
University of California

Coastal Marine Institute

Annual Report

2005 - 2006

University of California

Coastal Marine Institute

**Annual Report
2005 - 2006**

Russell J. Schmitt
Program Manager, CMI
and
Director, Coastal Research Center

Marine Science Institute
University of California
Santa Barbara, California 93106-6150

Mission of the Coastal Research Center

The Coastal Research Center of the Marine Science Institute, UC Santa Barbara, facilitates research and research training that fosters a greater understanding of the causes and consequences of dynamics within and among coastal marine ecosystems. An explicit focus involves the application of innovative but basic research to help resolve coastal environmental issues.

Disclaimer

This document was prepared by the Coastal Marine Institute, which is jointly funded by the Minerals Management Service and the University of California, Minerals Management Service contract agreement number 14-35-01-CA-31063. The report has not been reviewed by the Service. The views and conclusions contained in this document are those of the Program and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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THE COASTAL MARINE INSTITUTE

**A Cooperative Program
involving the**

**University of California,
the State of California**

and the

**Minerals Management Service
US Department of Interior**

ANNUAL REPORT PROGRAM YEAR 12

July 20, 2006

PROGRAM MANAGER'S REPORT

The Coastal Marine Institute (CMI) was initiated in July 1994 as a cooperative research and research training program involving the Minerals Management Service, the State of California and the University of California. The focus is on long-term environmental, social and economic consequences of oil and gas production activities in the Pacific Outer Continental Shelf region. This Annual Report summarizes activities and research progress during Program Year 12 (July 1, 2005 - June 30, 2006).

Major programmatic progress achieved during Program Year 12 of the CMI:

- ◆ During 2005 – 2006, 22 regular and research faculty, 72 trainees (2 postdoctoral students, 21 graduate students, 28 undergraduate students, and 21 staff) from 6 campuses and laboratories participated in CMI research projects;
- ◆ This Program year, CMI-sponsored studies produced 7 peer-reviewed papers, 3 publications in press, 1 submitted publication, and 3 publications in preparation, with an additional 32 research presentations. In addition, 6 CMI-MMS final reports were completed. One CMI draft final report is currently in review.

PROJECTS NEEDING REPORT STUDY NUMBERS FROM MMS

CMI Agreement #30758

Schmitt, Russell J. and Andrew J. Brooks. *Population Trends and Trophic Dynamics in Pacific OCS Ecosystems: What Can Monitoring Data Tell Us?* Task #: 14181

CMI Agreement #31063

Clark, Jordan F., Bruce P. Luyendyk, and Ira Leifer. *Simulation of a Subsurface Oil Spill by a Hydrocarbon Seep (SSOS-HYS) AND Oil Slicks in the Ocean: Predicting Their Release Points Using the Natural Laboratory of the Santa Barbara Channel* (these two projects will have one combined final report). Task #: 17611

Hodges, Scott A., Douglas S. Bush, Sally J. Holbrook, and Daniel C. Reed. *Population Genetics of Surfgrass (*Phyllospadix torreyi*) for Use in Restoration*. Task #: 17606

Lenihan, Hunter S. and Andrew J. Brooks. *Relative Importance of POCS Oil Platforms on the Population Dynamics of Two Reef Fishes in the Eastern Santa Barbara Channel*. Task #: 85340

Raimondi, Peter T. and Richard F. Ambrose. *Spatial and Temporal Variation in Recruitment to Rocky Shores: Relationship to Recovery Rates of Intertidal Communities*. Task #: 18234

Schmitt, Russell J., Jenifer E. Dugan, Scott A. Hodges, Robert S. Jacobs, H. Mark Page, Leslie Wilson, Steven D. Gaines. *Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine Natural Products*. Task #'s: 17609 and 85387

Valentine, David L. *Weathering of Oil and Gas in the Coastal Marine Environment: Quantifying Rates of Microbial Metabolism*. Task #: 85338

Washburn, Libe and Steven D. Gaines. *Observations of Surface Circulation in the Eastern Santa Barbara Channel Using High Frequency Radar and Lagrangian Drifters*. Task #: 36945

SUMMARY OF RESEARCH PROGRESS

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Task No. 85340: *Relative Importance of POCS Oil Platforms on the Population Dynamics of Two Reef Fishes in the Eastern Santa Barbara Channel*

Principal Investigators: **Hunter Lenihan**, Bren School of Environmental Science and Management, University of California, Santa Barbara, California 93106-5131 and **Andy Brooks**, Marine Science Institute, University of California, Santa Barbara, California 93106-6150

Education Opportunities:

We involved six graduate and nine undergraduate students in our research during the fiscal year. We also had six staff personnel volunteer their time on our project. Our study overlapped with dissertation research being conducted by graduate student Stu Levenbach of the Department of Ecology, Evolution, and Marine Biology at UCSB. He was able to access his sampling sites and was provided a buddy diver to conduct his sampling and experiments in exchange for help with our sampling and tagging studies.

Future Plans:

We are in the process of writing a Draft Final Report and Draft Technical Summary.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 85339: *Ecological Performance and Trophic Links: Comparisons Among Platforms and Natural Reefs for Selected Fishes and Their Prey*

Principal Investigators: **Mark Page**, Marine Science Institute, University of California, Santa Barbara, California 93106-6150 **Jenifer Dugan**, Marine Science Institute, University of California, Santa Barbara, California 93106-6150 **Milton Love**, Marine Science Institute, University of California, Santa Barbara, California 93106-6150 and **Hunter Lenihan**, Bren School of Environmental Science & Management, University of California, Santa Barbara, California 93106-5131

Summary of Research

One paper was accepted for publication and is in press (see below).

Page, H. M, J. E. Dugan, C. C. Culver, and J. Hoesterey. 2006. Exotic invertebrate species on offshore oil platforms. *Marine Ecology Progress Series In press.*

We continued to focus our efforts on writing the Draft Final Report and associated publications this past quarter.

Future Plans:

Complete and submit a Draft Final Report and Draft Technical Summary.

Problems Encountered:

No major problems were encountered during the past year.

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 85338: *Weathering of Oil and Gas in the Coastal Marine Environment*

Principal Investigator: **David Valentine**, Department of Geology, University of California,
Santa Barbara, California 93106-9630

Summary of Research

We are in the process of completing a manuscript based on the data collected from this project. We are also in the process of producing a Draft Final Report and Draft Final Technical Summary.

Future Plans:

We will submit the Draft Final Report and Draft Technical Summary.

Problems Encountered:

No major problems were encountered during the past year.

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 18234: *Spatial and Temporal Variation in Recruitment to Rocky Shores: Relationship to Recovery Rates of Intertidal Communities*

Principal Investigators: **Peter Raimondi**, Department of Ecology and Evolution, University of California, Santa Cruz, CA 95060 and **Richard Ambrose**, School of Public Health, Department of Environmental Sciences, University of California, Los Angeles, CA 90095-1772

Summary of Research

Progress During 2005-2006

Recovery plot sampling

Recovery plots (cleared Fall 2003, see Figure 1) were sampled (pt. contacts, mobile critter counts and photographs) at Point Sierra Nevada, Stairs and Point Fermin (Figure 2) in October 2005, and April 2006.

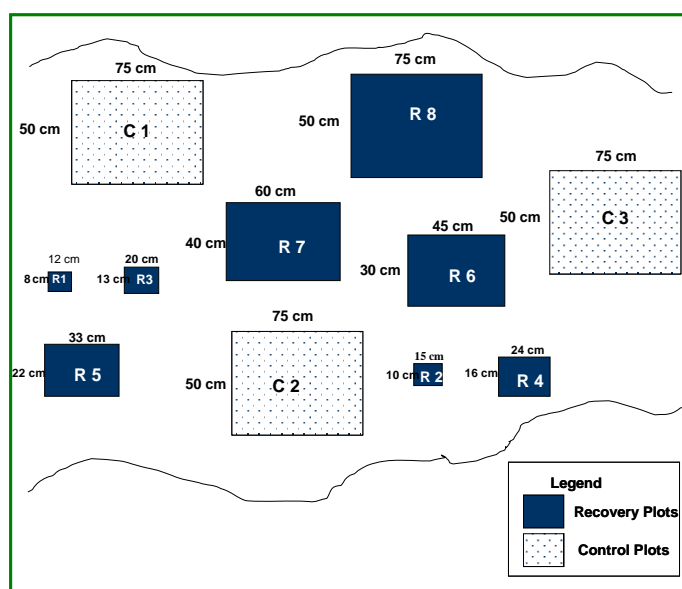


Figure 1. Schematic drawing of recovery (eight sizes ranging from 8 cm x 12 cm to 50 cm x 75 cm) and control plots (all 50 cm x 75 cm) in each assemblage (Chthamalus, Endocladia, Silvetia and Mytilus).

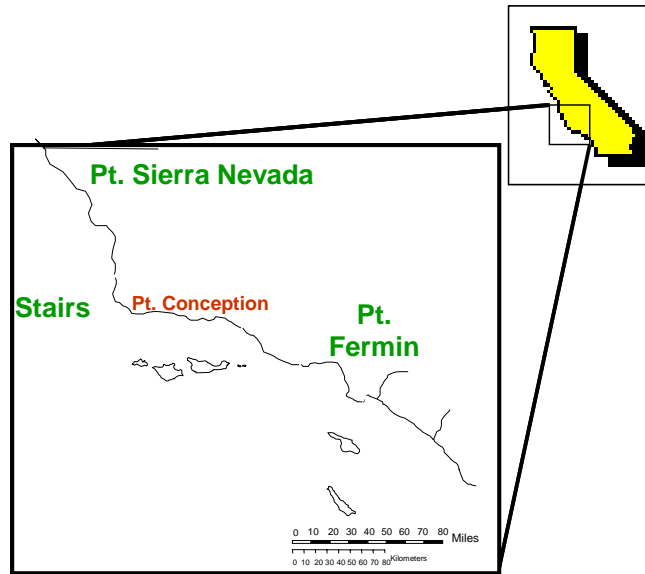


Figure 2. Location of three study sites North, near to and South of Pt. Conception, California

Initial trends – Recovery plots

Chthamalus Assemblage

Overall recovery (mean of all disturbance sizes) was highest at Point Sierra Nevada and Point Fermin and lowest at Stairs (Figure 3). Point Sierra Nevada and Point Fermin show indications of convergence between the recovery and control plots for this species assemblage, while Stairs has experienced slower recovery rates at in the *Chthamalus* assemblage.

Endocladia Assemblage

Endocladia recovery has been gradual at all three sites (Figure 4). Point Fermin has experienced a decline in *Endocladia* in the control plots. Stairs is showing the most recovery for this assemblage.

Silvetia Assemblage

Silvetia recruits are present in some recovery plots at all three sites (Figure 5). Both Stairs and Point Fermin show more recruits per recovery plot than Point Sierra Nevada. This may be in part due to the difference in rock types among the three sites. High variance in recovery plots is due to the large range of canopy cover among different sizes of disturbances.

Mytilus Assemblage

At all three sites, the smaller *Mytilus* plots were showed some recovery by encroachment of surrounding conspecifics (Figure 6). As Fall 2005, some *Mytilus* recruits are present in recovery plots at all three sites.

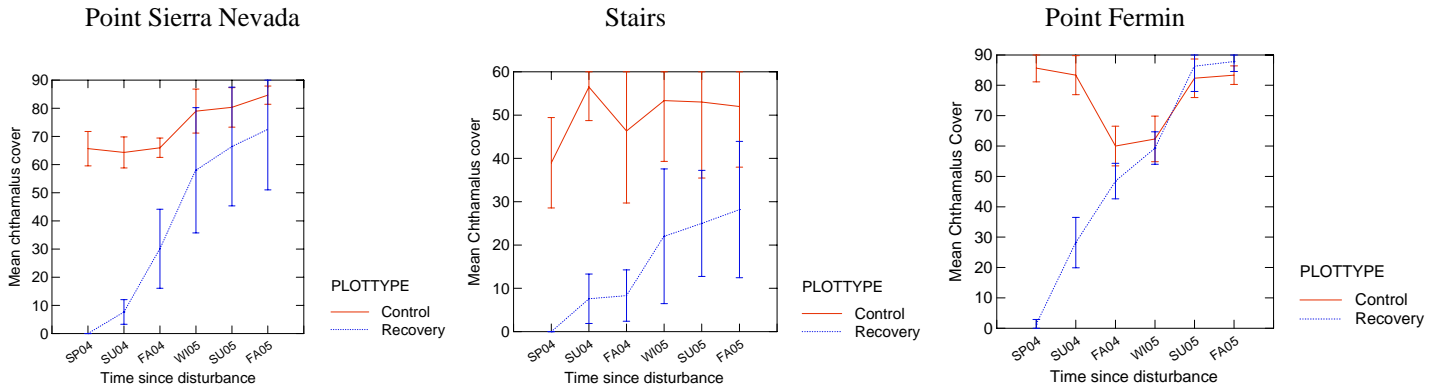


Figure 3. Percent *Chthamalus* cover (mean ± SD) in recovery plots (blue dashed) and control plots (red solid) over time at Point Sierra Nevada (top), Stairs (middle) and Point Fermin (bottom).

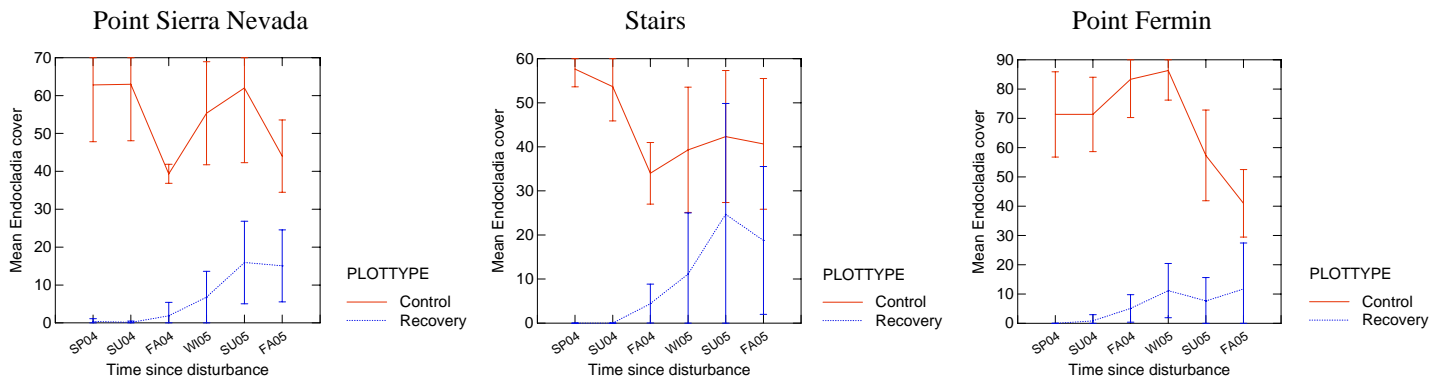


Figure 4. Percent *Endocladia* cover (mean ± SD) in recovery plots (blue dashed) and control plots (red solid) over time at Point Sierra Nevada (left), Stairs (middle) and Point Fermin (right).

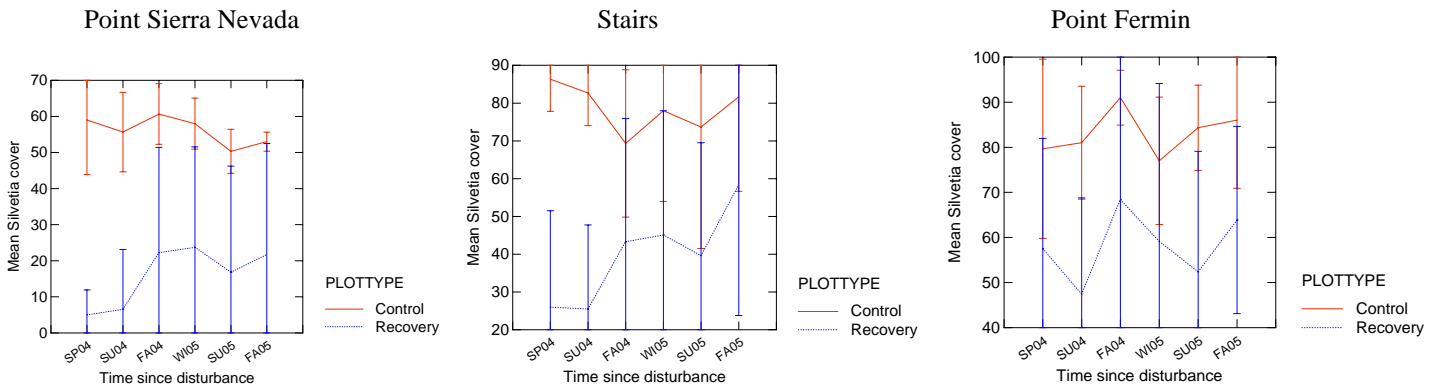


Figure 5. Percent *Silvetia* cover (mean ± SD) in recovery plots (blue dashed) and control plots (red solid) over time at Point Sierra Nevada (left), Stairs (middle) and Point Fermin (right).

