the standing stock biomass (B), plus the surplus production (*Y*'). Surplus production is the annual growth (G) in the adult stock (i.e., gonadal and somatic growth) plus recruitment (*R*), such that for any production component (Ricker 1975):

$$\boldsymbol{Y = B + Y' \text{ and } Y' = G + R}$$

The model will then estimate annual rates of somatic fish production ($g/m^2/yr$) for each platform for each decommissioning scenario (partial or complete removal). Somatic growth for each species will be estimated based on its standing stock and the species-specific von Bertalanffy growth function. As there are no available estimates of immigration (I) and emigration (E) rates of platform fishes, the model will assume I = E for subadult and adult life history stages. Larval/pelagic juvenile emigration is measured by recruitment to the platform and larval immigration rates can be calculated by fecundity and adult density and size distribution. The standing stock is also a factor of fishing and natural mortality. Fishing mortality is considered negligible as most platforms are currently acting as de facto closures due to security. Natural mortality is incorporated using mortality rate estimates from the literature. Currently only recruitment (*R*) for young-of-year (YOY) bocaccio is incorporated into the model based on available data for which recruit density and depth were reported (Love & York 2006). No other fishes were added to the recruitment component of the production model, which results in a conservative juvenile production estimate. The model will estimate productivity levels over a time frame of 5 years. A standing stock and production estimate for all fish species will be produced for as many Pacific OCS Region platforms as the data will support.

**Revised date:** April 19, 2011

**ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2012–2014**

**Region:** Pacific Region

**Planning Area(s):** Southern California

**Title:** Pacific Region Intertidal Sampling and Monitoring (PRISM) Study

**BOEMRE Information Need(s) to be Addressed:** The BOEMRE needs to understand the ecology and variability of rocky intertidal systems in order to evaluate oil and gas activities and effectively mitigate potential impacts on these natural resources. Direct monitoring of shoreline habitats by BOEMRE staff over the last 20 years has proven to be an effective way to gather this information and determine the effects of OCS oil and gas operations, especially those from accidental oil spills. This long-term research project has also enabled BOEMRE scientists to address bureau and departmental climate change objectives.

**Cost Range:** (in thousands) $60-$100 **Period of Performance:** FY 2012-2016

**Description:**

Background: The OCS platforms offshore of California are located in close proximity to the shoreline where important biological resources are present. Activities from offshore oil and gas drilling have the potential to directly affect these shoreline habitats, especially in the event of an accidental oil spill. This study is designed to monitor shorelines across the four counties that border producing OCS oil and gas facilities. The BOEMRE funds a separate study that supports scientists to perform monitoring, analysis, and management of the Multi-Agency Rocky Intertidal Network (MARINe), which conducts biannual rocky intertidal monitoring at over 120 established sites. The BOEMRE PRISM team, comprised of BOEMRE scientists, is currently one of 12 monitoring teams that collect data for the MARINe network. Federal participation is a requirement of the MARINe network Cooperative Agreement and funding of this study is the mechanism which supports that Federal participation and also offers multiple benefits to the bureau. The monitoring work in this study, which was initiated in 1991 and now spans 2 decades, allows PRISM staff to design and implement studies answering questions identified during monitoring and supporting the overall BOEMRE mission (e.g., climate change objectives). The PRISM team presence in the field has the added benefit of interacting with the public during monitoring and provides BOEMRE with the opportunity to demonstrate our commitment to the environment in a visible manner.

Objectives: 1) Monitor the shoreline adjacent to existing oil and gas operations by collecting long-term data about natural and anthropogenic perturbations in the rocky intertidal habitat in a manner that enables BOEMRE to determine effects from OCS operations and accidental oil spills; 2) conduct short, focused examinations in the field that improve our understanding of rocky intertidal ecology as it relates to the impact, response, and recovery from oil spills; and 3) fulfill our commitment to participate in the Cooperative Agreement with the University of California for MARINe.

Methods: The first task is for the PRISM team to jointly monitor rocky intertidal shores in San Luis Obispo, Santa Barbara, Ventura, and Los Angeles Counties with scientists from the University of California, Los Angeles and Santa Cruz. Monitoring will be conducted twice a year and includes photo documentation of fixed mussel, barnacle, and algae plots; counts and measurements of invertebrates such as owl limpets, sea stars, and abalone; and point intercept measurements of surf grass line transects. In the spring, counts of motile invertebrates are conducted in each photo quadrat. The BOEMRE funds these university scientists through the BOEMRE-MARINe Cooperative Agreement. To share the responsibility of conducting field monitoring, the proposed PRISM study supports BOEMRE scientists to provide man-power, equipment, and expertise.

