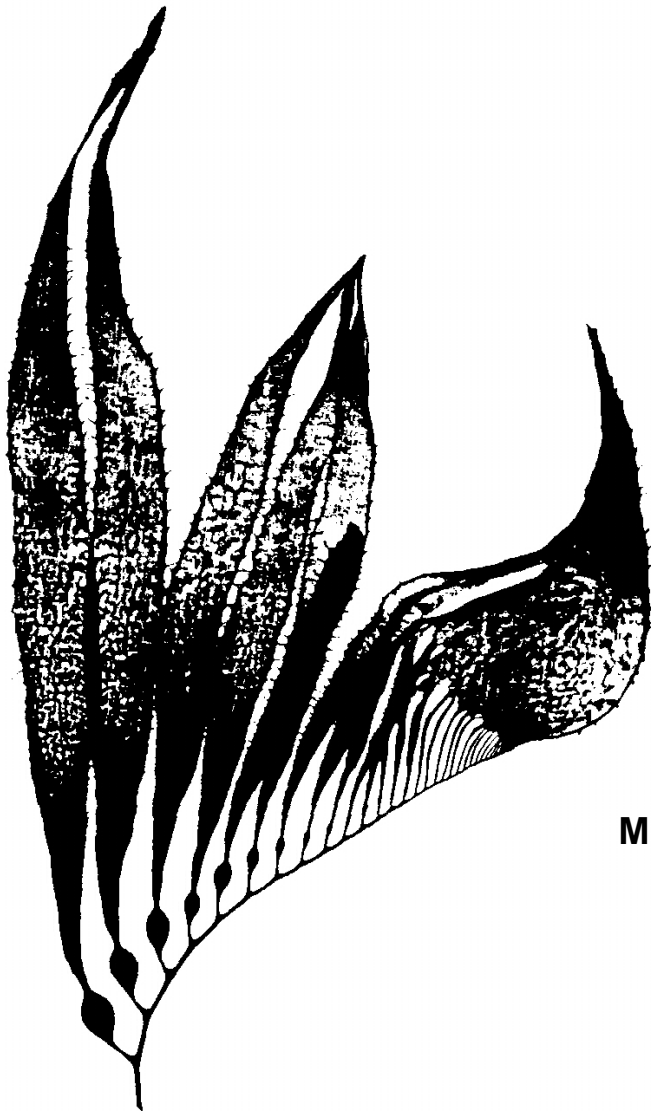


**COASTAL MARINE INSTITUTE
PROGRAM YEAR 7
QUARTERLY REPORT 1**

for the period

July 1, 2000 – September 30, 2000



*A Cooperative Program
between the*
University of California
and the
Minerals Management Service

October 18, 2000

**COASTAL MARINE INSTITUTE
PROGRAM YEAR 7
QUARTERLY REPORT 1**

for the period

July 1, 2000 – September 30, 2000

A Cooperative Program

between the

University of California

and the

Minerals Management Service

Russell J. Schmitt
Program Manager

Coastal Research Center
Marine Science Institute
University of California
Santa Barbara, California 93106

October 18, 2000

Program Manager's Report

for the period July 1, 2000 – September 30, 2000

This constitutes the quarterly report for the first quarter for Program Year 7 of the Coastal Marine Institute, a cooperative research agreement between the Minerals Management Service, the state of California and the University of California.

As of this quarter, 6 projects currently are being conducted under the aegis of the Coastal Marine Institute.

Actions Pending MMS Approval:

- Task 12387: *Ecological Consequences of Alternative Abandonment Strategies for POCS Offshore Facilities and Implications for Policy Development*, requires approval of a no-cost extension;
- We are awaiting comments from MMS on the draft final report for Task 13293: *Aerial Surveys of Marine Birds and Mammals in Santa Barbara Channel and the Santa Maria Basin*;
- We are awaiting comments from MMS on one of the full proposals that was submitted for funding, *Simulation of a Subsurface Oil Spill by a Hydrocarbon Seep (SSOS-HYS)*, PI, Clark *et al.*

Major Programmatic Progress and Actions during the Quarter:

- Contract and budget negotiations for the renewal of the Coastal Marine Institute contract were completed;
- Ten full proposals were received, eight were selected for immediate funding (still awaiting comments on 1 proposal);
- Contract and budget negotiations were completed in September allowing funding of 8 new proposals and the continuation of the internship and management tasks;
- We met with MMS personnel in June to discuss the potential for funding a “biotechnology” project. A group of UCSB researchers met during the summer and wrote a proposal on “Biotechnology: Exploring America’s Oceans for Our Health” which was submitted to MMS for consideration. The proposal was accepted and contract and budget negotiations were completed. The proposal was signed at a special ceremony on September 27, 2000, with the following people signing:
 - ❖ Deputy Secretary, David J. Hayes, Department of the Interior;
 - ❖ Deputy Director, Dr. Thomas Kitsos, Minerals Management Service;
 - ❖ Chancellor, Dr. Henry T. Yang, University of California, Santa Barbara;
 - ❖ Vice Chancellor for Research, Dr. France A. Cordova, University of California, Santa Barbara; and
 - ❖ CMI Program Director, Dr. Russell J. Schmitt, UC-MMS Coastal Marine Institute, University of California, Santa Barbara;
- The Final Report for Task 13096: *Utilization of Sandy Beaches by Shorebirds: Relationships to Population Characteristics of Macrofauna Prey Species and Beach Morphodynamics*, has been completed. It will be submitted to MMS as soon as the manuscript containing the data has been submitted for publication.

Task 12387: *Ecological Consequences of Alternative Abandonment Strategies for POCS Offshore Facilities and Implications for Policy Development*

Principal Investigators: **Mark H. Carr**, Department of Biology, University of California, Santa Cruz, CA 95064, **Graham E. Forrester**, Dept. of Biology, University of Rhode Island, Providence, RI, and **Michael V. McGinnis**, Coastal Research Center and Ocean and Coastal Policy Center, Marine Science Institute, University of California, Santa Barbara, CA 93106

Major Accomplishments, July 1, 2000 - September 30, 2000

Our major focus during the past quarter was to contribute to the report by the University of California Select Scientific Committee on Decommissioning Alternatives established by the University of California's Office of the President (UCOP) and the University of California Marine Council. M. Carr and P. Raimondi co-authored this report, chaired by Dr. Sally Holbrook at UC Santa Barbara. The report includes several figures and tables summarizing results generated from our MMS funded research. The report is available on the internet at: http://www.ucop.edu/research/ucmc_decommissioning/.

We also continued to focus our efforts on writing the final report and associated publications this past quarter. The primary tasks conducted this past quarter were:

- Preparing text, tables and figures for the final report and publications.
- Further analyses of fish abundance and size distributions among depths and habitats (platforms vs. natural reefs).

Problems Encountered: We still have not received the no-cost extension requested from MMS several months ago and this has constrained the amount of time our technicians can devote to data analysis for the past two quarters. Little work can be continued on this project until this is sorted out.

MMS Action Required: Please follow-up on the status of this no-cost extension request.

Future plans: Further analysis and preparation of final report and publications when the no-cost extension allows us to re-hire the technical assistance necessary for this effort.

Estimated Percentage of Budget Expended:

Project Year 1	100%
Project Year 2	100%
Project Year 3	70%

Task 12388: *Joint UCSB-MMS Pacific OCS Student Internship and Trainee Program*

Principal Investigators: **Jenifer Dugan**, Coastal Research Center, Marine Science Institute, University California, California. 93106, and **Edward A. Keller**, Environmental Studies Program, University of California, Santa Barbara, California, 93106

Major Accomplishments, July 1, 2000 - September 30, 2000

During the past quarter, we hired four new student interns. One of the new interns, Jodi Henri, worked with Michael McCrary at MMS, USGS-BRD personnel and NPS personnel on data from aerial surveys and monitoring of seabirds in the Santa Barbara Channel. Three new intern positions MMS were initiated in July 2000 to assist with the MARINE rocky intertidal monitoring network mentored by Ms. Mary Elaine Dunaway of MMS. The rocky intertidal interns are assisting with data collection, data entry, and databases, coordination of intertidal monitoring efforts among different agencies and universities and in the field on the mainland and the Channel Islands. Brent Mardian is an undergraduate student and is working on entry of data from rocky intertidal sites on the Channel Islands with Dan Richards of the National Park Service in Ventura. Brent will also be assisting NPS and other MARINE researchers in the field this fall and working on projects that interface between the island and the mainland intertidal sites. Another undergraduate student, Jessica Hayden-Spear is working with Ms. Dunaway and the MARINE researchers conducting mainland rocky intertidal monitoring. Jessica is coordinating field schedules for the researchers, collecting and organizing GPS coordinates, maps, and other information, and entering MARINE data. She will be assisting MARINE researchers in the field during fall 2000. Michael Asakawa is a graduate student and is working with Mark Shildhauer at the National Center for Ecological Analysis and Synthesis in Santa Barbara. His task is to collect, develop, and ensure quality control of the MARINE metadata. The rocky intertidal internships are expected to continue for a full year. We are working with Jim Lima and others to arrange additional internship opportunities for MMS/CMI projects during Fall and Winter 2000.

No Information Transfer Seminars were presented by CMI/SCEI PI's this past quarter. We are working with Jim Lima and others to determine which projects will present talks in the future and to develop a seminar schedule.

Future plans:

New interns will be hired as needs are identified.

Estimated Percentage of Budget Expended:

Project Year 1: 100%
Project Year 2: 100%
Project Year 3: 100%
Project Year 4: 100%
Project Year 5: 90%

Task 14181: *Population Trends and Trophic Dynamics in Pacific OCS Ecosystems: What Can Monitoring Data Tell Us?*

Principal Investigators: **Russell J. Schmitt**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106 and **Andrew J. Brooks**, Coastal Research Center, Marine Science Institute, University of California, Santa Barbara, CA 93106

Progress to Date:

A number of entities (including MMS) have devoted considerable effort and resources to the long-term monitoring of various components of the coastal marine ecosystems in the Southern California outer-continental shelf (OCS) region. The primary goals of such monitoring are to estimate the current state of the biota and to identify long-term trends in population demographics. Data from such studies are vital to resource and regulatory agencies as they provide critical baseline information needed for accurate assessment of potential effects arising from such particular activities as offshore oil and gas production. The fundamental need for such information is evidenced by the growing number of coastal marine monitoring programs that have been implemented in Southern California.

The behavior of the California Current System plays a critical role in determining the conditions of the nearshore marine environment off Southern California. The typically high productivity of this system is attributed to coastal upwelling which brings deeper, nutrient-rich water to the surface near shore. This high supply rate of nutrients enhances primary productivity, which in turn increases secondary productivity of the nearshore pelagic and benthic food webs. Time series studies of the California Current System conducted by the California Cooperative Fisheries Oceanic Investigations since the 1940's have revealed distinct seasonality within a year, and periodic wholesale change during El Niño Southern Oscillation (ENSO) events that have relatively brief (1-2 years) durations. There is abundant evidence that the California Current System has undergone a longer, interdecadal length change since the late 1970's and early 1980's. One manifestation off Southern California of this apparent regime shift was a rapid, large, and persistent increase in seawater temperature. Between 1976-1977, mean annual surface temperatures in the Southern California Bight rose an average of 1°C or more above the mean for the previous two decades. Associated with this warming event were a number of changes in other physical processes and events that can influence marine biota. Among the more important manifestations in Southern California of these altered physical conditions was a decrease in productivity in surface waters near shore. Although the exact physical explanation is still under study, it appears reasonably certain that the amount of nutrients upwelled into surface waters has declined during this recent period of elevated seawater temperature. There is compelling evidence that the abundances of many coastal species off Southern California have undergone dramatic declines over the past 1-2 decades in response to falling productivity in near shore, surface waters.

The vast amount of long-term data on nearshore biota collected by a large number of separate monitoring programs in the Southern California OCS region represents a relatively untapped "gold mine" of information for environmental managers. The occurrence of a regime shift in the ocean climate in the North Pacific in the past two decades provides a unique opportunity to determine whether and how various components of the biota respond to this source of

perturbation. Data from long-term monitoring programs not only indicate the current state and recent history of the biota, they can reveal much about the ecological structure of various coastal ecosystems, including the dynamical behavior and regulation of different food webs. Such knowledge provides managers with better understanding and enhanced predictive ability regarding the potential impacts to these ecosystems from other potential sources of disturbance. Further, analyses of existing data sets can expose whether and how our ability to estimate or interpret responses of the biota may be constrained by present monitoring practices.

Our MMS-UC CMI funded research encompasses two separate objectives: (1) the analysis and synthesis of existing long-term monitoring data and (2) the continued annual surveys of subtidal reef communities at Santa Cruz Island.

(1) The analysis and synthesis of existing long-term monitoring data.

To date we have analyzed 8 separate datasets collected in three different ecological systems; subtidal rocky reef, kelp bed, and open ocean pelagic. Trends in population abundances show consistent declines in all three systems over the last 10-15 years. Most interesting, within each system examined, trends for each component trophic level show approximately the same degree of decline. This pattern holds across spatial scales ranging from a single island within the northern Channel Islands group to the entire Southern California Bight. Also interesting is the fact that data collected using extremely different methodologies, e.g. coastal power plant impingement studies versus diver visual surveys, provide similar estimates of the magnitudes of these declines. We are in the process of updating our datasets through 1999. Our next step involves searching for possible correlations in the timing of the declines for the various trophic levels present within each of our component datasets.

(2) The continued annual surveys of subtidal reef communities at Santa Cruz Island.

We are still in the process of working-up samples collected during our 1999 surveys. All algal samples collected have been identified and weighed. Invertebrate resource samples have been rough sorted and we are now in the process of identifying the epi-faunal meso-invertebrates collected to the lowest taxon possible.

Publications and Presentations:

Brooks presented results from this work at the American Society of Ichthyologists and Herpetologists annual meeting held in mid-June, 2000. We are currently preparing two companion papers to this talk for publication.

List of all personal associated with the project 3rd Quarter - 2000

PIs: Dr. Russell J. Schmitt, Dr. Andrew J. Brooks

Post-graduate researchers: Keith Seydel, Bryn Evans

Undergraduate researchers: Jessica Hayden-Spear, Brooke Smith, Andrea DeMent

Estimated Percentage of Budget Expended:

Project Year 1 100%

Project Year 2 42%

Task 15115: *Effects of Temporal and Spatial Separation of Samples on Estimation of Impacts*

Principal Investigator: Peter Raimondi, Department of Biology, University of California,
Santa Cruz, CA 95064

Major Accomplishments, July 1, 2000 - September 30, 2000

Summary:

The project is continuing as planned and, although progress has been slow, there have been no major barriers to its success.

Below are the three main questions proposed by the project and progress to date.

Question 1: What are the spatial and temporal patterns in the structure of the monitored communities at all 25 monitored sites?

These patterns have now been documented.

Question 2: Should there be any modification to the sampling regime employed at the various sites?

The detailed and complex statistical analyses continue. Addressing this question awaits the outcome of all analyses, which are still in progress.

Question 3: Can the collected data be used to predict the structure of communities at previously unsampled sites?

We are planning to address this question with preliminary sampling this spring.

Personnel:

No changes.

Major Accomplishments:

Statistical analysis continue as planned.

Future plans:

1. Continue statistical analyses.
2. Design and preliminary sampling of field component of project to address Question 3.

Task 15117: *Assessing Toxic Effects on Population Dynamics Using Individual-Based Energy Budget Models*

Principal Investigators: **Roger M. Nisbet**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106 and **Erik B. Muller**, Marine Science Institute, University of California, Santa Barbara, CA 93106

Major Accomplishments, July 1, 2000 - September 30, 2000

We made final changes to our manuscript describing a model of growth and reproduction in variable environments (see annual report for scope and conclusions). This manuscript addresses questions relating to the sensitivity of organisms to environmental stress. The manuscript has now appeared in the Bulletin of Mathematical Biology.

We continued our improvement of methods for model validation. The aim is to test our toxicity model describing the sublethal effects of toxicants against competing models (see annual report for a description of our toxicity model), and to test the implementation of QSAR approaches into our modeling framework (see proposal for rationale). The methods are based on maximum likelihood ratio testing and use parameter estimation methods based on nonlinear least squares with normally distributed error with variable variance ("weighted least squares"). We tested computer programs we had developed before for this purpose using artificial data, and will apply the methodology to 'real' data in the near future.

Future Plans:

As in proposal.

Estimated Percentage of Budget Expended:

Project Year 1	100%
Project Year 2	99%

Task 15118: *An Experimental Evaluation of Methods of Surfgrass (Phyllospadix torreyi) Restoration Using Early Life History Stages*

Principal Investigators: **Daniel C. Reed**, Marine Science Institute, University of California, Santa Barbara, CA 93106 and **Sally J. Holbrook**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106

Major Accomplishments, July 1, 2000 - September 30, 2000

The vast majority of our effort during this quarter of research was spent sampling our many ongoing experiments that are testing the efficacy of various methods of surfgrass restoration. These experiments are being conducted in both intertidal and subtidal habitats and involve monitoring the survivorship and growth of naturally recruited seedlings, laboratory-reared seedlings outplanted to the field, and apical meristems and rhizome clumps that were collected from natural populations and transplanted to experimental sites. Factors that are being explicitly tested in these experiments include: (1) the effects of seedling density (three levels), algal cover (two levels) and outplant technique (three levels) on seedling survivorship and growth in both intertidal and subtidal habitats (2) the effect of transplant size on survivorship and expansion rate of transplanted surfgrass and (3) the effect of clump size on the recovery rate of the bare patches created by collecting clumps of surfgrass for transplanting.

MMS Action Required:

None

Future Plans: Work will proceed as scheduled.

Estimated Percentage of Budget Expended:

Project Year 1 100%

Project Year 2 100%

Task 17606: *Population genetics of surfgrass (Phyllospadix torreyi) for use in restoration.*

Major Accomplishments, July 1, 2000 - September 30, 2000

The first major goal of our project is to define the genetic boundaries of populations. During this quarter, we collected 49 samples each from two different areas along the Santa Barbara County coastline. The goal for our project is to make collections from a total of three areas along the coastline and therefore we have made significant progress. The sites where we collected within an area were arranged so that distances among them range from approximately 0.5 to 25 km. The samples were collected from intertidal regions and placed in silica gel for storage until processing for DNA extraction. We have completed the DNA extraction for one half of these samples.

Problems Encountered:

No problems were encountered during this quarter

Future plans:

Work will proceed as proposed.