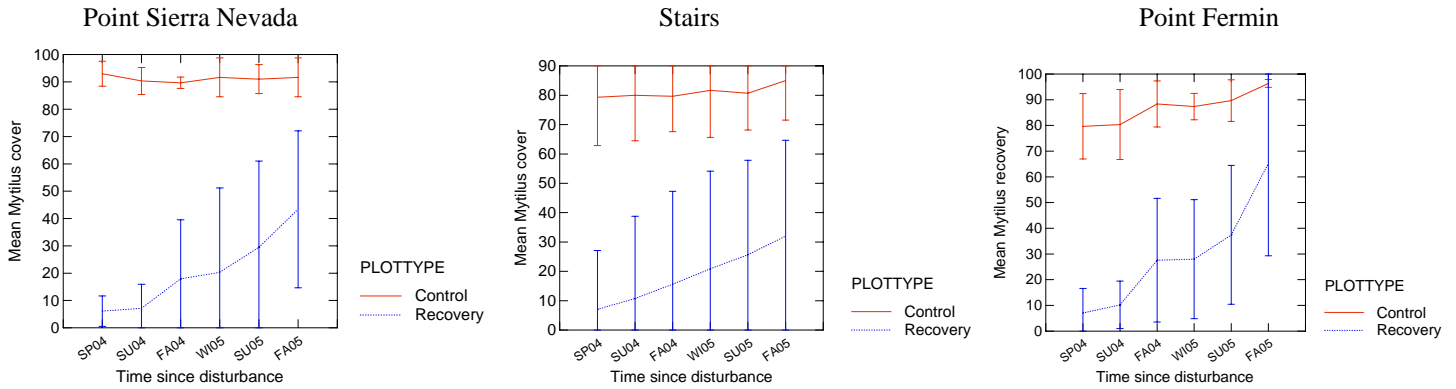


Figure 6. Percent *Mytilus* cover (mean ± SD) in recovery plots (blue dashed) and control plots (red solid) over time at Point Sierra Nevada (left), Stairs (middle) and Point Fermin (right).

Role of disturbance size – *Chthamalus* Assemblage

The rate of recovery in the *Chthamalus* assemblage was calculated for all plots at all three sites. A linear regression was conducted for the recovery rate (slope) of all plots to see whether there was a relationship between clearing size (disturbance area) and recovery rate (Figure 6). Regression analysis revealed that at Point Sierra Nevada, there was no relationship between recovery rate and disturbance size ($F_{1,5}=0.0198$; $p = 0.893$). This was also the case at Point Fermin ($F_{1,5} = 0.0091$; $p = 0.927$). Stairs showed a significant negative relationship between disturbance size and recovery rate ($F_{1,5} = 7.816$; $p = 0.038$).

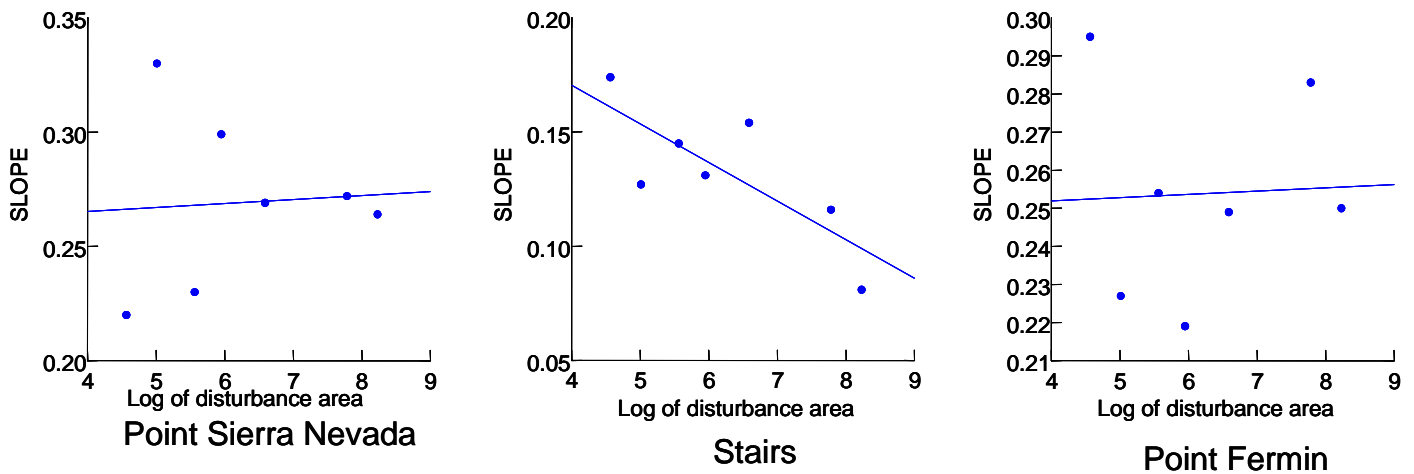


Figure 7. Relationship between recovery rate and disturbance size in *Chthamalus* plots at Point Sierra Nevada (left), Stairs (middle) and Point Fermin (right).

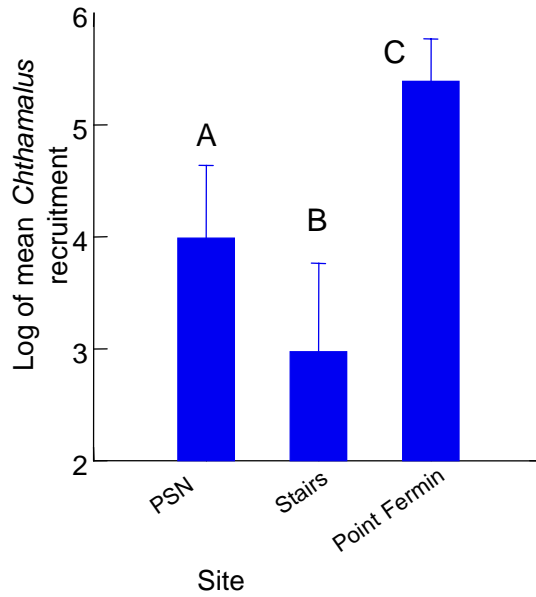


Figure 8. *Chthamalus* recruitment (mean±SD) at Point Sierra Nevada, Stairs and Pont Fermin.

Role of recruitment – *Chthamalus* Assemblage

Analysis of variance revealed that all three sites had significantly different levels of *Chthamalus* recruitment as of June 2005 ($F_{2,12}=24.0738$; $p < 0.0001$). Recruitment was a good predictor of recovery the lower recruitment rates experienced by Stairs and Point Sierra Nevada, but not at Point Fermin, which had very high recruitment but only moderately high recovery (Figure 8).

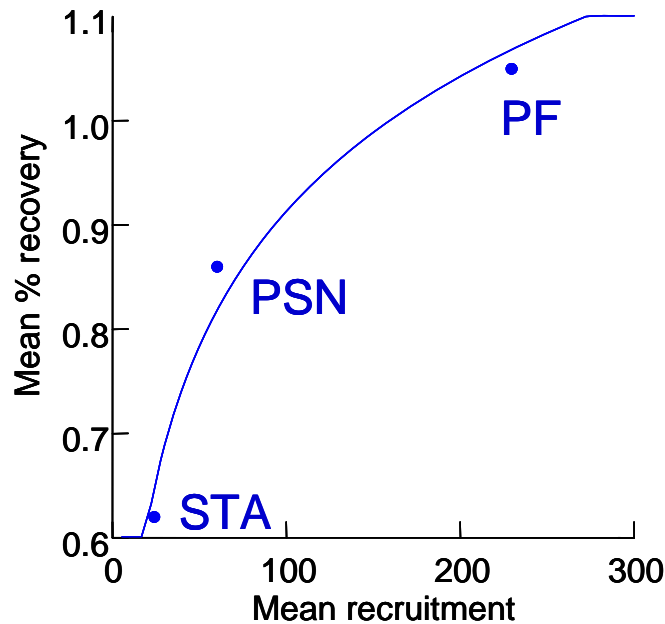


Figure 9. Relationship between recruitment and recovery at Stairs, Point Sierra Nevada and Point Fermin.

Community recovery – *Chthamalus* Assemblage

To address the recovery of the ecological community in addition to the dominant members of the assemblage, I conducted a Multi-Dimensional Scaling (MDS) analysis whereby I analyzed the recovery trajectory of each plot at each site (Figure 9)

Another MDS was conducted examine the extent to which recovery trajectories differed from one another (Figure 10). For this analysis, every point represents the community recovery trajectory shown by a particular plot (Ones represent the smallest disturbance size and Eights represent the largest). Instead of grouping together by disturbance size, there was strong evidence for site – specific recovery in that all three sites were significantly different from one another when I conducted an Analysis of Similarity (ANOSIM) test ($R=0.732$, $p = 0.0001$).

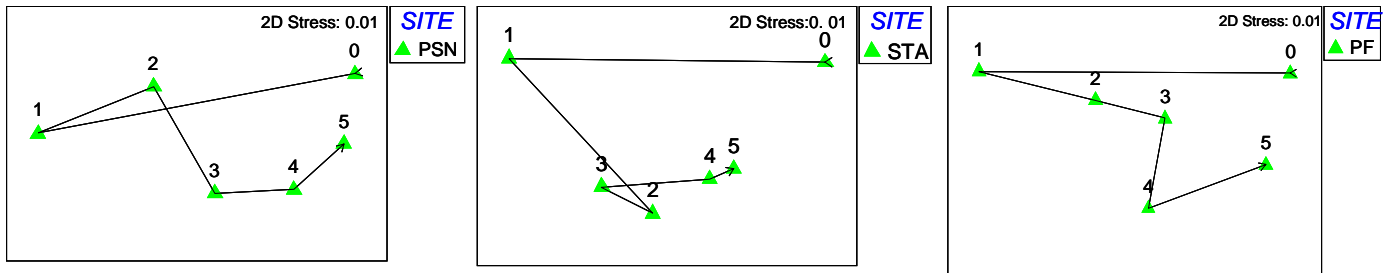


Figure 10. Community recovery trajectories in the *Chthamalus* zone for three plots at Point Sierra Nevada, Stairs and Point Fermin. Zero represents the community composition prior to disturbance. Numbers 1 through 5 represent community composition at subsequent sampling intervals. Note the in all three cases, the most different communities are times zero and one.

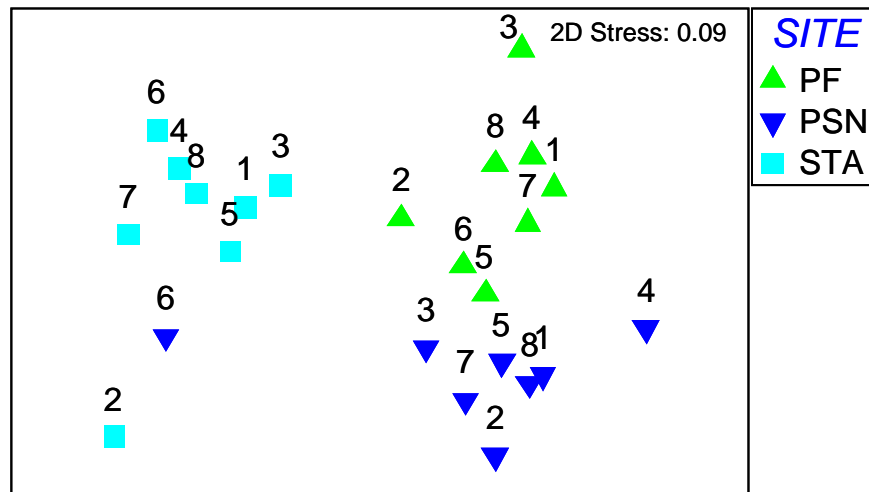


Figure 11. Community recovery trajectories for all plots in the *Chthamalus* zone at Point Fermin (green upwards triangles), Point Sierra Nevada (blue downwards triangles) and Stairs (turquoise squares). Numbers 1-8 represent clearing sizes where 1=smallest and 8=largest.

Recruitment Surfaces

Volunteers have been trained to assist with the sampling of barnacle and mussel recruitment surfaces in the lab. These data will be processed and reported as soon as possible.

Future Plans:

Recruitment collectors will be exchanged and natural recruitment sampled in adjacent plots every month at all three sites. Cleared plots will be sampled every three months. Data will be processed and summarized as soon as possible. Volunteers will continue to be trained to assist with processing of recruitment surfaces. Quantitative PCR will be performed on the juvenile *Mytilus* extracted from recruitment surfaces to determine the species recruiting.

Problems Encountered:

No major problems were encountered during the past year.

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 17609: *Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine Natural Products*

Principal Investigators: **Russell J. Schmitt**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610 **Jenifer Dugan**, Marine Science Institute, University of California, Santa Barbara, CA 93106-6150 **Scott Hodges**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610 **Robert Jacobs**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610 **Mark Page**, Marine Science Institute, University of California, Santa Barbara, CA 93106-6150 **Leslie Wilson**, Department of Molecular, Cellular and Developmental Biology, University of California, Santa Barbara, CA 93106-9610 and **Steven Gaines**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610

Progress During 2005-2006

ECOLOGY

We continued to focus our efforts on writing the Draft Final Report and associated publications this past quarter. One paper was published, and one paper was accepted for publication (see below).

Culver, C. S., H. M. Page, and J. E. Dugan. 2005. Oil, gas platforms--sources for marine natural products? *Global Aquaculture Advocate* 8: 60-61.

Page, H. M., J. E. Dugan, C. C. Culver, and J. Hoesterey. 2006. Exotic invertebrate species on offshore oil platforms. *Marine Ecology Progress Series*, *In press*.

GENETICS

We continued to focus our efforts on writing the Draft Final Report and associated publications this past quarter.

PHARMACOLOGY

We have examined the effects on HeLa cells of exposure to WC01A (organic extract of *Watersipora cucullata*). In our initial experiments cells were incubated with WC01A for 24 hrs and assayed for cell proliferation, viability, percent mitotic cells, and mitotic spindle morphology. An IC₅₀ (concentration that inhibits cell proliferation by 50%) of 28 μM was determined from five experiments. Immunofluorescence experiments using a tubulin antibody and DAPI to stain chromosomes did not reveal any alteration in the percentage of mitotic cells nor any evidence of mitotic spindle abnormalities. We will use flow cytometry to determine if cells treated with WC01A are blocked at some other point in the cell cycle. Cell viability was

unaffected by the 24 hr incubation with WC01A at concentrations up to 200 μ M. By doubling the time of exposure to 48 hrs we were able to detect dead cells by trypan blue dye exclusion at 75 μ M WC01A, with death of >80% of cells at 200 μ M. The latter are preliminary results and are being repeated along with assays to determine if the cell death is a result of activation of an apoptotic pathway.

Daniel Day continues research on extracts of *Watersipora cucullata* as part of his Masters thesis which will be included in the publications on this project. Completion of his thesis is expected by September 2006. We also continued to focus our efforts on writing the Draft Final Report and other associated publications this past quarter.

Future Plans:

We will complete and submit a Draft Final Report and Draft Technical Summary.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 17611: *Simulation of a Subsurface Oil Spill by a Hydrocarbon Seep (SSOS-HYS) and*

Task No. 18211: *Oil Slicks in the Ocean: Predicting their Release Points Using the Natural Laboratory of the Santa Barbara Channel*

Principal Investigators: **Jordan Clark**, Department of Geological Sciences, University of California, Santa Barbara, CA 93106-9630 **Bruce Luyendyk**, Department of Geological Sciences, University of California, Santa Barbara, CA 93106-9630 and **Ira Leifer**, Institute of Crustal Studies, University of California, Santa Barbara, CA 93106-1100

Summary of Research:

A Draft Final Report for this project was submitted to MMS in December 2005. We are awaiting a Final Study Report number from MMS in order to complete the Report.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 17608: *Observing the Surface Circulation along the South-Central California Coast Using High Frequency Radar: Consequences for Larval and Pollutant Dispersal* **and**

Task No. 85386: *Observations of the Surface Circulation in the Eastern Santa Barbara Channel Using High Frequency Radar and Lagrangian Drifters*

Principal Investigators: **Libe Washburn**, Department of Geography, University of California, Santa Barbara, CA 93106-4060 and **Steven Gaines**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610

Progress During 2005-2006

The Draft Technical Summary and Draft Final Report were submitted to the Coastal Marine Institute in June 2006.

Future Plans:

After MMS review, the Draft Final Report will be revised as needed.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number and comments on the Draft Final Report are needed from MMS.

Task No. 17606: *Population Genetics of Surfgrass (Phyllospadix torreyi) for Use in Restoration*

Principal Investigators: **Scott Hodges**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610 **Douglas Bush**, Marine Science Institute, University of California, Santa Barbara, CA 93106-6150 **Sally J. Holbrook**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA 93106-9610 and **Daniel C. Reed**, Marine Science Institute, University of California, Santa Barbara, CA 93106-6150

Summary of Research

During Spring of 2006, images of gels were scored by a CMI intern, Nichole Price, to regain data lost in a computer crash.

We are in the process of completing a manuscript based on the data collected from this project. We are also in the process of compiling a Draft Final Report and Draft Technical Summary.

Future plans:

We are currently writing a manuscript on our gender-specific DNA markers and sex-ratio findings. We are also analyzing our rescored AFLP data for the population genetics analysis.

We will also submit the Draft Final Report and Draft Technical Summary by September, 2006.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number is needed from MMS.

Task No. 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 93106-9610 and **Andrew J. Brooks**, Coastal Research Center, Marine Science Institute, University of California, Santa Barbara, CA 93106-6150

Progress During 2005-2006

Two papers have been published, and one manuscript has been written based on this project (see below).

Brooks, A.J., R. J. Schmitt and S. J. Holbrook. 2002. Declines in regional fish populations: have different species responded similarly to environmental change? *Marine and Freshwater Research* 53(2):189-198.