An additional four to six tasks will be identified at the beginning of the fiscal year in an annual plan, which is reviewed and approved by the Pacific Region and headquarters. These additional tasks are either special short-term studies designed by staff to answer specific questions, or efforts which support the monitoring task. The PRISM tasks that provide examples of the range of topics pursued by the PRISM team currently or in the past include:

- Climate Change Research – PRISM biologists are examining shifts in rocky intertidal communities as a response to climate change and associated sea level rise.

- Mussel Recovery Study – PRISM biologists conducted an experimental study of mussel recovery by establishing clearings and monitoring them over time. Currently, the team is analyzing data.

- Host MARINe Meetings – PRISM hosts meetings of MARINe scientists including the Annual Taxonomic Workshop, committee webinars and follow-up task force meetings. Our support includes creating the agenda, providing the forum, leading sessions, and taking notes.

- Protocol Videos – PRISM team biologists are videotaping the field sampling protocols for archival and training purposes.

- Go-Kit Equipment – PRISM developed the GO-Kits as a rapid assessment tool in the event of an oil spill for all shoreline habitats (wetlands, sandy beaches and rocky intertidal); these kits have been adopted by response groups and used in recent spills.

- Updating Field Guide – The hand-drawn field maps for PRISM sites have not been updated in many years. These maps are being redrawn and the PRISM team is collecting the key site measurements for this effort.

**Revised Date:** March 29, 2011

**ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2012–2014**

**Region:** Pacific OCS Region

**Planning Area(s):** Southern California

**Title:** Nocturnal Surveys for Ashy Storm-Petrels and Xantus's Murrelets at Offshore Oil Production Platforms, Southern California

**BOEMRE Information Need(s) to be Addressed:** The BOEMRE regulates oil and gas activities on platforms off the southern California coast. In addition, BOEMRE will likely receive renewable energy proposals within this area. A variety of birds may be attracted to artificial lights on these structures, including several species of conservation concern. Using existing facilities, this study will determine if artificial lighting on oil platforms in the Santa Barbara Channel is affecting two special-status seabird species; the Xantus's Murrelet (*Synthliboramphus hypoleucus*) and Ashy Storm-Petrel (*Oceanodroma homochroa*). The BOEMRE will use the data generated for environmental review of offshore energy projects.

**Cost Range:** (in thousands) $100-$150 **Period of Performance:** FY 2012-2013

**Description:**

Background: The attraction of seabirds to bright lights and associated light-induced mortality of seabirds has been well-documented (Imber 1975, Reed et al. 1985, Le Corre et al. 2002). The presence of bright lights in the marine environment is recognized as a potential threat to two special-status California seabird species, the Xantus's Murrelet and Ashy Storm-Petrel, although the magnitude and severity of this threat is not known (Carter et al. 2000, U.S. Fish and Wildlife Service (USFWS) 2009, USFWS 2010). Ashy Storm-Petrels have been recovered dead at Platform Hondo, Santa Barbara County, California, and at brightly lit coastal locations in southern California, and light attraction has been reported for Xantus's Murrelet at a coastal location in central California (Carter et al. 2000). In addition, both species have been observed landing on or colliding with brightly lit boats at night off southern California (D. Pereksta, personal observation). Incidental observations like these are the only existing information regarding the effects of artificial lighting on these two species and no directed studies have been conducted to date. The Xantus's Murrelet Technical Committee of the Pacific Seabird Group has identified lighting studies as a need to fill information gaps for that species. Lighting studies were also recommended for the Ashy Storm-Petrel in a recent summary of its status and threats (Carter et al. in Shuford and Gardali 2008).

The Xantus's Murrelet is a candidate for addition to the Lists of Endangered and Threatened Wildlife and Plants under the Endangered Species Act of 1973, as amended (USFWS 2004, 2010). The USFWS determined that listing of the Ashy Storm-Petrel was not warranted, but this decision is currently being legally challenged by the Center for Biological Diversity (USFWS 2009, Center for Biological Diversity 2010).

Offshore oil operations in California are conducted from 24 platforms along the southern coast of the state, well within the marine range of both species (Briggs et al. 1987, McCrary et

al. 2003). Lights are present on the platforms to illuminate working areas and make the platforms visible to passing ocean vessel traffic. In addition, offshore renewable energy production will likely be proposed at various locations on the Pacific OCS including the coast of California (USFWS 2009). Marine radar has been used to detect seabirds, including Xantus's Murrelets and Ashy Storm-Petrels, near their breeding locations, generally in low-light situations where the seabirds cannot be easily seen (Hamer et al. 1995, 2005). Hamer et al. (2005) refined species identification of seabirds on radar off southern California using flight speeds and echo sizes while monitoring Xantus's Murrelets. For these reasons, marine radar is a feasible method to use to detect seabirds that may be attracted to bright lights on offshore energy production platforms.

Objectives: The primary objectives of this study are to: 1) Evaluate the extent to which Xantus's Murrelets and Ashy Storm-Petrels interact with bright lights of offshore oil platforms off the coast of southern California; 2) prepare a synthesis report that summarizes the analyses and findings; and 3) submit a modified version of the report to a peer-reviewed publication.

Methods: Radar and visual surveys will be conducted during spring and fall of 2012 (preferred) or 2013. Radar/visual surveys for Xantus's Murrelets will occur on one of the oil platforms nearest to Anacapa Island (platforms, from west to east: C, B, A, Hillhouse, Habitat, Henry, Houchin, Hogan, Grace, Gilda, Gail, or Gina). Two surveys will be conducted during 10 days around new moons in the spring (March and April), to coincide with peak breeding activities of adult Xantus's Murrelets at Anacapa Island. Two radar/visual surveys for Ashy Storm-Petrels will occur on one of the oil platforms nearest to both San Miguel and Santa Cruz Islands (platforms, from west to east: Heritage, Harmony, or Hondo) during 10 days around new moons in the fall (September and October), to coincide with breeding activities of adult Ashy Storm-Petrels and peak fledging period of Ashy Storm-Petrel chicks at San Miguel and Santa Cruz Islands.

During each 10-day survey period, a marine radar unit will be mounted on the oil platform in a manner that allows at least one full vertical side of the platform to be adequately surveyed. The radar unit will be removed after each 10-day survey period for maintenance, and to protect the unit from weather during non-survey periods. A biologist experienced in interpretation of radar echoes will monitor the radar screen and record murrelet and storm-petrel detections on a data sheet. Echoes on the radar screen will also be recorded for the duration of each survey using a video camera so that biologists can review survey sessions at a later date. For each radar detection of a murrelet and storm-petrel, the technician will record: species, time, flight behavior, distance between echoes on the radar screen, flight speed, persistence of radar echoes on screen, and the number of radar echoes. The bird surveyor will visually scan the air and sea adjacent to the platform and lights and record all species observed, including time and flight behavior (e.g., circling around or aggregating at lights, disorientation, etc.), number of individuals, and weather conditions (e.g., wind speed and cloud cover).

**Revised Date:** March 29, 2011

**ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2012-2014**

**Region:** Pacific OCS Region

**Planning Area(s):** All

**Title:** Condition of the Rocky Shoreline

**BOEMRE Information Need(s) to be Addressed:** The BOEMRE needs to evaluate cumulative impacts from OCS operations on affected key biological communities and be able to assess impacts from accidents from the offshore program. The BOEMRE has collected several decades of long-term monitoring data but BOEMRE managers need the long-term monitoring data brought into a framework conducive to making program-wide decisions. Creating a bio-index will also allow BOEMRE to determine impacts of climate change, supporting bureau and departmental priority climate change objectives.

**Cost Range:** (in thousands) $175-$225 **Period of Performance:** FY 2012-2014

**Description:**

Background: The BOEMRE has been monitoring the rocky coastline adjacent to OCS oil and gas activities since 1991 and managing the Multi-Agency Rocky Intertidal Network (MARINe), a long-term monitoring program established in 1997 for a large network of sites across the Pacific and Atlantic coastlines (www.MARINe.gov). MARINe's Mission Statement is "to determine the health of the rocky intertidal and make this information available to the public." The BOEMRE is interested in analyzing the information from this study in the context of the condition of the communities in order to provide the type of information managers need to assess the condition of the rocky shoreline adjacent to our operations and the contribution that impacts from OCS projects make to the overall status of this resource. Furthermore, this work supports bureau and departmental climate change objectives by aiding in the determination of climate change impacts in the rocky intertidal. This project provides multiple benefits to multiple agencies for their management directives; such as the National Park Service, National Oceanic Atmospheric Administration Marine Sanctuary Program, California Department of Fish and Game, State Water Quality Control Board, and U.S. Fish and Wildlife Service. In addition, this information will be used to monitor newly established marine protected areas along the coast.

Because of the complexity of the rocky intertidal resource, many years of monitoring data collected at numerous locations were needed in order to initiate examination of this question. For the past 2 years, a Rocky Intertidal Health Experts Workgroup met to determine if it is possible, based on the data, to develop bioindices of rocky intertidal populations. Raw data sets from 22 central California MARINe sites were analyzed individually by each of 20 experts to determine if experts can agree on factors that can be associated with a disturbed or undisturbed system and in a disturbed system was the disturbance anthropogenic or natural. This effort culminated in a three day focused workshop where the experts agreed that establishing an index is feasible and worth pursuing. This portion of the effort is primarily funded by USC Sea Grant.

The next step is to develop the indices for rocky intertidal habitats, which has not been done before. The Experts Workgroup expects to publish this important work once it is completed. The goal is to use these indices to report on the condition of the rocky intertidal shoreline in a way that is predictable and comparable.

Objectives: 1) Develop bio indices for the rocky intertidal habitat; and 2) using these indices, publish a report on the state of rocky intertidal sites along the California mainland.

Methods:

1. Conduct a literature review and analysis of rocky intertidal disturbances and indices in other habitats.

2. Use scientific measurements of biodiversity and robustness of the resources, and known natural variables such as exposure, slope, substrate, predation, sand intrusion and other parameters determined by the experts.

3. Incorporate additional sites to provide a broader scope of anthropogenic disturbance.

4. Clarify the scale of scoring disturbance. Once "natural" environmental characteristics are accounted for, the expected condition can be described and deviations from the expected can be used to explain site condition.

5. Develop bioindices at a Rocky Intertidal Health Experts Workshop.

6. Analyze data from the California long-term monitoring program MARINe sites in accordance with the indices and "rank" sites form first to last using a more clearly defined disturbance scale.

7. Publish a scientific paper delineating the assumptions and ranks and a shortened public version. Peer-reviewed papers on the approach used will be encouraged as this is ground-breaking work.

8. Extensive peer review will be built into the development of this report to ensure there is a consensus among experts as to the validity of the rankings. The report will strike a balance between scientific and management goals to maximize its use in coastal management programs.

9. A bio-index for the rocky intertidal will assist BOEMRE in determining climate change impacts to this important resource.

**Revised date:** March 29, 2011

**ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan 2012–2014**

**Region:** Pacific OCS Region

**Planning Area(s):** Southern California

**Title:** Characterizing and Quantifying Sea Lion and Seal Use of Offshore Man-made Structures 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 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 environmental analyses and consultations under the National Environmental Policy Act (NEPA) and the MMPA. Although there have been studies of pinniped haul out areas, we are not aware of any studies that have assessed pinniped use of offshore oil and gas platforms. The data to be collected in this study are unique to the Pacific Region and we suspect that individual platforms will have significantly different patterns of pinniped use.

Objectives: 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 needs for NEPA and MMPA reviews for platform decommissioning activities.

Methods: This study will count sea lions and seals using all 23 Pacific OCS oil and gas platforms under a variety of daylight conditions such as differing weather states and seasons. Activity, sleeping, roosting, displays, etc., and trends will also be documented.

