**BOEMRE ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies**

**Region:** Pacific OCS Region

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

**Title:** BOEMRE-MARINe (Multi-Agency Rocky Intertidal Network)

**BOEMRE Information Need(s) to be Addressed:** Ongoing monitoring of rocky intertidal sites adjacent to OCS production facilities allows BOEMRE to directly assess potential and/or real impacts to the coastline from OCS operations. With these data, BOEMRE can directly assess impacts to shoreline resources from OCS activities by differentiating between naturally caused impacts and other anthropogenic impacts including impacts from OCS oil and gas production and accidental oil spills. The study implements BOEMRE's OCS Lands Act mandate to monitor the marine and coastal environment adjacent to OCS operations.

**Total BOEMRE Cost:** $1.7 million **Period of Performance:** FY 2010-2014

**Conducting Organization:** University of California, Santa Cruz

**Principal Investigators:** Dr. Pete Raimondi, Dr. Jack Engle, Dr. Rich Ambrose, Dr. Steve Murray, Dr. Jennifer Burnaford

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**Description:**
Background: Potential impacts to the shoreline are of particular concern in the Pacific OCS Region because OCS operations are located very close to shore. Public concern with these impacts has a considerable effect on the program. BOEMRE and its 40 partners in MARINe biannually monitor over 100 established shoreline rocky intertidal sites using a targeted assemblage protocol from California to British Columbia. MARINe partners also use a biodiversity protocol to sample an additional 100 plus sites from Alaska to Mexico on a periodic basis. MARINe employs standardized field protocols and a shared database (www.MARINe.gov). This study provides funding to monitor all 24 BOEMRE long-term monitoring sites adjacent to OCS operations. BOEMRE continues to participate actively in the management and oversight of MARINe, to access the data critical to our ongoing operations, and to fulfill our responsibility to monitor OCS platforms and pipeline operations.

A significant change documented at MARINe sites is the recent finding of juvenile black abalone at selected sites on offshore islands. This finding, while encouraging, is not sufficient to offset the need to list the black abalone as endangered (see Federal Register Notice January 14, 2009) Black abalone, throughout the area affected by withering foot syndrome, are still at the low levels (5% of the original population in the late 1980's and early 1990's) along much of the coastline. While the areal extent affected by withering

foot syndrome disease has leveled off, new evidence of the disease is still being found at BOEMRE sites in San Luis Obispo County. For many years, miles of coastline continued to be affected and the numbers of abalone fell drastically. It appears that the decline in abalone numbers continues due to a combination of loss of animals from withering foot coupled with an absence of recruitment. Evidence of withering foot syndrome was most recently observed in Central California. It seems unlikely the black abalone will recover; one of the problems limiting their recovery is the physical alteration to the community that routinely occurs after the abalone leave. No impacts have been identified from oiling over the recent past, either from OCS or non-OCS operations.

Partnerships are also fostered with local, State and Federal government agencies involved in monitoring research. This is an important Cooperative Agreement with the State as currently the State funding has been severely cut and BOEMRE-funded MARINe data are the key source of rocky intertidal information being used in Southern California to determine Marine Life Protected Areas designations/monitoring, and determining impacts to biology in Areas of Special Biological Significance. MARINe partners interact in technical conferences, government forums, and academic conferences to inform managers about the state of the rocky intertidal.

Objectives: This study will provide for the continued monitoring of 24 rocky intertidal sites on the mainland shore immediately adjacent to OCS facilities. Information generated will provide the basis for evaluating impacts to the shoreline from OCS activities, especially accidental oil spills. A web-based trend analysis of BOEMRE funded sites in combination with other MARINe sites in the shared database, along with coordination of MARINe and database tasks are included so that BOEMRE has access to the data needed for management decisions.

Methods: Sites are monitored biannually by 5 teams of field biologists, including the BOEMRE MINT team. Barnacles, mussels, seastars, black abalone, surfgrass, limpets, turf weed, rock weed and other algae are either photographed in fixed plots in the field, or measured and counted in irregular, circular or band plots. The sampling protocols are standardized across MARINe and are used by all MARINe field teams. Data is placed in a common database and is reviewed and published by the Science Panel.

The most recent analysis report describing changes at BOEMRE sites was completed in 2005 and covered data up to winter sampling 2003. It is proposed to update the analysis with data from 2003 to present in the first year of the funding. Rather than a report, however, a web-based product is planned to analyze trends at BOEMRE sites, in combination with data at other MARINe sites in the shared database. This will allow changes at BOEMRE sites to be evaluated in context with broader changes. Being able to evaluate changes occurring at BOEMRE-funded MARINe sites in context with the changes occurring at other MARINe sites monitored in exactly the same way is what makes the MARINe monitoring program so valuable. Rocky intertidal systems are so dynamic that it is very difficult to understand the importance or cause of significant changes without this contextual analysis.

Additionally, it is also envisioned as part of this funding to explore a real-time interface, which would allow users to produce trend products interactively with the data over the web. This work will be leveraged with work from one of BOEMRE's partners, PISCO, who has been developing a real-time interface for the biodiversity rocky intertidal data. These products are being produced in response to State and Federal managers who expressed the need to have quicker access to trends and comprehensive analyses.

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| **Current Status:** | Spring fieldwork February and March, including motile invertebrates. |
| **Final Report Due:** | Comprehensive Analysis report due May 2011. |
| **Publications Completed:** | See www.MARINe.gov |
| **Affiliated WWW Sites:** | www.MARINe.gov |
| **Revised Date:** | March 4, 2011 |