Schmitt, R.J. and S.J. Holbrook. 2006. Predicting the magnitude of temporal variation in young-of-year class strength of surfperch (Teleostei: Embiotocidae). *Raffles Bulletin of Zoology*. *In Press*.

Holbrook, S.J., A.J. Brooks and R.J. Schmitt. Temporal variation in temperate reef assemblages: have trophic levels responded similarly to environmental change? To be submitted December, 2006.

We submitted the Draft Technical Summary and Draft Final Report to the Coastal Marine Institute in June 2006.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number and comments on the Draft Final Report are needed from MMS.

Task No. 12388 & Task No. 17610: Joint UCSB-MMS Pacific OCS Student Internship and Trainee Program

Principal Investigators: Jenifer Dugan, Marine Science Institute, University of California, Santa Barbara, CA 93106-6150 and **Edward Keller**, Environmental Studies and Geological Sciences Departments, University of California, Santa Barbara, CA 93106-9630

Summary of Research

Progress During 2005 – 2006

The CMI internship program experienced continued success this year with good interest and participation by interns and mentors. Feedback from all participating interns and mentors continues to be positive and enthusiastic. As in previous years, the UC Santa Barbara Environmental Studies Internship Program served as an effective mechanism for advertising positions. The expanded distribution of advertisements for intern positions to other academic departments at UC Santa Barbara including: Department of Ecology, Evolution and Marine Biology, Department of Geology, Department of Geography, Girvetz Graduate School of Education and the Donald Bren School of Environmental Science and Management was effective in locating prospective interns and was successful in reaching students from a range of academic majors, levels and backgrounds to fill various internship openings.

During the past year, 4 graduate and undergraduate students participated as interns in 3 projects at MMS headquarters and on the UCSB campus. Student interns were jointly mentored by MMS staff and/or a member of the UCSB faculty or professional research staff. During the Summer of 2005 and the 2005-2006 academic year, CMI interns were involved in a variety of projects. Jennifer Klaib, an undergraduate intern mentored by Ms. Dunaway of MMS and Dr. Engle of UCSB, assisted with the development of websites and online data reporting for the MARINE rocky intertidal monitoring program. Jennifer Lape, a graduate student, developed and implemented a comprehensive compilation of scientific reprints resulting from >15 years of MMS funded research and provided program assistance during Summer and Fall 2005. In Spring 2006, Nichole Price, a graduate student intern mentored by Dr. Hodges of UCSB recovered data on the genetic structure of surfgrass populations by processing images of gels of samples. These data were lost due to a computer problem and are critical to completing the CMI report and manuscripts on the genetic structure of surfgrass populations.

In Summer 2005, Kristina Estudillo, a UCSB graduate student intern and her mentor Ms. Mary Elaine Dunaway, produced “Watts it to you?”, an interactive role playing curriculum activity for high school students on the use of alternative energy sources. The curriculum can be downloaded from: www.mms.gov/omm/pacific/kids/educate.htm

In Spring 2006, the collected scientific reprints and reports for the first (1989- 1994) and second (1994-2004) agreements of the Southern California Educational Initiative (SCEI) were produced as CD-ROMs and submitted to MMS along with the closing memo for the second SCEI. A similar set of products is in preparation for the Coastal Marine Institute program. The materials

for these products were researched and compiled by several CMI interns, both undergraduate and graduate student level.

Joint UCSB-MMS Pacific OCS Graduate Trainee Program

Graduate students continued to be directly or indirectly exposed to research sponsored by the Coastal Marine Institute through a variety of mechanisms. This exposure ranged from short term participation in field studies to the development of thesis proposals related to ongoing CMI projects. A list of participating graduate students appears in a separate section of this Annual Report.

Information Transfer Seminars (ITS)

Dr. Dugan presented an invited talk on her CMI and MMS funded research on factors affecting shorebird use of sandy beaches to the MMS Scientific Committee in May 2006 in Santa Barbara.

Future Plans:

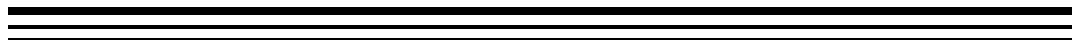
We will continue to provide student interns to MMS through the Joint UCSB-MMS Pacific OCS Internship program.

Problems Encountered:

None

MMS Action Required:

A Final Study Report number is needed from MMS.



TRAINEES AND STAFF



TRAINEES AND STAFF FUNDED BY THE COASTAL MARINE INSTITUTE

2004-2005

Name	Status	Task
Anderson, Kristen	Undergraduate Student	Ecological Performance
Bassin, Corrine	Graduate Student	Surface Circulation
Bayer, Pam	Staff	UCSB-MMS Internship
Bond, Morgan	Graduate Student	Recruitment to Rocky Shores
Bullard, Aimee	Graduate Student	Recruitment to Rocky Shores
Carr, Lindsey	Staff	Population Trends
Chambers, Jeanne	Staff	UCSB-MMS Internship
Cheng, Joe	Undergraduate Student	Ecological Performance
Cleland, Ashley	Undergraduate Student	Recruitment to Rocky Shores
Conway-Cranos, Tish	Graduate Student	Recruitment to Rocky Shores
Culver, Carrie	Staff	Marine Biotechnology
Day, Daniel	Graduate Student	Marine Biotechnology
Ding, Haibing	Post Doctoral Researcher	Rates of Microbial Metabolism
Emery, Brian	Staff	Surface Circulation
Engle, Caroline	Undergraduate Student	Recruitment to Rocky Shores
Estudillo, Kristina	Graduate Student	UCSB-MMS Internship
Foley, Melissa	Graduate Student	Recruitment to Rocky Shores
Grant, Nora	Graduate Student	Recruitment to Rocky Shores
Haston, Laura	Staff	UCSB-MMS Internship
Hayford, Hilary	Staff	Recruitment to Rocky Shores
Heidelberger, Sara	Undergraduate Student	Ecological Performance
Helix, Mary-Elaine	Staff	Recruitment to Rocky Shores
Herrar, Shannon	Staff	Relative Importance of POCS
Higgason, Kelley	Undergraduate Student	Recruitment to Rocky Shores
Holt, Galen	Undergraduate Student	Recruitment to Rocky Shores
Ireson, Kirk	Staff	Surface Circulation
Jech, Dawn	Graduate Student	Recruitment to Rocky Shores
Johnson, Cyril	Staff	Surface Circulation
Johnson, Robin	Staff	UCSB-MMS Internship
Johnston, Karina	Staff	UCSB-MMS Internship
Klaib, Jennifer	Undergraduate Student	UCSB-MMS Internship
Kleiner, Joshua	Undergraduate Student	Surface Circulation
Kunkle, Katy	Undergraduate Student	Population Trends
Lape, Jennifer	Graduate Student	UCSB-MMS Internship
Leard, Christina	Undergraduate Student	Recruitment to Rocky Shores
Leckliter, Alexandria	Undergraduate Student	Recruitment to Rocky Shores
Lenihan, Aaron	Undergraduate Student	Relative Importance of POCS
Lester, Sara	Graduate Student	Population Trends
Livingston, Haven	Staff	Recruitment to Rocky Shores
Lohse, Dave	Undergraduate Student	Recruitment to Rocky Shores
Martinez, Chris	Undergraduate Student	Population Trends
Milgrim, Justin	Undergraduate Student	Recruitment to Rocky Shores
Miller, Eric	Undergraduate Student	Recruitment to Rocky Shores
Miner, Melissa	Graduate Student	Recruitment to Rocky Shores
Mutz, Stephanie	Staff	Relative Importance of POCS
Nishimoto, Mary	Staff	Ecological Performance
Nishimoto, Mary	Graduate Student	Surface Circulation
O'Connor, Beth	Staff	UCSB-MMS Internship
Pai, Christine	Undergraduate Student	Rates of Microbial Metabolism
Pearson, Justin	Undergraduate Student	Surface Circulation
Perlman, Ben	Undergraduate Student	Recruitment to Rocky Shores

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Porzig, Libby	Undergraduate Student	Recruitment to Rocky Shores
Price, Nichole	Graduate Student	UCSB-MMS Internship / Surfgrass
Rassweiler, Andrew	Graduate Student	Population Trends
Readdie, Mark	Post-Doctoral Researcher	Recruitment to Rocky Shores
Redfield, Melissa	Undergraduate Student	Recruitment to Rocky Shores
Roe, Christy	Graduate Student	Recruitment to Rocky Shores
Rosen, Jessica	Undergraduate Student	Ecological Performance
Salazar, David	Staff	Surface Circulation
Samhoury, Jameal	Graduate Student	Ecological Performance
Schooler, Nick	Undergraduate Student	Relative Importance of POCS
Schroeder, Donna	Staff	Ecological Performance / POCS
Seydel, Keith	Staff	Population Trends
Spencer, Katie	Undergraduate Student	Recruitment to Rocky Shores
Springer, Yuri	Graduate Student	Recruitment to Rocky Shores
Strong, Erik	Undergraduate Student	Rates of Microbial Metabolism
Tanner, Christina	Undergraduate Student	Population Trends
Tate, Grady	Undergraduate Student	Relative Importance of POCS
Thrower, Doug	Post-Doctoral Researcher	Marine Biotechnology
Wardlaw, George	Graduate Student	Rates of Microbial Metabolism
Williamson, Bonnie	Staff	UCSB-MMS Internship
Wilson, Jono	Graduate Student	Relative Importance of POCS
Zimmerman, Eric	Staff	UCSB-MMS Internship

Key

Ecological Performance—Task # 85339, PIs Page, Dugan, Love, & Lenihan
Marine Biotechnology—Task # 17609, PIs Schmitt et al.
Population Trends—Task # 14181, PIs Schmitt & Brooks
Rates of Microbial Metabolism—Task # 85338, PI Valentine
Recruitment to Rocky Shores—Task # 18234, PIs Raimondi & Ambrose
Relative Importance of POCS—Task # 85340, PIs Lenihan & Brooks
SSOS-HYS—Task #s 17611 & 18211, PIs Leifer, Clark, & Luyendyk
Surface Circulation—Task #17608, PIs Washburn & Gaines
Surfgrass Population Genetics—Task # 17606, PIs Hodges, Holbrook, & Reed
UCSB-MMS Internship—Task #s 12388 & 17610, PIs Dugan, Keller

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PAPERS PUBLISHED

- Bassin, C.J., L. Washburn, M.A. Brzezinski, and E.E. McPhee-Shaw. 2005. Sub-mesoscale coastal eddies observed by high frequency radar: A new mechanism for delivering nutrients to kelp forests in the Southern California Bight, *Geophysical Research Letters*, 32, doi:10.1029/2005GL023017
- Beckenbach, E.H., and L. Washburn. 2004. Low frequency waves in the Santa Barbara Channel observed by high frequency radar, *Journal of Geophysical Research*, 109, doi:10.1029/2003JC001999,2004
- *Brooks, A.J., R. J. Schmitt and S. J. Holbrook. 2002. Declines in regional fish populations: have different species responded similarly to environmental change? *Marine and Freshwater Research* 53(2):189-198.
- Cudaback, C., L. Washburn, and E.P. Dever. 2005. Sub-tidal inner-shelf circulation near Pt. Conception, California, *Journal of Geophysical Research and Oceans*, 110, C10007, doi:10.1029/2004JC002608
- Culver, C. S., H. M. Page, and J. E. Dugan. 2005. Oil, gas platforms - Sources for marine natural products? *Global Aquaculture Advocate* 8: 60-61.
- Emery, B.M., L. Washburn, and J.A. Harlan. 2004. Evaluating radial current measurements from CODAR High Frequency radars with moored current meters, *Journal of Atmospheric and Oceanic Technology* 21(8): 1259-1271.
- Raimondi, PT. 2006. Contribution to Cabrillo Beach Aquarium quarterly newsletter "Disturbance and recovery of rocky seashores".

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- Emery, B.M., L. Washburn, M. Love, M.M. Nishimoto, and J. C. Ohlmann. 2006. Do oil and gas platforms off California reduce recruitment of bocaccio (*Sebastes paucispinis*) to natural habitat? An analysis based on trajectories derived from high frequency radar, *In Press*, *Fisheries Bulletin*
- Page, H. M., J. E. Dugan, C. S. Culver, J. Hoesterey. Exotic invertebrate species on offshore oil platforms. *Marine Ecology Progress Series. In Press.*
- Schmitt, R.J. and S.J. Holbrook. 2006. Predicting the magnitude of temporal variation in young-of-year class strength of surfperch (Teleostei: Embiotocidae). *Raffles Bulletin of Zoology. In Press.*

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Ohlmann, C., P. White, L. Washburn, E. Terrill, B.M. Emery, and M. Otero. 2006. Interpretation of coastal HF radar derived surface currents with high resolution drifter data, *Submitted*; Journal of Atmospheric and Oceanic Technology.

PUBLICATIONS IN PREPARATION

Brooks, AJ, H.S. Lenihan, and MC. Kay. *In preparation*. Age and growth of the blackeye goby *Rhinogobiops nicholsii*, in the Eastern Santa Barbara Channel. Target: Environmental Biology of Fishes.

Holbrook, S.J., A.J. Brooks and R.J. Schmitt. Temporal variation in temperate reef assemblages: have trophic levels responded similarly to environmental change? *In prep*.

Lenihan, H.S., A.J. Brooks, and M.C. Kay. *In preparation*. Relative contribution of POCS oil platforms to regional population dynamics of a model reef fish, the blackeye goby *Rhinogobiops nicholsii*, in the Eastern Santa Barbara Channel. Target: Ecological Applications.

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J. Carter Ohlmann. Task No. 18212. *Transport over the Inner-Shelf of the Santa Barbara Channel.* MMS OCS Study 2006-009. Coastal Research Center, Marine Science Institute, University of California, Santa Barbara, California. MMS Cooperative Agreement Number 1435-01-00-CA-31063. 29 pages.

Smith, E.R.A.N., J. Carlisle, and K. Michaud. Task No. 17607. *Public Attitudes Toward Oil and Gas Drilling Among Californians: Support, Risk Perceptions, Trust, and Nimbysism.* MMS OCS Study 2005-004. Coastal Research Center, Marine Science Institute, University of California, Santa Barbara, California. MMS Cooperative Agreement Number 1435-01-00-CA-31063. 92 pages.

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Page, H.M., J. Dugan, and J. Childress. Task No. 17601. *Role of Food Subsidies and Habitat Structure in Influencing Benthic Communities of Shell Mounds at Sites of Existing and Former Offshore Oil Platforms.* MMS OCS Study 2005-001. Coastal Research Center, Marine Science Institute, University of California, Santa Barbara, California. MMS Cooperative Agreement Number 14-35-0001-31063. 32 pages.

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- Arey, J.S., R.K. Nelson, G.D. Wardlaw, D.L. Valentine, C.M. Reddy. Disentangling evaporation and water-washing signatures in weathered oil mixtures using comprehensive two-dimensional gas chromatography (GCxGC). Gordon Research Conference, June 25-30, 2006.

- *Bassin, C.J., L. Washburn, and E. McPhee-Shaw. 2003. Sub-mesoscale eddies along the northern Santa Barbara Channel: A possible mechanism for nutrient delivery to the inner shelf”, Eastern Pacific Ocean Conference, Wrigley Marine Science Center, Catalina Island, CA, 24-27 Sept.

- *Bassin, C.J., L. Washburn, E.E., and McPhee-Shaw. 2004. Sub-mesoscale eddies along the northern Santa Barbara Channel: A possible transport mechanism for particle transport across the inner shelf. ASLO/TOS Ocean Science Research Conference, Honolulu, HI, 15-20 February.

- *Beckenbach, E.H. and L. Washburn. 2003. Vorticity, divergence, and flow states in the western Santa Barbara Channel. Eastern Pacific Ocean Conference, Wrigley Marine Science Center, Catalina Island, CA, 24-27 Sept.

- *Brooks, A.J. Declines in Regional Fish Populations: Species Responses to Environmental Change and the Nature of Community Organization. Western Society of Naturalists, Ventura, CA, November 2001.

- *Brooks, A.J. Declines in Rocky Reef Fish Populations: Have Different Species Responded Similarly to Environmental Change. Southern California Academy of Sciences, Claremont, CA, June, 2002.

- *Brooks, A.J., H.S. Lenihan and S. Lester. Temporal Trends in Shallow Nearshore and Deeper Continental Shelf Fishes Since 1977: Do Similar Responses Suggest a Common Mechanism Behind Observed Declines? Southern California Academy of Sciences, Northridge, CA, May 2003.

- *Brooks, A.J., R.J. Schmitt and S.J. Holbrook. Population Trends and Trophic Dynamics, the Use of Long-term Datasets. 5th Temperate Reef Symposium, Capetown, S.A., January, 2000.

- *Brooks, A.J., R.J. Schmitt and S.J. Holbrook. Population Trends and Trophic Dynamics, the Use of Long-term Datasets. American Society for Ichthyology and Herpetology, La Paz, Mexico, June, 2000.

- Brooks, A.J., R.J. Schmitt and S.J. Holbrook. Population Trends and Trophic Dynamics – What Can Be Learned from Long-term Monitoring. The Nature Conservancy, Santa Barbara, CA, October, 2003.
- Culver, C. The occurrence and potential implications of exotic species inhabiting California offshore oil platforms. American Fisheries Society - California-Nevada Chapter. March 30 - April 1, 2006; San Luis Obispo, CA
- Dugan, J.E. Shorebirds and Sandy Beaches on California's Coast. Seminar presented to the MMS OCS Scientific Committee, Annual plenary meeting, Santa Barbara, CA. 2006.
- *Emery, B., M. Nishimoto, L. Washburn, and M. Love. 2004. Do offshore platforms affect the fate of recruitment bocaccio? An analysis based on HF radar derived surface trajectories. Poster presented at the Thirteenth Western Groundfish Conference, Victoria, British Columbia, Canada, 9-13 February.
- *Emery, B.M., M.M. Nishimoto, L. Washburn, and M. Love. 2003. Alternative fate estimation of oil rig bocaccio recruits using HF radar. Eastern Pacific Ocean Conference, Wrigley Marine Science Center, Catalina Island, CA, 24-27 Sept.
- *Leifer, I., J. Boles, J.F. Clark, B. Luyendyk, and L. Washburn. 2003. Integrating bubble flux spectra and direct flux measurements of marine hydrocarbon seepage. XVI INQUA Congress, Reno, NV, July 23-30.
- Lenihan, H.S. 2005. Population ecology and problem solving in the marine environment. Bren School, UCSB. December 2005.
- Lenihan, H.S. 2006. Population source-sink dynamics and POCS oil platform decommissioning. March, 2006.
- Lenihan, H.S., A. Brooks, and MC. Kay. 2005. Relative Importance of POCS Oil Platforms on the Population Dynamics of Reef Fishes in the Eastern Santa Barbara Channel. Bren School, UCSB. October, 2005.
- *McPhee-Shaw, E., L. Washburn, and D. Siegel. 2003. Low-frequency dynamics and nutrient flux to the inner shelf of the Santa Barbara Channel. Eastern Pacific Ocean Conference, Wrigley Marine Science Center, Catalina Island, CA, 24-27 Sept.
- *McPhee-Shaw, E.E., D.A. Siegel, L. Washburn, D. Reed, and M. Brzezinski. 2004. Spring Upwelling in the Southern California Bight - Three Seasons of Observation. AGU Ocean Science Meeting, Portland, OR, 26-30 January.
- Nishimoto, M M, L. Washburn, M. Love, B. Emery, and D. Schroeder. 2006. Is the Timing of Juvenile Reef Fish Settlement Linked to Local and Regional Ocean Current Patterns? AGU/ASLO Ocean Sciences Meeting, 20-24 February, Honolulu, HI.

Nishimoto, M. M., L. Washburn, M. Love, D. Schroeder, and B. Emery. 2005. Is the delivery of juvenile fishes settling on offshore platforms linked to transport by ocean currents? American Fisheries Society Annual Meeting, Anchorage, AK; September 11-15, 2005.

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Ohlmann, C., P. White, L. Washburn, E. Terrill. 2006. Interpretation of HF Radar Derived Surface Currents with Arrays of GPS-Located, Reusable Drifters. AGU/ASLO Ocean Sciences Meeting, 20-24 February, Honolulu, HI.

*Palomino, E., M. McManus, J.L. Largier, L. Washburn, S. Morgan, K. Stolzenbach, B. Sanders, M. Stacey. 2003. Adding Value to NEOCO, the Network for Environmental Observations of the Coastal Ocean. Eastern Pacific Ocean Conference, Wrigley Marine Science Center, Catalina Island, CA, 24-27 Sept.

Raimondi, P. Geographical variation in recovery of intertidal communities following a disturbance: Linking recruitment to recovery. Western Society of Naturalists Conference; November 2005

Raimondi, P. Geographical variation in recovery of intertidal communities following a disturbance: Linking recruitment to recovery. International Temperate Reef Symposium; June 2006

Schmitt, R.J. and S.J. Holbrook. "Predicting the magnitude of temporal variation in young-of-year class strength of surfperch (Teleostei: Embiotocidae)." 7th Indo-Pacific Fish Conference, Taipei, Taiwan, May, 2005.

Wardlaw, G.D., C.M. Reddy, R.K. Nelson, and D. Valentine. Petroleum Weathering Associated with Hydrocarbon Migration and Seepage, a Case Study from the Santa Barbara Channel, CA. American Geophysical Union 2005 meeting, San Francisco, CA., Poster, December 5-9.

Wardlaw, G.D., C.M. Reddy, R.K. Nelson, and D. Valentine. Petroleum Weathering Associated with Hydrocarbon Migration and Seepage, a Case Study from the Santa Barbara Channel, CA. Toxic Substances Research and Teaching Program Symposium, April 28 & 29, 2006, San Diego, CA., Poster.

*Washburn, L. and M. Lavin. 2003. Inverse estuarine circulation in the northern Gulf of California. UC-MEXUS Workshop, Ensenada, Baja California, Mexico; 28 November.

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RICHARD F. AMBROSE

Environmental Science and Engineering Program
Department of Environmental Health Sciences
University of California
Los Angeles, CA

Projects: *Inventory of Rocky Intertidal Resources in Southern Santa Barbara, Ventura and Los Angeles Counties*

Education: B.S. University of California, Irvine 1975
Ph.D. University of California, Los Angeles 1982

Positions: 2000-present Professor, Environmental Science and Engineering Program, Department of Environmental Health Sciences, University of California, Los Angeles
1998-present Director, Environmental Science and Engineering Program, UCLA
1992-2000 Associate Professor, Environmental Science and Engineering Program, Department of Environmental Health Sciences, UCLA
1991-present Associate Research Biologist, Marine Science Institute, University of California, Santa Barbara
1985-1991 Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara
1983-1984 Postdoctoral Fellow, Department of Biological Sciences, Simon Fraser University, Burnaby, B.C., Canada
1982 Visiting Lecturer, Department of Biology, University of California, Los Angeles
1976-1981 Teaching Assistant, Department of Biology, University of California, Los Angeles

Major Research Interests:

- Restoration ecology, especially for coastal marine and estuarine environments
- Development and scientific evaluation of mitigation techniques
- Long-term ecological monitoring
- Development of habitat valuation techniques
- Ecology of artificial and natural reefs
- Ecology of Coastal wetlands and estuaries
- Marine ecology
- Interface between environmental biology and resource management policy

Selected Publications:

- Shuman, C.S., G. Hodgson, and R.F. Ambrose. 2004. Managing the Marine Aquarium Trade: Is Eco-Certification the Answer? *Environmental Conservation* **31**(4):339-348.
- Vance, R.R., R.F. Ambrose, S.S. Anderson, S. MacNeil, T. McPherson, I. Beers and T.W. Keeney. 2003. Effects of sewage sludge on the growth of potted salt marsh plants exposed to natural tidal inundation. *Restoration Ecology* **11**:155-167.
- Shuman, C.S. and R.F. Ambrose. 2003. A comparison of remote sensing and ground-based methods for monitoring wetland restoration success. *Restoration Ecology* **11**:325-333.
- Page, H.M., S. Schroeter, D. Reed, R.F. Ambrose, J. Callaway and J. Dixon. 2003. An inexpensive method to identify the elevation of tidally inundated habitat in coastal wetlands. *Bulletin of the Southern California Academy of Sciences* **102**:130-142.

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- Forrester, G. E., B.I. Fredericks, D. Gerdeman, B. Evans, M.A. Steele, K. Zayed, L.E. Schweitzer, I.H. Suffet, R.R. Vance, and R.F. Ambrose. 2003. Correspondence between field-measured growth rates of fish from several California estuaries and the inferred toxicity of multiple sediment contaminants. *Marine Environmental Research* **56**:423-442.
- Moeller, A., S.D. MacNeil, R.F. Ambrose, and S. S. Que Hee. 2003. Elements in fish of Malibu Creek and Malibu Lagoon near Los Angeles, California. *Marine Pollution Bulletin* **46**:424-429.
- Raimondi P.T., C.M. Wilson, R.F. Ambrose, J.M. Engle, T.E. Minchinton. 2002. Continued declines of black abalone along the coast of California: are mass mortalities related to El Nino events? *Marine Ecology Progress Series* **242**:143-152.
- Sudol, M.F. and R.F. Ambrose. 2002. The US Clean Water Act and habitat replacement: Evaluation of mitigation sites in Orange County, California. *Environmental Management* **30**:727-734.
- Boyer, K.E., P. Fong, R.R. Vance and R.F. Ambrose. 2001. *Salicornia virginica* in a Southern California salt marsh: seasonal patterns and a nutrient enrichment experiment. *Wetlands* **21**(3):315-326.
- Cohen, T., S.S. Que Hee and R.F. Ambrose. 2001. Comparison of trace metal concentrations in fish and invertebrates in three Southern California wetlands. *Marine Pollution Bulletin* **42**:224-232.
- Downs T.J, and R.F. Ambrose. 2001. Syntropic ecotoxicology: A heuristic model for understanding the vulnerability of ecological systems to stress. *Ecosystem Health* **7**(4):266-283.
- Moeller, A, R.F. Ambrose, and S.S. QueHee. 2001. A comparison of techniques for preparing fish fillet for ICP-AES multi-elemental analysis and the microwave digestion of whole fish. *Food Addit Contamination* **18**(1):19-29.
- Stein, E.D. and R.F. Ambrose. 2001. Landscape-scale analysis and management of cumulative impacts to riparian ecosystems: past, present and future. *Journal of American Water Resources Association* **37**(6):1597-1614.
- Ambrose, R.F. 2000. Wetland mitigation in the United States: Assessing the success of mitigation policies. *Wetlands (Australia)* **19**:1-27.
- Ambrose, R.F. and D.J Meffert. 1999. Fish-assemblage dynamics in Malibu Lagoon, a small, hydrologically altered estuary in southern California. *Wetlands* **19**:327-340.
- Lafferty, K., C. Swift and R.F. Ambrose. 1999. Extirpation and recovery of local populations of the endangered tidewater goby, *Eucyclogobius newberryi*. *Conservation Biology* **13**:1447-1453.
- Stein, E.D. and R.F. Ambrose. 1998. A rapid impact assessment method for use in a regulatory context. *Wetlands* **18**:379-392.
- Ambrose, R.F. 1997. Ecological value in restored coastal ecosystems. Pp. 67-86 in *Saving the Seas: Values, Scientists, and International Governance*, L.A. Brooks and S.D. VanDeveer, editors. Maryland Sea Grant College, College Park, MD.
- Dunaway, M.E., R.F. Ambrose, J. Campbell, J.M. Engle, M. Hill, Z. Hymanson, and D. Richards. 1997. Establishing a Southern California rocky intertidal monitoring network. Pp. 1278-1294. in *California and the World Ocean '97*, O.T. Magoon, H. Converse, B. Baird, and M. Miller-Henson, editors. American Society of Civil Engineers, Reston, Virginia.
- Engle, J.M., R.F. Ambrose, and P.T. Raimondi. 1997. Synopsis of the Interagency Rocky Intertidal Monitory Network Workshop. Final Report, OCS Study MMS 97-0012. U.S. Minerals Management Service, Pacific OCS Region. 18p.
- Palmer, M.A., N.L. Poff, and R.F. Ambrose. 1997. Ecological theory and community restoration ecology. *Restoration Ecology* **5**:291-300.

Coastal Marine Institute

ANDREW J. BROOKS

Department of Ecology, Evolution and Marine Biology
University of California
Santa Barbara, CA

Projects: *Population Trends and Trophic Dynamics in Pacific OCS Ecosystems: What Can Monitoring Data Tell Us?*
Relative importance of POCS oil platforms on the population dynamics of two reef fishes in the Eastern Santa Barbara Channel

Education:

B.A.	Biology with Marine Emphasis, Occidental College	1984
Certificate	Aquatic Biology and Fisheries Management, University College of North Wales, U.K.	1987
M.A.	Biological Sciences, University of California, Santa Barbara	1993
Ph.D.	Ecology, Evolution and Marine Biology, University of California, Santa Barbara	1999

Positions:

2004 –Present	Deputy Director, Moorea Coral Reef LTER, University of California
2001-Present	Director, Carpinteria Salt Marsh Reserve, University of California
1999-Present	Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara
1998-Present	Lecturer, Dept. of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1998-1999	Post-Doctoral Researcher, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1998	Teaching Associate, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1990-1998:	Research Assistant, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1988-89	Instructor, Department of Physics, Los Angeles Valley College
1988-91	Instructor, Department of Biology, Occidental College
1987-89	Marine Ecologist and Project Leader, Vantuna Research Group, Occidental College
1984-86	Marine Ecologist, Vantuna Research Group, Occidental College

Grants and Awards:

2002-2005	W.M. Keck Foundation
2002-2004	Minerals Management Service CMI Project Award
2001-2004	US Environmental Protection Agency
2001	Member, American Institute of Fishery Research Biologists
1997-2001	Minerals Management Service CMI Project Award
1997	University Award of Distinction, University of California, Santa Barbara
1995-1999	UC TSR&TP Fellowship, University of California, Santa Barbara
1994-1996	Mildred Mathias Grant, University of California, Santa Barbara
1994-1996	Crocker Grant
1994-1995	Continuing Graduate Student Fellowship, University of California, Santa Barbara

Selected Publications:

Brooks, A.J., S.J. Holbrook, and R.J. Schmitt. Patterns of Microhabitat Use by Fishes in the Patch-forming Coral *Porites rus*. *Raffles Bulletin of Zoology*. (submitted).

Morgan, S.G., S. Spilseth, H.M. Page, T. Grosholz, and A. J. Brooks. Spatial and temporal movement patterns of the lined shore (*Pachygrapsus crassipes*) and its utility as an indicator of habitat condition. *Marine Ecological Progress Series*. (submitted).

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- Anderson, S.L., G.N. Cherr, S.G. Morgan, C.A. Vines, R.M. Higashi, W.A. Bennett, W.L. Rose, A.J. Brooks and R.M. Nisbet. Integrating contaminant responses in indicator saltmarsh species. (submitted).
- Holbrook, S.J., A.J. Brooks, and R.J. Schmitt. Relationships between Live Coral Cover and Reef Fishes: Implications for Predicting Effects of Environmental Disturbances. Proceedings of the 10th International Coral Reef Symposium. (in press).
- Brooks, A. J., R.J. Schmitt, and S. J. Holbrook. Parallel changes observed across several trophic levels suggest a common response by marine communities to short-term climate change. *Ecology Letters* (in prep).
- Swearer, S. E., G.E. Forrester, M.A. Steele, A.J. Brooks, and D.W. Lea. Spatio-temporal and interspecific variation in otolith trace-elemental fingerprints in a temperate estuarine fish assemblage. *Estuarine, Coastal and Shelf Science* (in press).
- Holbrook, S.J., A.J. Brooks, and R. J. Schmitt. 2002. Are fish assemblages on coral patch reefs predictable? *Marine and Freshwater Research* **53** (2):181-188.
- Brooks, A.J., R.J. Schmitt, and S. J. Holbrook. 2002. Declines in regional fish populations: have different species responded similarly to environmental change? *Marine and Freshwater Research* **53** (2):189-198.
- Holbrook, S.J., A.J. Brooks, and R. J. Schmitt. 2002. Variation in structural attributes of patch forming corals and in patterns of abundance of associated fishes. *Marine and Freshwater Research* **53**(7):1045-1053.
- Brooks, A.J. 1999. Factors Influencing the Structure of an Estuarine Fish Community: The Role of Interspecific Competition. Ph.D. Dissertation. University of California, Santa Barbara, 219 pp.
- Nisbet, R.M., E.B. Muller, A.J. Brooks, and P. Hosseini. 1997. Models relating individual and population response to contaminants. *Environmental Modeling and Assessment* **2**:7-12.
- Love, M.S., A.J. Brooks, and J.R.R. Ally. 1996. An analysis of the commercial passenger fishing vessel fisheries for kelp and barred sand basses (*Paralabrax clathratus* and *P. nebulifer*) in the Southern California Bight. *California Fish and Game* **82**:105-121.
- Nisbet, R.M., A.H. Ross, and A.J. Brooks. 1996. Empirically-based dynamic energy budget models: theory and an application to ecotoxicology. *Nonlinear World* **3**:85-106.
- Love, M.S., A.J. Brooks, D. Busatto, J. Stephens Jr., and P. Gregory. 1996. Aspects of the life histories of the kelp bass and barred sand bass (*Paralabrax clathratus* and *P. nebulifer*) from the Southern California Bight. *Fisheries Bulletin* **94**:472-481.
- Love, M.S., J. Hyland, A. Ebeling, T. Herrlinger, A.J. Brooks, and E. Imamura. 1994. A pilot study of the distribution and abundance of rockfishes in relation to natural environmental factors and an offshore oil and gas production platform off the coast of Southern California. *Bulletin Marine Science* **55**:1062.-1085.
- Love, M.S. and A.J. Brooks. 1990. Size and age at first maturity of the California halibut, *Paralichthys californicus*, in the Southern California Bight. Pp. 167-174 in: *The California halibut, Paralichthys californicus, resource and fisheries*. *California Fish and Game Fisheries Bulletin*.
- Love, M.S., B. Axell, P. Morris, R. Collins, and A.J. Brooks. 1987. Life history and fishery of the California scorpionfish, *Scorpaena guttata*, within the Southern California Bight. *Fisheries Bulletin* **85**:99-116.
- Brooks, A.J. 1987. Two species of Kyphosidae seen in King Harbor, Redondo Beach, California. *California Fish and Game* **73**:49-61.

Coastal Marine Institute

DOUGLAS S. BUSH

Marine Science Institute
University of California
Santa Barbara, CA

Project: *Population Genetics of Surfgrass (Phyllospadix torreyi) for Use in Restoration*

Education:	B.A.	Botany, University of Hawaii	1974
	M.S.	Plant Physiology, UC Berkeley	1979
	Ph.D.	Plant Physiology, UC Berkeley	1983

Positions:	2003-Present	Academic Coordinator, UC Santa Barbara
	1998-2003	Associate Research Biologist, Marine Science Institute, UC Santa Barbara
	1998-2003	Adjunct Associate Professor, Dept. of Ecology, Evolution, and Marine Biology, UC Santa Barbara
	1990-1997	Assistant/Associate Professor, Rutgers University, Dept. of Biological Sciences
	1989-1990	Assistant Research Botanist, UC Berkeley, Dept. of Botany
	1984-1989	Postdoctoral Associate, UC Berkeley, Dept. of Botany
	1979-1983	Research Associate, UC Berkeley, Dept. of Plant and Soil Biology
	1977-1979	Statistician, UC Berkeley, Dept. of Plant and Soil Biology

Research Interests:

Genetics of natural plant populations, Evolutionary Genetics, Plant cell biology, cell calcium and transduction of hormonal signals. Membrane transport events induced by plant growth regulators. Programmed cell death.

Awards:

Henry Rutgers Fellow, 1990
EMBO Workshop Fellowship, Patch Clamp Techniques, Göttingen, West Germany, 1987
Presidents Fellowship, University of California, Berkeley, 1980-1981

Selected Publications:

- Rodriguez, M.T. and D.S. Bush. 1999. Gibberellin-induced cell death in the wheat aleurone. *Plant Physiology* (submitted).
- Silverman, P., A. Assiahmah, and D.S. Bush. 1998. Cytokinin action in root hairs of *Medicago sativa*. *Planta* **205**:25-31.
- Subbaiah, C., D.S. Bush, and M. Sachs. 1998. Mitochondria contribution to the anoxic Ca²⁺ signal in maize suspension-cultured cells. *Plant Physiology* **118**:759-771.
- Thompson, M.D., D.S. Bush, and L.E. Bello. 1997. Possible Wilson's disease: A case presentation. *Archives of Clinical Neuropsychology* **12**(4):416-416.
- Bush, D.S. 1996. Effects of gibberellic acid and environmental factors on cytosolic calcium in wheat aleurone cells. *Planta*. **199**:89-99.
- Kuo, A., S. Cappellutti, M.Cervantes-Cervantes, M. Rodriguez, and D.S. Bush. 1996. Okadaic acid, a protein phosphatase inhibitor, blocks calcium changes, gene expression and cell death induced by gibberellin in wheat aleurone. *The Plant Cell* **8**:259-269.
- Rodriguez, M.T. and D.S. Bush. 1996. Programmed cell death and hormonal responses in wheat aleurone cells. *Molecular Biology of the Cell* **7**:2015-2015 Suppl. S.
- Silverman, F.P. and D.S. Bush. 1996. Membrane transport and cytokinin action in alfalfa root hairs. *Molecular Biology of the Cell* **7**:1761-1761 Suppl. S.

- Bush, D.S. 1995. Calcium regulation in plant cells and its role in signaling. *Annual Review of Plant Physiology. Plant Molecular Biology* **46**:95-122.
- Bush, D.S. and T. Wang. 1995. Diversity of calcium efflux transporters in wheat aleurone cells. *Planta*. **197**:19-30.
- Cervantes-Cervantes, M., S.J. Cappelluti, and D.S. Bush. 1995. Identification of Plant Ca²⁺ Transport Proteins by Complementation in Yeast. *Plant Physiology* **108**(2):37-37 Suppl. S.
- Silverman, P., A. Assiamah, and D.S. Bush. 1995. Cytokinin Action in Medicago-Sativa Root Hairs. *Plant Physiology* **108**(2):46-46 Suppl. S.
- Subbaiah, C., D.S. Bush, and M. Sachs. 1994. Elevation of cytosolic calcium precedes anoxic gene expression in maize suspension-cultured cells. *The Plant Cell* **6**:1747-1762.
- Bush, D.S. 1993. Regulation of cytosolic calcium in plants. *Plant Physiology* **103**:7-13.
- Bush, D.S., A.K. Biswas, and R.L. Jones. 1993. Hormonal regulation of Ca²⁺-transport in the endomembrane system of the barley aleurone. *Planta* **189**:507-515.
- Bush, D.S. 1992. The role of Ca²⁺ in the action of GA in the barley aleurone. In: CM Karssen, LC Van Loon, and D Vreugdenhil, eds. "Progress in plant growth regulation: Proceedings of the 14th International conference on plant growth substances, Amsterdam, 21-26 July, 1991." pp. 96-104. Kluwer Academic Pub., Dordrecht, The Netherlands.
- Drøbak, B.K., D.S. Bush, R.L. Jones, A.P. Dawson, and I.B. Ferguson. 1992. Analysis of calcium involvement in host-pathogen interactions. In: Gurr, S.J., M.J. McPherson, and D.J. Bowles eds. "Molecular Plant Pathology: A Practical Approach". Vol. II, pp. 159-194. IRL Press at Oxford University Press, Cambridge.
- Arnalte, M.E., M.J. Cornejo, D.S. Bush, and R.L. Jones. 1991. The effect of gibberellic acid on the lipid composition of barley aleurone protoplasts. *Plant Science* **77**:223-232.
- Bush, D.S., L. Sticher, and R.L. Jones. 1991. Gibberellic acid-regulated α -amylase synthesis and calcium transport in the endoplasmic reticulum of barley aleurone cells. In: "Gibberellins: Tokyo 1989". pp. 106-113.
- Jones, R.L. and D.S. Bush. 1991. Gibberellic acid and abscisic acid regulate the level of a BiP cognate in the endoplasmic reticulum of barley aleurone cells. *Plant Physiology* **97**:456-459.
- Jones, R.L., L. Sticher, and D.S. Bush. 1991. Secretion of hydrolases from cereal aleurone cells. In: Hawes, C., J. Coleman and D. Evans, eds. "Endocytosis, Exocytosis and Vesicle Traffic in Plants", Cambridge University Press, Cambridge.
- Bush, D.S. and R.L. Jones. 1990. Hormonal Regulation of Ca²⁺ transport in microsomal vesicles isolated from barley aleurone layers. Calcium in plant growth and development. Leonard and Hepler eds. *American Society of Plant Physiologists* **4**:60-65.
- Bush, D.S. and R.L. Jones. 1990. Measuring intracellular Ca²⁺ levels in plant cells using the fluorescent probes, indo-1 and fura-2: progress and prospects. *Plant Physiology* **93**:841-845.
- DuPont, F.M., D.S. Bush, J.J. Windle, and R.L. Jones. 1990. Calcium and proton transport in membrane vesicles from barley roots. *Plant Physiology* **94**:179-188.
- Hillmer, S., D.S. Bush, D.G. Robinson, I. Zingen-Sell, and R.L. Jones. 1990. Endomembrane structure and function in barley aleurone protoplasts. *European Journal of Cell Biology* **52**:169-173.
- Sticher, L., A.K. Biswas, D.S. Bush, and R.L. Jones. 1990. Heat shock inhibits α -amylase synthesis in barley aleurone without inhibiting the activity of endoplasmic reticulum marker enzymes. *Plant Physiology* **92**:506-513.

JAMES J. CHILDRESS

Department of Ecology, Evolution and Marine Biology
University of California
Santa Barbara, CA

Project: *Habitat Value of Shell Mounds to Ecologically and Commercially Important Benthic Species*

Education: B.A. Biological Sciences, Wabash College 1964
Ph.D. Physiology, Stanford University 1969

Positions: 1969-present Professor, Department of Ecology, Evolution and Marine Biology,
University of California, Santa Barbara, California.

Selected Publications:

- Felbeck, H., C. Arndt, U. Hentschel, and J.J. Childress. 2004. Experimental application of vascular and coelomic catheterization to identify vascular transport mechanisms for inorganic carbon in the vent tubeworm, *Riftia pachyptila*. *Deep-Sea Research* **51**:401-411.
- Childress, J.J., C.R. Fisher, H. Felbeck, and P. Girguis. 2003. On the edge of a deep biosphere: Real animals in extreme environments. *American Geophysical Union* volume on the subsurface biosphere. (in press)
- Girguis, P.R., J.J. Childress, J.K. Freytag, K. Klose, and R. Stuber. 2002. Effects of metabolite uptake on proton-equivalent elimination by two species of deep-sea vestimentiferan tubeworm, *Riftia pachyptila* and *Lamellibrachia cf. luymesii*: proton elimination is a necessary adaptation to sulfide-oxidizing chemoautotrophic symbionts. *Journal of Experimental Marine Biology and Ecology* **205**(19):3055-3066.
- Freytag, J.K., P.R. Girguis, D.C. Bergquist, J.P. Andras, J.J. Childress, and C.R. Fisher. 2001. A paradox resolved: Sulfide acquisition by roots of seep tubeworms sustains net chemoautotrophy. *P National Academy of Science USA* **98**(23):13408-13413.
- Goffredi, S.K., and J.J. Childress. 2001. Activity and inhibitor sensitivity of ATPases in the hydrothermal vent tubeworm *Riftia pachyptila*: a comparative approach. *Marine Biology* **138**(2):259-265.
- Chevaldonne, P., C.R. Fisher, J.J. Childress, D. Desbruyeres, D. Jollivet, F. Zal, and A. Toulmond. 2000. Thermotolerance and the 'Pompeii worms'. *Marine Ecology Progress Series* **208**:293-295.
- Girguis, P.R., R.W. Lee, N. Desaulniers, J.J. Childress, M. Pospesel, H. Felbeck, and F. Zal. 2000. Fate of nitrate acquired by the tubeworm *Riftia pachyptila*. *Applied and Environmental Microbiology* **66**:2783-2790.
- Janssens, B.J., J.J. Childress, F. Baguet, Rees, J.F. 2000. Reduced enzymatic antioxidative defense in deep-sea fish. *Journal of Experimental Biology* **203**(24):3717-3725.
- Seibel, B.A. and J.J. Childress. 2000. Metabolism of benthic octopods (Cephalopoda) as a function of habitat depth and oxygen concentration. *Deep-Sea Research Part I Oceanographic Research Papers* **47**(7):1247-1260.
- Seibel, B.A., E.V. Thuesen, and J.J. Childress. 2000. Light-limitation on predator-prey interactions: Consequences for metabolism and locomotion of deep-sea cephalopods. *Biological Bulletin* **198**(2):284-298.
- Zal, F., B.N. Green, P. Martineu, F.H. Lallier, A. Toulmond, S.N. Vinogradov, and J.J. Childress. 2000. Polypeptide chain composition diversity of hexagonal-bilayer haemoglobins within a single family of annelids, the Alvinellidae. *European Journal Biochemistry* **267**(16):5227-5236.
- Zal, F., E. Leize, D.R. Oros, S. Hourdez, A. Van Dorsselaer, and J.J. Childress. 2000. Haemoglobin structure and biochemical characteristics of the sulphide-binding component from the deep-sea clam *Calyptogena magnifica*. *Cahiers de Biologie Marine* **41**(4):413-423.

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- Shillito, B., J. Ravaux, F. Gaill, J. Delachambre, E. Thiebaut, and J.J. Childress. 1999. Preliminary data on carbon production of deep-sea vent tubeworms. *Marine Ecology Progress Series* **183**:275-279.
- Childress, J.J. and B.A. Seibel. 1998. Life at stable low oxygen: Adaptations of animals to oceanic oxygen minimum layers. *Journal of Experimental Biology* **201**:1223-1232.
- Girguis, P.R. and J.J. Childress. 1998. H^+ equivalent elimination by the tube-worm *Riftia pachyptila*. *Cahiers de Biologie Marine* **39**(3-4):295-296.
- Goffredi, S.K., J.J. Childress, F.H. Lallier, and N.T. Desaulniers. 1998. How to be the perfect host: CO_2 and HS^- accumulation and H^+ elimination in the hydrothermal vent tube-worm *Riftia pachyptila*. *Cahiers de Biologie Marine* **39**(3-4):297-300.
- Ravaux, J., B. Shillito, F. Gaill, L. Gay, M.F. Voss-Foucart, and J.J. Childress. 1998. Tube synthesis and growth processes in the hydrothermal vent tube-worm *Riftia pachyptila*. *Cahiers de Biologie Marine* **39**(3-4):325-326.
- Thuesen, E.V., C.B. Miller, and J.J. Childress. 1998. Ecophysiological interpretation of oxygen consumption rates and enzymatic activities of deep-sea copepods. *Marine Ecology Progress Series* **168**:95-107.
- Zal, F., E. Leize, F.H. Lallier, A. Toulmond, A.V. Dorsselaer, and J.J. Childress. 1998. S-sulfohemoglobin and disulfide-exchange: The mechanisms of sulfide-binding by *Riftia pachyptila* hemoglobins. *Proceedings of the National Academy of Sciences* **95**:8997-9002.
- Goffredi, S.K., J.J. Childress, N.T. Desaulniers, and F.H. Lallier. 1997. Sulfide uptake by the hydrothermal vent tubeworm *Riftia* is via diffusion of HS^- , rather than H_2S . *Journal Experimental Biology* **200**:2609-2616.
- Goffredi, S.K., J.J. Childress, N.T. Desaulniers, R.W. Lee, F.H. Lallier, and D. Hammond. 1997. Inorganic carbon acquisition by hydrothermal vent tubeworm *Riftia pachyptila* depends upon high external PCO_2 and on proton equivalent ion transport by the worm. *Journal of Experimental Biology* **200**:883-896.
- Seibel, B.A., E.V. Thuesen, J.J. Childress, and L.A. Gorodezky. 1997. Decline in pelagic cephalopod metabolism with habitat depth reflects changes in locomotory efficiency. *Biological Bulletin* **192**:262-278.
- Childress, J.J. 1995. Are there physiological and biochemical adaptations of metabolism in deep-sea animals? *Trends in Ecology and Evolution* **10**:30-36.
- Lee, R.W. and J.J. Childress. 1994. Assimilation of inorganic nitrogen by marine invertebrates and their chemoautotrophic and methanotrophic symbionts. *Applied and Environmental Microbiology* **60**:1852-1858.
- Childress, J.J., C.R. Fisher, J.A. Favuzzi, A.J. Arp and D.R. Oros. 1993. The role of a zinc-based, serum-borne sulphide-binding component in the uptake and transport of dissolved sulphide by the chemoautotrophic symbiont containing clam *Calyptogena elongate*. *Journal of Experimental Biology* **179**:131-158.
- Childress, J.J., R.W. Lee, N.K. Sanders, H. Felbeck, D. Oros, A. Toulmond, D. Desbruyères, J. Brooks, and M.C. Kennicutt II. 1993. Inorganic carbon uptake in hydrothermal vent tubeworms facilitated by high environmental pCO_2 . *Nature* **362**:147-149.
- Childress, J.J. and C.R. Fisher. 1992. The biology of hydrothermal vent animals: physiology, biochemistry, and autotrophic symbioses. *Oceanography and Marine Biology: an Annual Review* **30**:337-441.

Coastal Marine Institute

JORDAN CLARK

Department of Geological Sciences
Program of Environmental Studies
University of California
Santa Barbara, CA

Projects: *Simulation of a Subsurface Oil Spill by a Hydrocarbon Seep (SSOS-HYS).*
Oil Slicks in the Ocean: Predicting their Release Points Using the Natural Laboratory of the Santa Barbara Channel.

Education: B.S. Yale University, New Haven, Connecticut 1988
M.A. Columbia University, New York City, New York 1991
Ph.D. Columbia University, New York City, New York 1995

Positions: 2002-present Associate Professor, Dept. of Geological Sciences and Program of Environmental Studies, University of California, Santa Barbara
1996-2002 Assistant Professor, Dept. of Geological Sciences and Program of Environmental Studies, University of California, Santa Barbara
1995 -1996 Post-doctoral Fellowship, Isotope Hydrology Group, Lawrence Livermore National Laboratory
1989-1995 Graduate Research Assistant, Columbia University

Selected Publications:

- Avisar, D. and J.F. Clark. Evaluating ground water flow beneath an artificial recharge pond using sulfur hexafluoride. *Environmental and Engineering Geoscience*. (submitted).
- Cook, P.G., T. Stieglitz and J.F. Clark. Quantifying groundwater discharge to the Burdekin River, northeastern Australia, using dissolved gas tracers 222Rn and SF6. *Water Resources Research*. (submitted).
- Clark, J.F. and T. Stieglitz. 2.2.2 Isotope and Tracer Techniques. In: *Submarine Groundwater*, ed. Zektser, I., Lewis Press (submitted).
- Rademacher, L.K., J.F. Clark, D.W. Clow, and G.B. Hudson. 2005. Old groundwater influence on stream hydrochemistry and catchment response in a small Sierra Nevada catchment: Sagehen Creek, California. *Water Resources Research* **41**:W02004, doi:10.1029/2003WR002805.
- Clark, J.F., G.B. Hudson, and D. Avisar. 2005. Gas transport below artificial recharge ponds: Insights from dissolved noble gases and a dual gas (SF6 and 3He) tracer experiment. *Environmental Science and Technology* **39**:3939-3945.
- Washburn, L., J.F. Clark, and P. Kyriakidis. 2005. The spatial scales, distribution, and intensity of natural marine hydrocarbon seeps near Coal Oil Point, California. *Marine and Petroleum Geology* **22**:569-578.
- Luyendyk, B.P., J.P. Kennett, and J.F. Clark. 2005. Hypothesis for increased atmospheric methane input from hydrocarbon seeps on exposed continental shelves during glacial low sea level. *Marine and Petroleum Geology* **22**:591-596.
- Clark, J. F., G.B. Hudson, M.L. Davisson, G. Woodside, and R. Herndon. 2004. Geochemical imaging of flow near an artificial recharge facility, Orange County, CA. *Ground Water* **42**:167-174.
- Cook, P.G., T. Stieglitz, and J.F. Clark. 2004. Groundwater discharge from the Burdekin Floodplain aquifer, North Queensland. CSIRO Land and Water Technical Report N. **26**(04), 118 p.
- Leifer, I., J.R. Boles, B.P. Luyendyk, and J.F. Clark. 2004. Transient discharges from marine hydrocarbon seeps: Spatial and temporal variability. *Environmental Geology* **46**:1038-1052.

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- Rademacher, L.K., J.F. Clark, and J.R. Boles. 2003. Groundwater residence times and flow paths in fractured rock determined using environmental tracers in the Mission Tunnel; Santa Barbara County, California, USA. *Environmental Geology* **43**:557-567.
- Thomas, J.M., M. Stute, J.F. Clark, and G. B. Hudson. 2003. Noble gas loss may indicate groundwater flow across flow barriers in southern Nevada. *Environmental Geology* **43**:568-579.
- Clark, J.F. 2003. Application of geochemical tracers for flow characterization near artificial recharge operations. Proceedings of the 11th Biennial Symposium on Groundwater Recharge.
- Avisar, D. and J.F. Clark. 2003. A gas tracer study in the El-Rio spreading ponds, Ventura County, California. Proceedings of the 11th Biennial Symposium on Groundwater Recharge.
- Fram, M.S., B.A. Bergamaschi, K.D. Goodwin, R. Fujii, and J. F. Clark. 2003. Processes affecting the trihalomethane concentrations associated with the third injection, storage, and recovery test at Lancaster, Antelope Valley, California, March 1998 through April 1999. Water-Resources Investigations Report 03-4062, 72 p.
- Clark, J.F., I. Leifer, L. Washburn, and B.P. Luyendyk. 2003. Compositional changes in natural gas bubble plumes: Observations from the Coal Oil Point Seep Field. *Geo Marine Letters* **23**:187-193.
- Leifer, I., J.F. Clark, B. Luyendyk, and D. Valentine. 2003. Identifying future directions for subsurface hydrocarbon migration research. *EOS* **84**:364-371.
- Aeschbach-Hertig, W., M. Stute, J.F. Clark, R. Reuter, and P. Schlosser. 2002. A paleotemperature record derived from dissolved noble gases in groundwater of the Aquia Aquifer (Maryland, USA). *Geochimica et Cosmochimica Acta* **66**:797-817.
- Boles, J.R., J.F. Clark, I. Leifer, and L. Washburn. 2002. Temporal variation in natural methane seep rate due to tides, Coal Oil Point area, California. *Journal of Geophysical Research* **106**: 27,077-27,086.
- Rademacher, L.K., J.F. Clark, and G.B. Hudson. 2002. Temporal changes in stable isotope composition of spring waters: Implications for recent changes in climate and atmospheric circulation. *Geology* **20**:139-142.
- Clark, J.F. and G.B. Hudson. 2001. Tracing hydrothermal fluids in hypersaline Mono Lake using helium isotopes. *Limnology and Oceanography* **46**:189-196.
- Gamlin, J.D., J.F. Clark, G. Woodside, and R. Herndon. 2001. Tracing groundwater flow patterns in an area of artificial recharge using sulfur hexafluoride. *Journal of Environmental Engineering ASCE* **127**:171-174.
- Rademacher, L.K., J.F. Clark, G.B. Hudson, D.C. Erman, and N.A. Erman. 2001. Chemical evolution of shallow groundwater as recorded by springs, Sagehen basin, Nevada County California. *Chemical Geology* **179**:37-51.
- Clark, J.F., L. Washburn, J.S. Hornafius, and B.P. Luyendyk. 2000. Dissolved hydrocarbon flux from natural marine seeps to the southern California Bight. *Journal of Geophysical Research* **105**(11):509-11,522.
- Leifer, I., J.F. Clark, and R.F. Chen. 2000. Modifications of the local environment by natural marine hydrocarbon seeps. *Geophysical Research Letters* **27**:3711-3714.
- Macfarlane, P.A., J.F. Clark, M.L. Davisson, G.B. Hudson, and D.O. Whittemore. 2000. Late Quaternary ground water recharge in the central Great Plains from geochemical tracers in shallow ground water. *Quaternary Research* **53**:167-174.
- Quigley, D.C., J.S. Hornafius, B.P. Luyendyk, R.D. Francis, J.F. Clark, and L. Washburn. 1999. Decrease in natural marine hydrocarbon seepage near Coal Oil Point, California associated with offshore oil production. *Geology* **27**:1047-1050.

Coastal Marine Institute

JENIFER E. DUGAN

Marine Science Institute
University of California
Santa Barbara, CA

Projects: *Joint UCSB-MMS Pacific OCS Student Internship and Trainee Program*
Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine
Natural Products
Habitat Value of Shell Mounds to Ecologically and Commercially Important Benthic Species

Education: A.A. Liberal Arts, De Anza Junior College, Cupertino, CA 1977
B.A. Aquatic Biology, University of California, Santa Barbara 1980
Ph.D. Biology, University of California, Santa Barbara 1990

Positions: 2003-present Associate Research Biologist, Marine Science Institute, University of California, Santa Barbara
2002-present Science Coordinator, Santa Barbara Coastal Long Term Ecological Research Program UC Santa Barbara
2000-present Deputy Director, Coastal Marine Institute, UC Santa Barbara
1991-2004 Lecturer, Environmental Studies Program and Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1995-2003 Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara
1990-1995 Postdoctoral Researcher, Marine Science Institute, University of California, Santa Barbara
1994 Postdoctoral Fellow, Department of Marine Science, University of Otago, New Zealand
1993 Postdoctoral Fellow, Department of Zoology, University of Port Elizabeth, Republic of South Africa
1988-1993 Marine Biologist, Cooperative Park Science Unit, University of California, Davis, Channel Islands National Park, Ventura, CA

Selected Publications:

- Page, H. M., J. E. Dugan, C. C. Culver, and J. Hoesterey. 2006. Exotic invertebrate species on offshore oil platforms. *Marine Ecology Progress Series* *In press*.
- Dugan, J. E. and D. M. Hubbard. 2006. Ecological responses to coastal armoring on exposed sandy beaches. *Shore and Beach* **74**(1): 10-16.
- Dugan, J. E., D. M. Hubbard, H. M. Page. 2005. Ecological effects of grooming on exposed sandy beaches in Southern California. Pp. 824-826 In: *California and The World Ocean '02: Revisiting and Revising California's Ocean Agenda: proceedings of the conference*. O. T. Magoon, H. Converse, B. Baird, B. Jines, M. Miller-Henson (eds.). ASCE
- Culver, C., H. M. Page, J. E. Dugan. 2005. Oil and gas platforms: sources for marine natural products. *Global Aquaculture Advocate* Vol **8**(3): 60-61
- Bram, J.B., H.M. Page and J.E. Dugan. 2005. Spatial and temporal variability in early successional patterns of an invertebrate assemblage at an offshore oil platform. *Journal of Experimental Marine Biology and Ecology* **317**:223-237.
- Dugan, J.E., D.M. Hubbard, E. Jaramillo, H. Contreras and C. Duarte. 2004. Competitive interactions in macroinfaunal animals of exposed sandy beaches. *Oecologia* **139**(4):630-640.

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- Bomkamp, R., H.M Page and J.E. Dugan. 2004. Role of food subsidies and habitat structure in influencing benthic communities of shell mounds at sites of existing and former offshore oil platforms. *Marine Biology* 1432-1793 (Online) DOI: 10.1007/s00227-004-1413-8.
- Dugan, J.E. and D. Hubbard. 2004. Southern New Zealand Beaches *in* Natural History of Southern New Zealand. Darby, J. and W. Harrex (editors) University of Otago Press and the Otago Museum, Dunedin, New Zealand. 400 pp.
- Dugan, J.E., D.M. Hubbard, M. McCrary, and M. Pierson. 2003. The response of macrofauna communities and shorebirds to macrophyte wrack subsidies on exposed sandy beaches of southern California. *Estuarine and Coastal Shelf Science* **56** (in press)
- Hubbard, D.M., and J.E. Dugan. 2003. Shorebird use of an exposed sandy beach in southern California. *Estuarine and Coastal Shelf Science* **56** (in press)
- Lastra, M., J.E. Dugan, and D.M. Hubbard. 2002. Burrowing and swash behavior of the Pacific mole crab, *Hippa pacifica* (Anomura, Hippidae) on tropical sandy beaches. *Journal of Crustacean Biology* **22**:53-58.
- Dugan, J.E., D.M. Hubbard, and M. Lastra. 2000. Burrowing abilities and swash behavior of three crabs, *Emerita analoga* Stimpson, *Blepharipoda occidentalis* Randall and *Lepidopa californica* Efford (Anomura, Hippoidea), of exposed sandy beaches. *Journal of Experimental Marine Biology and Ecology* **255**(2):229-245.
- Dugan, J.E., D.M. Hubbard, J.M. Engle, D.L. Martin, D.M. Richards, G.E. Davis, K.D. Lafferty, and R.F. Ambrose. 2000. Macrofauna communities of exposed sandy beaches on the Southern California mainland and Channel Islands. Fifth California Islands Symposium, OCS Study, MMS 99-0038:339-346.
- Jaramillo, E., J. Dugan, and H. Contreras. 2000. Abundance, tidal movement, population structure and burrowing rate of *Emerita analoga* (Anomura, Hippidae) at a dissipative and a reflective sandy beach in south central Chile. *Mar Ecol-P S Z N I* **21**(2):113-127 AUG 2000
- Barron, M.G., T. Podrabsky, R.S. Ogle, J.E. Dugan, J.E. 1999. Sensitivity of the sand crab *Emerita analoga* to a weathered oil. *Bulletin of Environmental Contamination and Toxicology* **62**:469-475.
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- Dugan, J.E., D.M. Hubbard, and H.M. Page. 1995. Scaling population density to body size: tests in two soft sediment intertidal communities. *Journal of Coastal Research* **11**:849-857.
- Jamarillo, E., A. McLachlan, and J. Dugan. 1995. Total sample area and estimate of species richness in exposed sandy beaches. *Marine Ecology Progress Series*. **119**:311-314.

Coastal Marine Institute

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Projects: *Application of Coastal Ocean Dynamics Radars for Observation of Near-Surface Currents off the South-Central California Coast*
Observing the Surface Circulation Along the South-Central California Coast Using High Frequency Radar: Consequences for Larval and Pollutant Dispersal
Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine Natural Products

Education: B.S. Biology, University of California, Irvine 1977
Ph.D. Ecology, Oregon State University 1982

Positions: 1997-present Director, Marine Science Institute, University of California, Santa Barbara
1994-present Associate Professor, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA
1993-1994 Associate Professor, Brown University, Providence, RI
1987-1993 Assistant Professor, Brown University, Providence, RI
1986-1987 Research Associate, Brown University, Providence, RI
1982-1986 Postdoctoral Fellow, Stanford University, Stanford, CA

Selected Publications:

- Kinlan, B. and S.D. Gaines. 2003. A comparative analysis of dispersal scales in marine and terrestrial systems. *Ecology*. In press.
- Gaines, S.D., B. Gaylord, and J. Largier. 2003. Avoiding current oversights in marine reserve design. *Ecological Applications* **13**(1): 532-546.
- Allison, G., S. Gaines, J. Lubchenco, and H. Possingham. 2003. Ensuring persistence of marine reserves: Catastrophes require adopting an insurance factor. *Ecological Applications* **13**(1): s8-s24.
- Gerber, L.R., S.J. Andelman, L.W. Botsford, S.D. Gaines, A. Hastings, S.R. Palumbi, and H.P. Possingham. 2003. Population models for marine reserve design: A retrospective and prospective synthesis. *Ecological Application* **13**(1): s47-s64.
- Lubchenco, J., S. Palumbi, S.D. Gaines, and S. Andelman. 2003. Plugging a hole in the ocean: an introduction to the special feature on marine reserves. *Ecological Applications* **13**(1): s3-s7.
- Blanchette, C.A., B.G. Miner, and S.D. Gaines. 2002. Geographic variability in form, size and survival of *Egria menziesii* around Point Conception, California. *Marine Ecology Progress Series* **239**:69-82.
- Phillips, N.E. and S.D. Gaines. 2002. Spatial and temporal variability in size at settlement of intertidal *mytilid* mussels from around Pt. Conception, California. *Invertebrate Reproduction Development* **41**(1-3):171-177.
- Sagarin, R.D. and S.D. Gaines. 2002. Geographical abundance distributions of coastal invertebrates: using one-dimensional ranges to test biogeographic hypotheses. *Journal of Biogeography* **29**(8):985-997.
- Sagarin, R.D. and S.D. Gaines. 2002. The 'abundant centre' distribution: to what extent is it a biogeographical rule? *Ecology Letters* **5**(1):137-147.
- Sax, D.F., S.D. Gaines, and J.H. Brown. 2002. Species invasions exceed extinctions on islands worldwide: A comparative study of plants and birds. *American Naturalist* **160**(6):766-783.
- Botsford, L.W., A. Hastings, and S.D. Gaines. 2001. Dependence of sustainability on the configuration of marine reserves and larval dispersal distance. *Ecology Letters* **4**(2):144-150.

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- Broitman, B.R., S.A. Navarrete, F. Smith, and S.D. Gaines. 2001. Geographic variation of southeastern Pacific intertidal communities. *Marine Ecology Progress Series* **224**:21-34.
- Wares, J.P., S.D. Gaines, and C.W. Cunningham. 2001. A comparative study of asymmetric migration events across a marine biogeographic boundary. *Evolution* **55**(2):295-306.
- Gaylord, B. and S.D. Gaines. 2000. Temperature or transport? Range limits in marine species mediated solely by flow. *American Naturalist* **155**(6):769-789.
- Taylor, P.H. and S.D. Gaines. 1999. Can Rapoport's rule be rescued? Modeling causes of the latitudinal gradient in species richness. *Ecology* **80**(8):2474-2482.
- Bertness, M.D., S.D. Gaines, and S.M. Yeh. 1998. Making mountains out of barnacles: the dynamics of hummock formation. *Ecology* **79**:1382-1394.
- Hacker, S. and S.D. Gaines. 1997. Some implications of direct positive interactions for community species diversity. *Ecology* **78**:1990-2003.
- Worcester, S. and S.D. Gaines. 1997. Quantifying hermit crab recruitment rates and larval shell selection on wave swept shores. *Marine Ecology Progress Series* **157**:307-310.
- Bertness, M., S.D. Gaines, and R. Wahle. 1996. Wind-driven settlement patterns in the acorn barnacle, *Semibalanus balanoides*. *Marine Ecology Progress Series* **137**:103-110.
- Gaines, S.D. 1995. Modeling the dynamics of marine species: the importance of incorporating larval dispersal. Pages 389-423 in *Ecology of Marine Invertebrate Larvae*, L. McEdward, editor. CRC Press.
- Gaines, S.D. and M. Bertness. 1994. Does variable transport general variable settlement in coastal and estuarine species? Pages 315-322 in *Changes in Fluxes in Estuaries: Implications from Science to Management*, K. Dyer and R. Orth, editors. Olsen and Olsen Press, London, England.
- Rice, W.R. and S.D. Gaines. 1994. Extending nondirectional heterogeneity tests to evaluate simply ordered alternative hypotheses. *Proceedings of the National Academy of Sciences* **91**:225:226.
- Rice, W.R. and S.D. Gaines. 1994. Heads I win, tails you lose: testing directional alternative hypotheses in ecological and evolutionary research. *Trends in Ecology and Evolution* **9**:235-237.
- Rice, W.R. and S.D. Gaines. 1994. The ordered-heterogeneity test. *Biometrics* **50**:1-7.
- Sanford, E., E. Bermudez, M. Bertness, and S.D. Gaines. 1994. Flow, food supply, and the population dynamics of acorn barnacles. *Marine Ecology Progress Series* **104**:49-62.
- Bertness, M. and S.D. Gaines. 1993. Larval dispersal and local adaptation in acorn barnacles. *Evolution* **47**:316-320.
- Gaines, S.D. and M. Bertness. 1993. The dynamics of juvenile dispersal: Why field ecologists must integrate. *Ecology* **74**:2430-2435.
- Gaines, S.D. and M. Denny. 1993. The largest, smallest, highest, lowest, longest, and shortest: Extremes in ecology. *Ecology* **74**:1677-1692.
- Rice, W.R. and S.D. Gaines. 1993. Calculating P-values for ANOVA with unequal variances. *Journal of Statistical Computation and Simulation* **46**:19-22.
- Bertness, M., S.D. Gaines, E. Stephens, and P. Yund. 1992. Components of recruitment in populations of the acorn barnacle *Semibalanus balanoides*. *Journal of Experimental Marine Biology and Ecology* **156**:199-215.

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Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine
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Education: B.A. Botany & Biology, University of California, Berkeley, CA 1983
Ph.D. Botany, University of California, Berkeley, CA 1990

Positions: 2000-Present Associate Professor, Department of Ecology, Evolution and Marine Biology,
University of California, Santa Barbara, CA
1995-2000 Assistant Professor, Department of Ecology, Evolution and Marine Biology,
University of California, Santa Barbara, CA
1993-1995 Postdoctoral Associate, Departments of Botany and Genetics, University of
Georgia, Athens, GA
1992 Research Associate, Department of Genetics, University of Georgia, Athens, GA
1991 Visiting Assistant Professor of Biology, Bernard College, Columbia University,
New York, NY
1983-1990 Research Associate, Research Associate, Teaching Assistantship at UC Berkeley

Awards and Honors:

2004 George Saul Lecturer, Middlebury College
1998 UCSB nominee for Packard Fellowship
1997 Regents' Junior Faculty Fellowship
1996 Regents' Junior Faculty Fellowship
1996-2000 White Mountain Research Station, Faculty Fellowship
1994 Menzel Award, Genetics Section, Botanical Society of America
1988 Distinguished Instructor, University of California, Berkeley
1987-88 Regents Fellowship, University of California, Berkeley

Selected Publications:

- Whittall, J.B. and S.A. Hodges. Speciation and floral evolution in the North American *Aquilegia*: inferences from an AFLP phylogeny. (In preparation)
- Hawkins, A, D.D. Kaska and S.A. Hodges. Genetic differentiation within and among islands in paleo-endemic California Island Ironwood, *Lyonothamnus floribundus*. (In preparation)
- Whittall, J.B., C. Voelckel and S.A. Hodges. Convergence of floral color among species of *Aquilegia*: Gene expression patterns in the anthocyanin biosynthetic pathway. (In preparation)
- Whittall, J.B., A. Medina-Marino, E.A. Zimmer and S.A. Hodges. Generating single-copy nuclear gene data in a recent adaptive radiation. Submitted to *Molecular Phylogenetics and Evolution*. (submitted)
- Tucker, S.C. and S.A. Hodges 2005. Floral ontogeny of *Aquilegia*, *Semiaquilegia* and *Enemion* (Ranunculaceae). *International Journal of Plant Sciences* **166**(4):557-574.
- Hodges, S.A. 2005. One begets two. Review of *Speciation*, by J. A. Coyne and H. A. Orr. *American Journal of Botany* **92**(7):1215-1218.
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- Taylor, D.L., T.D. Bruns, and S.A. Hodges. 2004. Evidence for mycorrhizal races in a cheating orchid. *Proceedings of the Royal Society of London, Series B* **271**:35-43.
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- Taylor, D.L., T.D. Bruns, T.M. Szaro, and S.A. Hodges. 2003. Divergence in mycorrhizal specialization within *Hexalectris spicata* (Orchidaceae), a non-photosynthetic desert orchid. *American Journal of Botany* **90**:1168-1179.
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- Yang, J. B.A. Counterman, C.G. Eckert and S.A. Hodges. Microsatellite markers for evolutionary studies in *Aquilegia*. *Molecular Ecology Notes* **5**:317-320.
- Hodges, S.A., J.B. Whittall, M. Fulton, and J.Y. Yang. 2002. Genetics of floral traits influencing reproductive isolation between *Aquilegia Formosa* and *A. pubescens*. *American Naturalist* **159**: S51-S60.
- Bushakra, J.M., S.A. Hodges, J.B. Cooper, and D.D. Kaska. 1999. The extent of clonality and genetic diversity in the Santa Cruz Island Ironwood *Lyonothamnus floribundus*. *Molecular Ecology* **8**:471-476 (cover photo).
- Fulton, M. and S.A. Hodges. 1999. Floral isolation between *Aquilegia formosa* and *A. pubescens*. *Proceedings of the Royal Society of London, Series B* **266**:2247-2252
- Baker, H.G., I. Baker, and S.A. Hodges. 1998. Sugar composition of nectars and fruits consumed by birds and bats in the tropics and subtropics. *Biotropica* **30**:559-586.
- Hodges, S.A. 1997. A rapid adaptive radiation via a key innovation in *Aquilegia*. Pages 391-405. in *Molecular evolution and adaptive radiations..* T. Givinish and K. Sytsma editors. Cambridge University Press, Cambridge.
- Hodges, S.A. 1997. Floral nectar spurs and diversification. *International Journal of Plant Sciences* **158**:S81-S88.
- Carney, S.E., S.A. Hodges, and M.L. Arnold. 1996. Effects of differential pollen-tube growth on hybridization in the Louisiana irises. *Evolution* **47**:1432-1445.
- Emms, S.K., S.A. Hodges, and M.L. Arnold. 1996. Pollen-tube competition, siring success and consistent asymmetric hybridization in the Louisiana irises. *Evolution* **50**:2201-2206.
- Hodges, S.A., J. Burke, and M.L. Arnold. 1996. Natural formation of iris hybrids: experimental evidence on the establishment of hybrid zones. *Evolution* **47**:2504-2509
- Arnold, M.L. and S.A. Hodges. 1995. Are natural hybrids fit or unfit relative to their parents? *Trends in Ecology and Evolution* **10**:67-70.
- Arnold, M.L. and S.A. Hodges. 1995. The fitness of Hybrids - A response to Day and Schluter. *Trends in Ecology and Evolution* **10**:289.
- Hodges, S.A. 1995. The influence of nectar production on hawkmoth behavior, self pollination and seed production in *Mirabilis multiflora* (Nyctaginaceae). *American Journal of Botany* **82**:197-229.

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Education: B.A. Biology, Smith College 1970
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Positions: 1987-present Professor, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1981-87 Associate Professor, Department of Biological Sciences, University of California, Santa Barbara
1975-81 Assistant Professor, Department of Biological Sciences, University of California, Santa Barbara

Selected Publications:

- Holbrook, S.J. and R.J. Schmitt. 2005. Growth, reproduction and survival of a tropical sea anemone (actiniaria): benefits of hosting anemonefish. *Coral Reefs* (in press).
- Bull, J.S., D.C. Reed, and S. J. Holbrook. 2004. An experimental evaluation of different methods of restoring *Phyllospadix torreyi* (Surfgrass). *Restoration Ecology* **12**:70-79.
- Holbrook, S. J. and R. J. Schmitt. 2004. Population dynamics of a damselfish: effects of a competitor that also is an indirect mutualist. *Ecology* **85**:979-985.
- Schmitt, R. J. and S. J. Holbrook. 2003. Mutualism can mediate competition and promote coexistence. *Ecology Letters* **6**:898-902.
- Bernardi, G., S.J. Holbrook, R.J. Schmitt, and N.L. Crane. 2003. Genetic evidence for two distinct clades in a French Polynesian population of the coral reef three-spot damselfish *Dascyllus trimaculatus*. *Marine Biology* **143**:485-490.
- Holbrook, S.J. and R. J. Schmitt. 2003. Spatial and temporal variation in mortality of newly settled damselfish: patterns, causes and co-variation with settlement. *Oecologia* **135**:532-541.
- Bernardi, G., S.J. Holbrook, R.J. Schmitt, N.L. Crane, and E. DeMartini. 2002. Species boundaries, populations, and color morphs in the coral reef three-spot damselfish (*Dascyllus trimaculatus*) species-complex. *Proceedings of the Royal Society of London B* **269**(1491):599-605.
- Bolker, B.M., C.M. St.Mary, C.W. Osenberg, R.J. Schmitt, and S.J. Holbrook. 2002. Management at a different scale: marine ornamentals and local processes. *Bulletin of Marine Science* **70**:733-748.
- Brooks, A.J., R.J. Schmitt, and S.J. Holbrook. 2002. Declines in regional fish populations: have species responded similarly to environmental change? *Marine and Freshwater Research* **53**(2):189-198.
- Holbrook, S.J. and R.J. Schmitt. 2002. Competition for shelter space causes density-dependent mortality in damselfishes. *Ecology* **83**:2855-2868.
- Holbrook, S.J., A. Brooks, and R.J. Schmitt. 2002. Predictability of fish assemblages on coral patch reefs. *Marine and Freshwater Research* **53**(2):181-188.
- Holbrook S.J., A.J. Brooks, and R.J. Schmitt. 2002. Variation in structural attributes of patch-forming corals and in patterns of abundance of associated fishes. *Marine Freshwater Research* **53**(7):1045-1053.

- Holbrook, S.J., D.C. Reed, and J.S. Bull. 2002. Survival experiments with outplanted seedlings of surfgrass (*Phyllospadix torreyi*) to enhance establishment on artificial structures. *ICES Journal of Marine Science* **59**:S350-S355 Supplement S.
- Osenberg, C.W., C.M. St.Mary, R.J. Schmitt, S.J. Holbrook, P. Chesson, and B. Byrne. 2002. Rethinking ecological inference: density-dependence in reef fishes. *Ecology Letters* **5**(6):715-721.
- Schmitt, R.J. and S.J. Holbrook. 2002. Correlates of spatial variation in settlement of two tropical damselfishes. *Marine and Freshwater Research* **53**(2):329-337.
- Schmitt, R.J. and S.J. Holbrook. 2002. Spatial variation in concurrent settlement of three damselfishes: relationships with near-field current flow. *Oecologia* **131**:391-401.
- Bernardi, G., S.J. Holbrook, and R.J. Schmitt. 2001. Gene flow in the coral reef three-spot dascyllus, *Dascyllus trimaculatus*, at three spatial scales. *Marine Biology* **138**:457-465
- Holbrook, S.J., G.E. Forrester, and R.J. Schmitt. 2000. Spatial patterns in abundance of a damselfish reflect availability of suitable habitat. *Oecologia* **122**(1):109-120.
- Holbrook, S.J., D.C. Reed, K. Hansen, et al. 2000. Spatial and temporal patterns of predation on seeds of the surfgrass *Phyllospadix torreyi*. *Marine Biology* **136**(4):739-747.
- Schmitt, R.J. and S.J. Holbrook. 2000. Habitat-limited recruitment of coral reef damselfish. *Ecology* **81**(12):3479-3494.
- Blanchette, C.A., S. Worcester, D. Reed, and S.J. Holbrook. 1999. Algal morphology, flow and spatially variable recruitment of surfgrass, *Phyllospadix torreyi*. *Marine Ecology Progress Series* **184**:119-128.
- Holbrook, S.J. and R.J. Schmitt. 1999. *In situ* nocturnal observations of reef fishes using infrared video. In: Proc. 5th Indo-Pac. Fish Conf., Nouméa, 1997 (Séret B. & J.-Y. Sire, eds), pp. 805-812. Paris: Soc. Fr. Ichtyol.
- Holbrook, S.J., G.E. Forrester, and R.J. Schmitt. 1999. Spatial patterns in abundance of a damselfish reflect availability of suitable habitat. *Oecologia*.
- Schmitt, R.J. and S.J. Holbrook. 1999. Mortality of juvenile damselfish: implications for assessing processes that determine abundance. *Ecology* **80**:35-50.
- Schmitt, R.J. and S.J. Holbrook. 1999. Settlement and recruitment of three damselfish species: larval delivery and competition for shelter space. *Oecologia* **118**:76-86.
- Schmitt, R.J. and S.J. Holbrook. 1999. Temporal patterns of settlement of three species of damselfish of the genus *Dascyllus* (*Pomacentridae*) in the coral reefs of French Polynesia. In: Proc. 5th Indo-Pac. Fish Conf., Nouméa, 1997 (Séret B. & J.-Y. Sire, eds), pp. 537-551. Paris: Soc. Fr. Ichtyol.
- Schmitt, R.J., S.J. Holbrook, and C.W. Osenberg. 1999. Quantifying the effects of multiple processes on local abundance: A cohort approach for open populations. *Ecology Letters* **2**:294-303.
- Holbrook, S.J. and R.J. Schmitt. 1998. Have field experiments aided in the understanding of abundance and dynamics of reef fishes? Pages 152-169 in *Issues and Perspectives in Experimental Ecology*, W.J. Resetarits and J. Bernado editors. Oxford University Press, Oxford, England.
- Reed, D.C., S.J. Holbrook, E. Solomon, and M. Anghera. 1998. Studies on germination and root development in the surfgrass *Phyllospadix torreyi*: Implications for habitat restoration. *Aquatic Botany* **62**:71-80.

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Ph.D. Pharmacology, Stritch School of Medicine, Loyola University, Chicago, IL 1971

Positions: 1995-Present Professor of Pharmacology, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, CA
1982-1995 Professor of Pharmacology, Department of Biological Sciences, University of California, Santa Barbara, CA
1978-1982 Associate Professor of Pharmacology, Department of Biological Sciences, University of California, Santa Barbara, CA
1974-1978 Assistant Professor of Pharmacology, Department of Biological Sciences, University of California, Santa Barbara, CA
1971-1974 Assistant Professor of Pharmacology, Department of Pharmacology, Stritch School of Medicine, Loyola University, Chicago, IL

Selected Publications:

- Ross, C., V. Vreeland, J.H. Waite, and R.S. Jacobs. 2005. Rapid assembly of a wound plug: stage one of two stage wound repair mechanism in the giant unicellular chlorophyte *Dasycladus vermicularis*. *Journal of Phycology* **40**(1):46-54.
- Madari, H. and R.S. Jacobs. 2004. An ethnopharmacological study of medicinal plant extracts used in ancient Persian medicinal formulations. *Journal of Natural Products* **67**(8):1204-1210.
- Mydlarz, L.D. and R.S. Jacobs. 2004. Inducible oxidative burst in dinoflagellates and inhibition by the marine natural products, the pseudopterosins. *Phytochemistry* **65**:3231-3241.
- Santiago-Vazquez, L., L.D. Mydlarz, R.S. Jacobs, and J.G. Pavlovich. 2004. Identification of hydroxyl fatty acids by liquid chromatography-atmospheric pressure chemical ionization mass spectrometry in *Euglena gracilis*. *Journal of Chromatography B*. **803**:233-236.
- Ata, A., R.G. Kerr, C.E. Moya, and R.S. Jacobs. 2003. Identification of anti-inflammatory diterpenes from the marine gorgonian *Pseudopterogorgia elisabethae*. *Tetrahedron* **59**:4215-4222.
- Madari, H., D. Panda, L. Wilson, and R.S. Jacobs. 2003. Dicummarol: A unique microtubule stabilizing natural product that is synergistic with taxol. *Cancer Research* **63**:1214-1220.
- Mydlarz, L.D., R.S. Jacobs, J. Bohnlein, and R.G. Kerr. 2003. Pseudopterosin biosynthesis in *Symbiodinium* sp., the dinoflagellate symbiont of *Pseudopterogorgia elisabethae*. *Chemistry and Biology* **10** (Nov.):11.
- Stevenson, C.S., E.A. Capper, A.K. Roshak, B. Marquez, C. Eichman, J.R. Jackson, M. Mattern, W.H. Gerwick, R.S. Jacobs, and L.A. Marshall. 2002. The identification and characterization of the marine natural product scytonemin as a novel antiproliferative pharmacophore. *Journal of Pharmacology and Experimental Therapeutics* **303**(2):858-866.
- Stevenson, C.S., E.A. Capper, A.K. Roshak, B. Marquez, K. Grace, W.H. Gerwick, R.S. Jacobs, and L.A. Marshall. 2002. Scytonemin - a marine natural product inhibitor of kinases key in hyperproliferative inflammatory diseases. *Inflammation Research* **51**(2):112-114.

- Bemis, D.L., V. Roussis, C. Vagias, and R.S. Jacobs. 2000. Chloroplast fatty acid composition in Mediterranean populations of the marine Chlorophyte, *Anadyomene stellata*. *Zeitschrift Fur Naturforschung C-A Journal of Biosciences* **55**(7-8):569-575.
- MacPherson, J.C. and R.S. Jacobs. 2000. An 18.5 kDa protein from the amebocyte of *Limulus polyphemus*, homologous to the previously described amebocyte aggregation factor, expresses alternative phospholipase A(2) activity. *Comparative Biochemistry and Physiology B* **127**(1):31-44.
- Mayer, A.M.S., W. Fenical, and R.S. Jacobs. 2000. The marine pseudopterosins modulate rat microglia superoxide and thromboxane generation. *FASEB Journal* **14**(8):266.
- Mayer, A.M.S., S. Oh, W. Fenical, and R.S. Jacobs. 1999. *Escherichia coli* LPS-primed rat brain microglia superoxide and thromboxane B-2 generation is inhibited by the marine pseudopterosins. *Shock* **11**:58 Suppl. 1.
- Pennings, S.C., V.J. Paul, D.C. Dunbar, M.T. Hamann, W.A. Lumbang, B. Novack, and R.S. Jacobs. 1999. Unpalatable compounds in the marine gastropod *Dolabella auricularia*: Distribution and effect of diet. *Journal of Chemical Ecology* **25**(4):735-755.
- Qureshi, A., C.S. Stevenson, C.L. Albert, R.S. Jacobs, and D.J. Faulkner. 1999. Homo- and nor-plakotenin, new carboxylic acids from the Palauan sponge *Plakortis lita*. *Journal of Natural Products* **62**(8):1205-1207 Aug 1999.
- MacPherson, J.C., J.G. Pavlovich, and R.S. Jacobs. 1998. Phospholipid composition of the granular amebocyte from the horseshoe crab, *Limulus polyphemus*. *Lipids* **33**(9):931-940.
- Mayer, A.M.S., P.B. Jacobson, W. Fenical, R.S. Jacobs, and K.B. Glaser. 1998. Pharmacological characterization of the pseudopterosins: Novel anti-inflammatory natural products isolated from the caribbean soft coral, *Pseudopterogorgia elisabethae*. *Life Sciences* **62**(26):401-7.
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- Williams, A.B. and R.S. Jacobs. 1993. A marine natural product, Patellamide D, reverses multidrug resistance in a human leukemic cell line. *Cancer Letters* **71**:97-102.

Coastal Marine Institute

EDWARD A. KELLER

Department of Environmental Studies
& Department of Geological Sciences
University of California
Santa Barbara, CA

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

Education:	B.S.	Mathematics, California State University, Fresno	1965
	B.A.	Geology, California State University, Fresno	1968
	M.S.	Geology, University of California	1969
	Ph.D.	Geology, Purdue University	1973

Positions:	1993-present	Chair of the Environmental Studies Program, University of California, Santa Barbara
	1976-present	Professor, Department of Geological Sciences, University of California, Santa Barbara
	1973-76	Asst. Professor, Department of Environmental Studies, University of North Carolina

Selected Publications:

- Keller, E.A. 2002. Introduction to Environmental Geology, second edition, Prentice Hall, Upper Saddle River, New Jersey.
- Keller, E.A., and N. Pinter. 2002. Active Tectonics, 2nd edition, Upper Saddle River. New Jersey, Prentice Hall.
- Keller, E.A. 2001. Environmental Geology, 8th Edition, Upper Saddle River, New Jersey, Prentice Hall.
- Keller, E.A., D.L. Johnson, D.L. Laduzinsky, D.B. Seaver, and T.L. Ku. 2000. Tectonic Geomorphology of Active Folding Over Buried Reverse Faults: San Emigdio Mountain Front, Southern San Joaquin Valley, California, *Geological Society of America Bulletin* **112**:86-97.
- Botkin, D.B. and E.A. Keller. 1999. Environmental Science, 3rd Edition, New York, John Wiley and Sons, Inc.
- Keller, E.A., L. Gurrola, and T.E. Tierney. 1999. Geomorphic criteria to determine direction of lateral propagation of reverse faulting and folding. *Geology* **27**:515-518.
- Botkin, D.B. and E.A. Keller. 1998. *Environmental Science*. New York, John Wiley and Sons. 649 p.
- Keller, E.A., R.L. Zepeda, T.K. Rockwell, T.L. Ku, *et al.* 1998. Active tectonics at Wheeler Ridge, Southern San Joaquin Valley, California. *Geological Society of America Bulletin* **110**:298-310.
- Pinter, N., S.B. Lueddecke, E.A. Keller, and K.R. Simmons. 1998. Late Quaternary slip on the Santa Cruz Island fault, California. *Geological Society of America Bulletin* **110**:711-722.
- Trecker, M.A., L.D. Gurrola, and E.A. Keller. 1998. Oxygen - isotope correlation of marine terraces and uplift of the Mesa hills, Santa Barbara, CA, USA. In: Stewart I.S. & Vita-Finzi, C.(eds) Coastal Tectonics. Geological Society, London, Special Publications 146:57-69 (invited contribution).
- Keller, E.A., D.W. Valentine, and D.R. Gibbs. 1997. Hydrological response of small watersheds following the Southern California Painted Cave Fire of June 1990. *Hydrological Processes* **11**:40-414.
- Keller, E.A. and N. Pinter. 1996. *Active Tectonics*. Englewood Cliffs, New Jersey, Prentice Hall Inc. 338 p.
- Keller, E.A. and H.A. Loaiciga. 1993. Fluid-pressure induced seismicity at regional scales. *Geophysical Research Letters* **20**(16):1683-1686.

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- Keller, E.A. and M.H. Capelli. 1993. Reply to discussion Ventura River flood of February 1992: A lesson ignored? *Water Resources Bulletin* **29**:873.
- Pinter, N. and E.A. Keller. 1993. Quaternary tectonic and topographic evolution of the northern Owens Valley. In the history of water: eastern Sierra Nevada, Owens Valley, White-Inno Mountains. *White Mountain Research Station Symposium* **4**:32-39.
- Keller, E.A. 1992. *Environmental Geology*, 6th ed. Macmillan Publishing Co., New York. 521 p.
- Keller, E.A. and M.H. Capelli. 1992. Ventura River flood of February 1992: A lesson ignored? *Water Resources Bulletin* **28**:813-832.
- Florsheim, J.L., E.A. Keller, and D.W. Best. 1991. Fluvial sediment transport in response to moderate storm flows following chaparral wildfire, Ventura County, southern California. *The Geological Society of America Bulletin* **103**:504-511.
- Keller, E.A., ed. 1991. *Active Folding and Reverse Faulting in the western Transverse Ranges, southern California*. Geol. Soc. Amer. Guidebook. Guidebook.
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- Zhao, E., E.A. Keller, and D.L. Johnson. 1991. Tectonic geomorphology of the Frazier Mountain area. In: E.A. Keller, ed., *Active Folding and Reverse Faulting in the Western Transverse Ranges, Southern California*. Geol. Soc. Amer. Guidebook, 1991 Annual Meeting. pp. 50-60.
- Johnson, D.L., E.A. Keller, and T.K. Rockwell. 1990. Dynamic pedogenesis: New views on some key soil concepts and a model for interpreting quaternary soils. *Quaternary Research* **33**:306-319.
- Keller, E.A. and G.M. Kondolf. 1990. Groundwater and fluvial processes: Selected observations with case studies by D.J. Hagerty and G.M. Kondolf. In: C.G. Higgins and D.R. Coates, eds., *Groundwater Geomorphology: The role of Subsurface Water in Earth-surface Process and Landforms*. Boulder, Colorado, *Geological Society of America Special Paper* 252.

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Projects: *Simulation of a Subsurface Oil Spill by a Hydrocarbon Seep (SSOS-HYS)*
Oil Slicks in the Ocean: Predicting their Release Points Using the Natural Laboratory of the Santa Barbara Channel

Education: B.S. Physics/ Astronomy, SUNY at Stony Brook, New York 1984
M.S. Aeronomy, University of Michigan 1989
Ph.D. Atmospheric Sciences, Georgia Institute of Technology 1995

Positions: 2003-Present Researcher III, Marine Science Institute and Chemical Engineering Department, University of California, Santa Barbara, CA.
2001-2003 Researcher I, Marine Science Institute and Chemical Engineering Department, University of California, Santa Barbara, CA.
1999-2001 Post Doctoral Researcher, Chemical Engineering Department, University of California, Santa Barbara, CA.
1998-1999 Visiting Scientist, TNO Physics and Electronics Laboratory, The Hague, The Netherlands.
1996-1999 Post Doctoral Researcher, Martin Ryan Institute of Marine Science, National University of Ireland, Galway, Ireland.

Selected Publications:

- Leifer I. and J. Boles. 2005. Measurement of marine hydrocarbon seep flow through fractured rock and unconsolidated sediment. *Marine Petroleum Geology* (in press).
- Leifer, I. and J. Boles. 2005. Turbine seep-tent measurements of marine hydrocarbon seep forcing on sub-hourly time scales. *Journal of Geophysical Research* (in press).
- Leifer I., T. Del Sontro, B. Luyendyk and K. Broderick. 2005. Time evolution of beach tar, oil slicks, and seeps in the Coal Oil Point seep field, Santa Barbara Channel, California. International Oil Spill Conference, May 15-19, 2005, Miami, FL, EIS Digital Publishing, 14718A.
- Leifer I., I and K. Wilson, J. Tarpley, R. Lewis, R. Imai, K. Mayer and C. Moore. 2004. Factors affecting marine hydrocarbon emissions in an area of natural seeps and abandoned oil wells - Summerland, California. International Oil Spill Conference, May 15-19, 2005, Miami, FL, EIS Digital Publishing, 14718A.
- Leifer, I., J. Boles, J.F. Clark and B.P. Luyendyk. 2004. The dynamic nature of marine hydrocarbon seepage. *Environmental Geology* **46**(8):1038-1052.
- La Montagne, G., I. Leifer, S. Bergmann, L.C. Van De Werfhorst and P.A. Holden. 2004. Bacterial diversity in marine hydrocarbon-seep sediments. *Environmental Microbiology* **6**(8):799-808.
- Clark, J.F., I. Leifer, L. Washburn and B.P. Luyendyk. 2003. Compositional changes in natural gas bubble plumes: observations from the Coal Oil Point marine hydrocarbon seep field. *Geo Marine Letters* **23**:187-193.
- Roy, L.A., S. Steinert, S.M. Bay, D. Greenstein, Y. Sapozhnikova, O. Bawardi, I. Leifer and D. Schlenk. 2003. Biochemical effects of petroleum exposure in hornyhead turbot (*Pleuronichthys verticalis*) exposed to a gradient of sediments collected from a natural petroleum seep in CA, USA. *Aquatic Toxicology* **65**(2):159-169.
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- Leifer, I., and I. MacDonald. 2003. Dynamics of the gas flux from shallow gas hydrate deposits: Interaction between oily hydrate bubbles and the oceanic environment. *Earth and Planetary Science Letters* **210(3/4)**:411-424.
- Leifer, I. and J. Clark. 2002. Modeling trace gases in hydrocarbon seep bubbles. Application to marine hydrocarbon seeps in the Santa Barbara Channel. *Russian Geology and Geophysics* **43(7)**:613-621.
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- Leifer, I. and R. Patro. 2002. The bubble mechanism for transport of methane from the shallow sea bed to the surface: A review and sensitivity study. *Continental Shelf Research* **22**:2409-2428.
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- Leifer, I. and G. De Leeuw. 2001. Bubble Measurements in Breaking-Wave Generated Bubble Plumes During the LUMINY Wind-Wave Experiment. In *Gas Transfer and Water Surfaces*, Eds. M. Donelan, W. Drennan, E.S. Salzman, and R. Wanninkhof, AGU Monograph **127**:303-309.
- Patro, R., I. Leifer, and P. Bowyer. 2001. Better bubble process modeling: Improved bubble hydrodynamics parameterisation. Pages **127**:315-320 in *Gas Transfer and Water Surfaces*, Editors M. Donelan, W. Drennan, E.S. Salzman, and R. Wanninkhof, AGU Monograph.
- Boles, J.R., J.F. Clark, I. Leifer, and L. Washburn. 2000. Temporal variation in natural methane seep rate due to tides, Coal Oil Point area, California. *Journal of Geophysical Research* **106(C11)**:27077-27086.
- Leifer, I., J. Clark, and R. Chen. 2000. Modifications of the local environment by a natural marine hydrocarbon seep, *Geophysical Research Letters* **27(22)**:3711-3714.
- Leifer, I., G. De Leeuw, and L.H. Cohen. 2000. Secondary bubble production from breaking waves: The bubble burst mechanism, *Geophysical Research Letters* **27(24)**:4077-4080.
- Leifer, I., R. Patro, and P. Bowyer. 2000. A study on the temperature variation of rise velocity for large clean bubbles. *Journal of Atmospheric and Oceanic Technology* **17(10)**:1392-1402.
- Asher, W.E., L.M. Karle, B.J. Higgins, P.J. Farley, I.S. Leifer, and E.C. Monahan. 1995. The effect of bubble plume size on the parameterization of air-seawater gas transfer velocities, Pages 205-216 in *Proceedings of the Third International Symposium on Air-Water Gas Transfer Meeting*, Editors B. Jähne and E.C. Monahan, Aeon Verlag, Hanau, Germany.
- Asher, W.E., L.M. Karle, B.J. Higgins, P.J. Farley, E.C. Monahan, and I.S. Leifer. 1995. The influence of bubble plumes on air-seawater gas transfer velocities, *Journal of Geophysical Research* **101**:12,027-12,041.

Coastal Marine Institute

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Bren School of Environmental Science and Management
University of California, Santa Barbara

Projects: *Ecological performance and trophic links: comparisons among platforms and natural reefs for selected fishes and their prey*
Relative importance of POCS oil platforms on the population dynamics of two reef fishes in the Eastern Santa Barbara Channel

Education: B.S. Conservation of Natural Resources, University of California, Berkeley 1986
M.S. Marine Sciences, Moss Landing Marine Laboratories, San Jose State University 1994
Ph.D. Marine Sciences, University of North Carolina at Chapel Hill 1996

Positions: 2002-Present Assistant Professor, Donald Bren School of Environmental Science and Management, UCSB
2001-2002 Assistant Research Biologist II, UCSB
2001 Fishery Biologist, NOAA-National Marine Fisheries Service
1998-2000 Postdoctoral Research, NSF, Office of Polar Programs
1996-1997 Postdoctoral Research Associate, NRC, NOAA-National Marine Fisheries Service, Beaufort, NC
1992-1996 Research assistant, Institute of Marine Sciences, University of North Carolina at Chapel Hill, NC
1988-1992 Research assistant, Moss Landing Marine Laboratories, Moss Landing, CA

Grants and Awards:

2002-2004 US Minerals Management Service
1999-2000 National Geographic Society
1997-2000 National Science Foundation
1996-1997 National Marine Fisheries Service

Selected Publications:

- Lenihan, H.S. and M. Adjeroud. Physical-biological coupling on coral reefs: current flow reduces coral bleaching and mortality. *Oecologia* (submitted).
- Powers, S.P., C.H. Peterson, J.H. Grabowski and H.S. Lenihan. The realities of native oyster restoration and why the myth of failure intensifies a conservation crisis. *Restoration Ecology* (submitted).
- Griffiths, J., M.N. Dehtier, A. Newsom, J.E. Byers, J.J. Myers, F. Oyarzun and H.S. Lenihan. Infaunal Responses to Recreational Clam Digging. *Marine Biology* (submitted).
- Lenihan, H.S., S. Mills, L.S. Mullineaux, F. Micheli, C.R. Fisher and C.H. Peterson. Biotic interactions at hydrothermal vents: negative density-dependent recruitment in mussels beds. *Oecologia* (submitted).
- Peterson, C.H. and H.S. Lenihan. Ecological impacts of dredge spoil discharge on a sandy bottom community. *Coastal Research* (submitted).
- Lenihan, H. S. and C.H. Peterson. 2005. Conserving oyster reef habitat by switching from dredging and tonging to diver hand-harvesting. *Fishery Bulletin* **102**:298-305.
- Sancho, G., C.R. Fisher, S.F. Mills, F. Micheli, G.A. Johnson, H.S. Lenihan, C.H. Peterson and L.S. Mullineaux. 2005. Selective predation by the zoarcid fish *Thermarces cerberus* at hydrothermal vents. *Deep Sea Research* **52**:837-844.
- Conlan, K. E., S.L. Kim, H.S. Lenihan, and J.S. Oliver. 2004. Benthic changes during 10 years of organic enrichment by M^cMurdo Station, Antarctica. *Marine Pollution Bulletin* **49**:43-60.

- Lenihan, H.S. and C.H. Peterson. 2004. Conserving oyster reef habitat by switching from dredging and tonging to diver hand-harvesting. *Fishery Bulletin* **102**:298-305.
- Conlan, K.E., S.L. Kim, H.S. Lenihan, and J.S. Oliver. 2003. Benthic community changes at McMurdo Station, a response to sewage abatement? in A.H.L. Huiskes, W.W.C. Gieskes, J. Rozema, R. M. L. Schorno, S. M. van der Vies & W. J. Wolff (editors) Antarctic biology in a global context. Leiden, Netherlands: Backhuys Publishers.
- Lenihan, H.S., C.H. Peterson, S.L. Kim, K.E. Conlan, R. Fairey, C. McDonald, J.H. Grabowski and J. S. Oliver. 2003. How variation in marine benthic community composition allows discrimination of multiple stressors. *Marine Ecology Progress Series* **206**:63-73.
- Micheli, F., C.H. Peterson, L.S. Mullineaux, C.R. Fisher, S.W. Mills, G. Sancho, G.A. Johnson, and H. S. Lenihan. 2002. Species interactions at deep-sea hydrothermal vents: the role of predation in structuring communities in an extreme environment. *Ecological Monographs* **73**:365-382.
- Jackson, J.B.C., M.X. Kirby, W.H. Berger, K.A. Bjorndal, L.W. Botsford, B.J. Bourque, R. Bradbury, R. Cooke, J.A. Estes, T.P. Hughes, S. Kidwell, C.B. Lange, H.S. Lenihan, J.M. Pandolfi, C.H. Peterson, R.S. Steneck, M.J. Tegner, and R. Warner. 2001. Historical overfishing and the collapse of marine ecosystems. *Science* **293**:629-638.
- Lenihan, H.S. and F. Micheli. 2001. Soft sediment communities. In M. Bertness, M.E. Hay, and S.D. Gaines (editors), *Marine Community Ecology*. Sinauer Associates, Inc.
- Lenihan, H.S., C.H. Peterson, J.E. Byers, J.H. Grabowski, G.W. Thayer, and D. R. Colby. 2001. Cascading of habitat degradation: oyster reefs invaded by refugee fishes escaping stress. *Ecological Applications* **11**:748-764.
- Peterson, C.H., J.B.C. Jackson, M.X. Kirby, H.S. Lenihan, R. Borque, R. Bradbury, R. Cooke, and S. Kidwell. 2001. Factors in the decline of coastal ecosystems- Response. *Science* **293**:1590-1591.
- Lenihan, H.S. and F. Micheli. 2000. Biological effects of shellfish harvesting on oyster reefs: resolving a fishery conflict using ecological experimentation. *Fishery Bulletin* **98**:86-95.
- Peterson, C.H., H.C. Summerson, E. Thompson, H.S. Lenihan, J.H. Grabowski, L. