

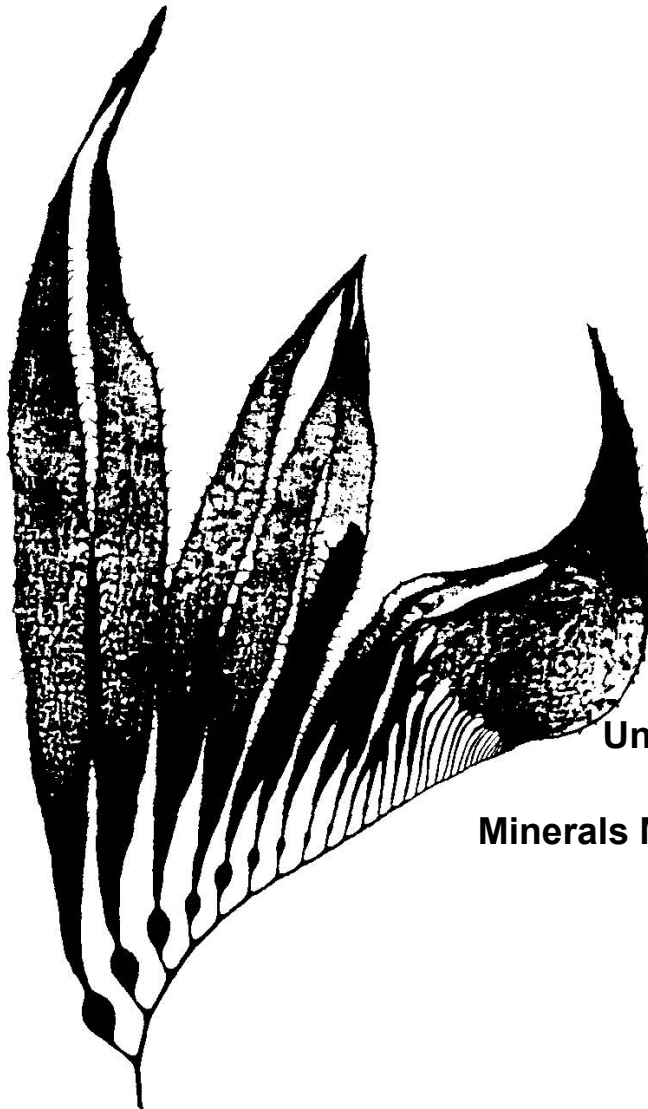
COASTAL MARINE INSTITUTE

PROGRAM YEAR 5

QUARTERLY REPORT 3

for the period

January 1, 1999 – March 31, 1999



A Cooperative Program

between the

University of California

and the

Minerals Management Service

April 13, 1999

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Russell J. Schmitt
Program Manager

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

April 13, 1999

Program Manager's Report

for the period January 1, 1999 – March 31, 1999

This constitutes the quarterly report for the second quarter for Program Year 5 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, 10 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;
- Task 13095: *Effects of Produced Water on Complex Behavioral Traits of Invertebrate Larvae and Algal Zoospores*, 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*.

Major Programmatic Progress and Actions during the Quarter:

- Task 12392: *Development of Methods for Surfgrass (*Phyllospadix* spp.) Restoration Using Early Life History Stages* has been completed and the draft final study report has been submitted to MMS for review/comments;
- Task 12391: *Effect of Offshore Oil Platform Structures on the Distribution Pattern of Commercially Important Benthic Crustaceans, with Emphasis on the Rock Crab*, has been completed and the draft final study report has been submitted to MMS for review/comments;
- Task 13096: *Utilization of Sandy Beaches by Shorebirds: Relationships to Population Characteristics of Macrofauna Prey Species and Beach Morphodynamics*, has been completed and the draft final study report will be submitted to MMS next quarter.