Sea lions resting on platform decks and buoys are relatively easy to count. Monthly observations conducted by boat for example from the regularly schedule service vessels 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 through consultations with BOEMRE, 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 29, 2011

## 2.3 FY 2013 Table

**Table 4.** BOEMRE Pacific OCS Region Studies Proposed for the Fiscal Year 2013 NSL

| Page # | Discipline | Title |
|---|---|---|
| 29 | HE | Influence of Pacific Offshore Platforms on Marine Fish Ecology |
| 31 | MM | Nearshore Marine Bird Surveys from Southern California Points and Beaches: Baseline for Offshore Renewable Energy and Post-lease Oil and Gas Projects |

**ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan 2013–2015**

**Region:** Pacific OCS Region

**Planning Area(s):** Southern California

**Title:** Influence of Pacific Offshore Platforms on Marine Fish Ecology

**BOEMRE Information Need(s) to be Addressed:** The long-term fate of 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 peer-reviewed BOEMRE OCS reports, various USGS reports, and scientific literature 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) $150-$200 **Period of Performance:** FY 2013-2015

**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, DOI is the only public agency (Federal or State) that has funded research at the offshore platforms. The study proposed for FY 2012, *Biological Productivity of Offshore Oil and Gas Structures in the Pacific OCS*, if approved and funded, will be completed before the start of this project and from that study we expect a manuscript submittal and work *in press* to a scientific journal well within time to be included in this present effort. The BOEMRE needs to have the resulting peer-reviewed BOEMRE OCS reports, various USGS reports, and scientific literature material compiled into a single, professionally published reference to support environmental reviews associated with decommissioning and for public outreach purposes. There are many peer-reviewed papers and reports. The goal is to publish a book or special issue of a respected peer-reviewed journal on the influence of Pacific offshore platforms on marine fish ecology based on information obtained through these studies. An identical effort in the Gulf of Mexico resulted in a 2003 special publication from the American Fisheries Society titled "Fisheries, Reefs, and Offshore Development," which addressed the influence of Gulf of Mexico platforms on marine fish (see http://www.afsbooks.org/x54036xm). Permission was requested and received from multiple sources to reprint and compile published peer-reviewed literature.

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

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

**Revised date:** March 29, 2011

**ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2013-2015**

**Region:** Pacific OCS Region

**Planning Area(s):** Southern California

**Title:** Nearshore Marine Bird Surveys from Southern California Points and Beaches: Baseline for Offshore Renewable Energy and Post-lease Oil and Gas Projects

**BOEMRE Information Need(s) to be Addressed:** The BOEMRE regulates post-lease oil and gas activities on platforms off the southern California coast. In addition, BOEMRE will likely receive renewable energy proposals within this area. The proposed study will provide up-to-date information on species composition, distribution, abundance, and seasonal variation of nearshore marine birds along this section of coast. The data generated will be used for environmental review of both renewable energy and oil and gas projects proposed in the area.

**Cost Range:** (in thousands) $200-$300 **Period of Performance:** FY 2013-2015

**Description:**

Background: The BOEMRE funded aerial seabird surveys offshore southern California from 1999-2002. The results of that study were published (Mason et al. 2007), comparing the results to those obtained 20 years earlier by Briggs et al. (1987). In addition, BOEMRE funded shorebird surveys on Ventura County beaches from 1994-1997 (McCrary and Pierson 2002) and again from 2007-2010, report pending. While these surveys provide valuable information regarding the status and distribution of birds at-sea and on local beaches, little information has been collected regarding species composition and abundance of marine birds in the nearshore environment where platforms exist and renewable energy facilities will be installed.

The shoreline of Los Angeles, Ventura, and Santa Barbara Counties in California is closest to the oil platforms off southern California and most likely to be affected by a spill. In addition, these waters are expected to attract renewable energy proposals due to their proximity to urban centers. The birds found in nearshore areas (including loons, grebes, scoters, pelicans, cormorants, etc.) are among the birds most affected by oil spills in California and species that could be affected by offshore renewable energy development. There are anecdotal indications that the distribution and abundance of some of these species has changed over the past decade.

The proposed study will provide up-to-date information and establish a more robust data set from which to draw on for marine spatial planning, environmental analyses, and oil spill responses. Shore-based surveys, with the possibility of being supplemented by small-boat surveys, will provide a more thorough assessment of bird distribution and abundance than previous aerial surveys including the ability to detect migrational movements along the coast. The latter will be valuable for assessing the placement of offshore wind turbines and

hydrokinetic devices. Marbled Murrelets have been observed off the Ventura County coast during recent National Audubon Society Christmas Bird Counts and the proposed surveys may help refine the status of this federally threatened species where it is poorly known south of its regular range.

Objectives: 1) To observe and characterize the distribution, abundance, and migratory passage of nearshore marine birds along the mainland coast of Los Angeles, Ventura, and Santa Barbara Counties in California; 2) to characterize the current marine bird diversity, distribution, abundance, and migratory movements within the study area; 3) to refine the status of the Marbled Murrelet in the study area; and 4) publish report(s) on the findings of the surveys and data analysis.

Methods: Monthly surveys will be conducted over a 3-year period. Surveys will be taken from shore-based observation sites using binoculars and spotting scopes, and possibly supplemented with some small-boat surveys. Survey sites will include coastal promontories and other areas that provide sufficient visibility to survey areas up to 500 m from shore. Known shore-based seabird watching locations will be used for the surveys including Point Fermin, Point Dume, Mugu Rock, Pitas Point, and Goleta Point.

To ensure that the coast is adequately surveyed, additional survey sites will be established by reviewing historical information and consulting with local experts on nearshore bird distribution, migratory pathways, and sites that provide an elevated and wide view of the coast. Access to Naval Base Ventura County and Vandenberg Air Force Base may be necessary to survey key points along large expanses of coastline under military ownership.

Survey methodologies from similar studies will be reviewed and modified, as necessary, to account for site-specific considerations and equipment availability. The exact methodology will be determined later, but will be similar to other land-based survey methodologies and incorporate the most applicable protocol. Examples of applicable protocols include:

The Puget Sound Seabird Survey protocol:
http://www.seattleaudubon.org/sas/Portals/0/Science/Puget_Sound_Seabird_Survey/PSSS_Protocol_10-11.pdf

The nearshore distribution of terns and other seabirds in relation to EnCana's Deep Panuke natural gas pipeline construction in Stormont Bay, Nova Scotia:
http://www.bsc-eoc.org/organization/images/news/ternrpt.pdf

**Revised date:** March 29, 2011

## SECTION 3.0 TOPICAL AREAS for FISCAL YEAR 2014

Renewable Energy and Alternate Use

Implementation of the BOEMRE Renewable Energy and Alternate Use Program from offshore wind and wave facilities remains a priority for the Pacific Region. 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 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. Future studies will be needed to consider the impacting agents of proposed wind and wave energy devices, to identify suitable areas and conditions, and to examine environmental effects for the entire Pacific OCS Region of Washington, Oregon, California, and Hawaii.

Shorebird Surveys of the Channel Islands off Ventura and Santa Barbara Counties

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 existing or potential 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 on this effort.

Comprehensive Geodatabase and Geospatial Mapping of Seabird Data for the Pacific OCS

The Pacific Region has sponsored the collection of data on seabirds on the OCS for several decades. Recently, major strides have been made towards collecting seabird survey data in additional areas and in the form of improved survey design (e.g., Seabird and Marine Mammal Surveys off the Northern California, Oregon, and Washington Coasts) with USGS and USFWS. As a result, we have a large collection of knowledge about seabirds and it continues to grow. Some projects are near completion (e.g., Shorebird Survey of Ventura County), or will complete field collection in about 2 years (e.g., Seabird and Marine Mammal Surveys off the Northern California, Oregon, and Washington Coasts). A final compendium of information in the form of geodatabase expressed as geospatial mapping will augment our understanding of the seabird and shorebird species that are potentially at risk from offshore energy development and provide maps that illustrate the results in a way that is understandable to decisionmakers and the public. As new information becomes available, the data can be folded into the existing database once work is completed.

Decommissioning

The Pacific Region faces a variety of environmental information needs related to decommissioning and probable creation of artificial reefs from some oil and gas platforms. The focus of this topical area continues to be the study of potential environmental impacts due

to decommissioning OCS facilities off California, many of which are in exceptional water depths. Review of the 2004 Proceedings of the Decommissioning Workshop (http://www.boemre.gov/omm/pacific/lease/Decommissioning/Summary_Recommendations_to_MMS.htm) and comparison to studies that have been accomplished since that time, show that most of the recommendations have been completed or are underway. The present 2012 Studies Development Plan includes two recommended studies from the workshop; one on productivity of platforms under two decommissioning options and one on sea lion use of offshore structures. However, a few issues related to marine mammals and onshore dismantlement, disposal, and recycling remain. Specific areas of potential future studies may include assessment of removal and disposal of marine growth, development of criteria/factors in assessing potential onshore processing sites, and a review of the effects from the most current methods of severing platform legs applicable to Pacific Region platforms.

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