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 California, Los Angeles, CA 90095-1606, 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, January 1, 1999 through March 31, 1999

We continued to focus our efforts on processing and analyzing data this past quarter. The primary tasks conducted this past quarter were:

- Continued development of the database, integrating transect volumes with fish counts to estimate fish density by species and size class. Transect volumes are based on the lengths of structural members sampled on platforms. These volumes were used in conjunction with diver and ROV-video recorded fish counts to calculate fish densities.
- Species and assemblage level comparisons of recruitment and density (fish per unit water volume) among platforms and between platforms and reefs were analyzed.
- Processing of the ROV video tapes to determine fish size distributions (based on laser methods). Technicians and volunteers (two UCSC undergraduates) located, measured, and recorded fish identification, counts and size estimates from oil platforms dives and natural reefs. This task is completed. Only size estimates from divers on platforms and natural reefs have yet to be completed.
- A summary of analyses to date was presented at the Platform Ecology and Ocean Circulation Symposium, at the 5th California Islands Symposium, Santa Barbara, California, March, 1999.

MMS Action Required: Approval of no-cost extension.

Future plans: Further analysis and preparation of publications.

Estimated Percentage of Budget Expended:

Project Year 1	100%
Project Year 2	100%
Project Year 3	75%

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, January 1, 1999-March 31, 1999

During the past quarter, we hired several new student interns in addition to the ongoing interns. Heather Wallings is working with Mike McCrary, Mark Pierson, Mary Elaine Dunaway and Maurice Hill from MMS and Jenny Dugan (UCSB) on a literature review of marine mussel ecology and biology. Jorine Lawyer will be working with David Panzer on nearshore sediment transport and offshore pipelines. We also advertised and hired 5 student interns, Aurelia Alcantar, Cassandra Hensher, Jorine Lawyer, Peter Paige, and Brandon Thorne, on a temporary basis to assist David Browne (MMS) during the MMS sponsored 5th California Islands Symposium at the end of March. Jenny Dugan is working with Jim Lima to arrange additional internship opportunities for MMS/CMI projects during Spring and Summer 1999.

Because of scheduling difficulties, no Information Transfer Seminars were presented by CMI/SCEI PI's this past quarter. Jenny Dugan is working with Jim Lima to determine which projects should present talks next quarter and a seminar schedule is being developed.

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: 77%

Task 12390: *Testing and Calibrating the Measurement of Nonmarket Values for Oil Spills Via the Contingent Valuation Method*

Principal Investigators: **W. Michael Hanemann**, Department of Agricultural and Resources Economics, University of California, Berkeley, California 94720, and **Jon A. Krosnick** Department of Psychology, The Ohio State University, Columbus, Ohio

Major Accomplishments, January 1, 1999 - March 31, 1999

We continue our process of collecting survey data through telephone interviews of representative samples of adults in Ohio. This process yields us 500 interviews per month and is designed to continue through May, 1999, to yield a total sample size of approximately 2,000 respondents. The purpose of this study is to assess any potential anchoring effects of bid values in willingness-to-pay measurements and to compare open to closed ended WTP measures.

We are also continuing design and preparation work to do our final pilot experiment involving undergraduate students respondents. This process involves design of a questionnaire to assess people's beliefs about matters on which they themselves are experts (e.g., their own personal life histories) and matters on which other people are likely to be more expert (e.g., technical scientific issues). With this questionnaire, we will explore whether anchoring effects of bid amounts in contingent valuation measurements are greater on issues about which people are not expert than on matters about which they are expert.

Estimated Percentage of Budget Expended:

Project Year 1 92%

Task 13094: *Application of Coastal Ocean Dynamics Radars for Observation of Near-Surface Currents off the South-Central California Coast*

Principal Investigators: Libe Washburn, Department of Geography, University of California, Santa Barbara, CA 93106, Steven D. Gaines, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106

Major Accomplishments, 1 January-31 March, 1999

Over the past quarter we have focussed on improving the processing of our high frequency radar data set. Efficient processing is essential given the amount of the data collected each month. Specifically we have upgraded our flow visualization software so we can incorporate results from our two new sites on Vandenberg Air Force Base (VAFB). These sites, one at Pt. Arguello and the other just south of Pt. Sal., were added in November and December, 1998. We are also developing software to do objectively map the evolving current flow fields (so-called empirical orthogonal function analysis [EOF]).

In our last quarterly report we stated that we were going to replace the malfunctioning computer and transmit electronics at the new sites with equipment from the closer Coal Oil Pt. site. This was successfully accomplished, and we have since repaired the malfunctioning equipment and re-installed it at Coal Oil Point. Apart from occasional power outages at Pt. Arguello, all sites have been functioning satisfactorily. However we have been unable to service our site at Pt. Conception since November (see below)

A development since our last report is that our group will be cooperating with a new research initiative to study marine recruitment in sub-tidal and inter-tidal habitats. This project is sponsored by the David and Lucille Packard Foundation and involves investigators from Oregon State University, UC Santa Cruz, UC Santa Barbara, and Stanford. This will greatly expand the biological studies that have been a part of this proposal. For example, we have now compiled nearly two years of larval recruitment data from 7 sites spanning Pt. Conception. We have obtained biweekly recruitment rates at these sites for a variety of marine invertebrates. These larval recruitment studies will now extend all the way to Oregon. Our surface current data will be a key element of this research. At our sites spanning Pt. Conception, we have identified two key transition regions. The first is between Gaviota and Pt. Conception. The second is near Pt. Sal. There are striking differences in larval species composition in the three regions separated by these points. With the 5 CODAR antennas now deployed, we can evaluate how circulation patterns generate the disjunct larval recruitment patterns in these three regions. We will greatly expand the spatial and temporal resolution of our sampling in the next few months in conjunction with the complementary Packard Foundation program. We are also working with MMS personnel to maintain at least a subset of the Scripps/Center for Coastal Studies array to support this project.

Results from our work were presented at two recent meetings: 1) at the High Frequency Radar Workshop held in San Diego, CA in early March; 2) at the Fifth California Islands Symposium in Santa Barbara, CA, sponsored by MMS. Our research results were well

received at both meetings. Our MATLAB software for displaying animated current time series has been adopted by our colleagues at the Naval Post graduate school in Monterey, California. They presented their data with the “viewer” software we developed at the HF Radar Workshop.

Problems Encountered: We are still being denied access to our radar site at Pt. Conception. This has become a very serious problem for us and we need help from MMS. I have discussed the problem with Dr. Fred Piltz and David Browne, both of MMS in Camarillo. They exploring ways to correct this situation.

MMS Action Required: We need all possible help from MMS in gaining access to our equipment at Pt. Conception.

Estimated Percentage of Budget Expended:

Project Year 1: 100%

Project Year 2: 100%

Project Year 3: 71%

Task 13095: *Effects of Produced Water on Complex Behavioral Traits of Invertebrate Larvae and Algal Zoospores*

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

Major Accomplishments, January 1, 1999 through March 31, 1999

Summary:

As I have previously noted in my reports, the work on the original project stopped completely due to the inability of MMS to supply me with the PW I required.

I have forged a collaboration with Dr Gary Cherr from the Bodega Marine Laboratory of UC, Davis. He has supplied me with other sources of oil-based toxicants to use in our experiments. At the moment, I am using some lyophilized PW he had in storage to round off my previous PW studies. We are also collaborating on work into the sub-lethal effects of a bacterial degraded crude oil fraction. It is progressing well.

As I have previously stated, I will complete a study, however it will not be the project MMS originally funded. The MMS-CMI director, Russ Schmit was fully appraised of the situation in late 1998.

Personnel to March 1999:

During this period the Post-Doctoral Researcher, Anthony Boxshall, was the main researcher on this grant, however he drew a salary from matching funds. At present, two students, Derek Smith and Jason Yonehiro are helping with various aspects of this project. Derek is a work study student and Jason is completing 5 academic units of independent study.

Estimated Percentage of Budget Expended: 95-97%

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

Major Accomplishments, January 1, 1999 through March 31, 1999

Progress to Date:

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.

We have continued with our efforts to obtain additional long-term datasets. All of our 1998 Santa Cruz Island data has now been converted into an electronic format. We continue to use this dataset to develop and test our relational database formats. We anticipated that this process would be the most time consuming and it has proven to be so. We have also begun to convert the raw abundance data contained in these datasets into the more ecologically meaningful metrics needed for use in our meta-analyses.

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

We have completed the sorting and identification of the 1997 resource samples collected from Santa Cruz Island and this data has been entered into the master database. We are now in the process of sorting and identifying the food resource samples collected during our 1998 surveys conducted last fall.

Publications and Presentations:

We are still in the initial stages of compiling and verifying the data which will compose our master database. To date we have no publications.

Estimated Percentage of Budget Expended:

Project Year 1 12%

Task 15116: *Wave Prediction in the Santa Barbara Channel*

Principal Investigators: Robert T. Guza and William C. O'Reilly, Center for Coastal Studies, Scripps Institution of Oceanography, La Jolla, CA 92093

Major Accomplishments, January 1, 1999 through March 31, 1999

During the first quarter of the project's second year the reflected wave field from Santa Cruz Island has been quantified using existing regional wave data from the Channel. The largest amount of reflected energy is found at the far east end of the Channel and is consistent with strong specular reflection from the coastal cliffs of Santa Cruz Island. However, significant levels of reflected energy have been detected at a number of historical measurement stations north and north-northwest of Santa Cruz Island that are not along purely reflected propagation paths, indicating that some non-specular wave reflection needs to be incorporated in the model algorithm.

A paper on wave prediction in the Santa Barbara Channel and the island reflection problem was presented at the 5th California Island Symposium in Santa Barbara on March 30.

Future Plans:

Model north side of Santa Cruz Island as a source of quasi-specular wave reflection. Reflected wave field will be parameterized as a function of the incident wave conditions at Pt. Conception.

Estimated Percentage of Budget Expended:

Project Year 1	100%
Project Year 2	10%

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, January 1, 1999 through March 31, 1999

We continued our model analysis in variable food environments, and we are presently putting our results in manuscript for publication. As we explained in previous reports, variations in food supply imply that organisms periodically encounter stress, and this stress adds to other forms, such as the presence of toxic contaminants whose effects we modeled previously. We assume an environment in which the scaled food density (type II) fluctuates either periodically or stochastically (pink noise). With both fluctuations, and on the provision of survival, organisms grow more (on average) than their conspecifics growing in an average constant food environment, and this increase is a function of the intensity of the fluctuations. The intensity of the fluctuations reduces the (average) life-span. The life-span is also a function of the model parameter specifying the partitioning of energy between somatic and reproductive tissues, which parameter may vary considerably within a species. Individuals are more likely to survive a variable food environment when they reproduce at a relatively high rate. The effects of food fluctuations on reproduction show a more complex picture. With periodic food, strong fluctuations enhance reproduction in organisms that favor reproduction over growth, but reduce reproduction in organisms that give higher priority to growth. With stochastic food, reproduction in surviving individuals increases with the intensity of the food fluctuations, but the reproductive effort of a cohort may decline. The production and survival potential of an individual in a variable food environment thus depends on the type and strength of the food fluctuations, and on the priority status it gives to reproduction.

Future Plans:

As in proposal.

Estimated Percentage of Budget Expended:

Project Year 1 38%

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, January 1, 1999 through March 31, 1999

During this quarter of research we continued our monthly sampling of flower abundance and flowering state at a subset of our permanent sites (five intertidal sites and one subtidal site). We also continued our monthly sampling of seed availability at these sites using artificial seed collectors. All data collected to date have been entered into our data base and stored on a PC. Data entry and quality control continue to be an ongoing task.

We completed our semiannual sampling of our nine intertidal permanent sites. Because of adverse ocean conditions we only sampled one of our permanent subtidal sites (Mohawk) during this survey. At each site we measured the densities of flowering shoots, vegetative shoots, and seedlings, and the percentage cover of surfgrass, algae, bare rock and sand.

We began testing several different methods for outplanting laboratory-reared seedlings to the field. Experiments are now underway to test 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. To date over five thousand seedlings have been outplanted to the field. In addition, we have monitored the survivorship and growth of 25 naturally recruited seedlings at one intertidal site (More Mesa) monthly since November 1998. Data on sand inundation is also recorded on each visit. Lastly, we also conducted laboratory experiments using seeds collected from the field to examine the ability of host algae and artificial seed collectors to retain seeds and seedlings under varying conditions of flow.

PIs Reed and Holbrook spent much time this quarter analyzing data for inclusion into two manuscripts, which are currently in preparation. One paper focuses on temporal patterns of seed predation at four sites during the period 1995-1998, while the second paper examines patterns of flowering, seed abundance and seedling recruitment (and the relationships among them) at nine intertidal and five subtidal sites during the period 1995-1998. A another paper on the effects of algal morphology and flow on seedling attachment was accepted for publication in Marine Ecology Progress Series.

Future Plans: Work will proceed as scheduled.

Estimated Percentage of Budget Expended:

Project Year 1 89%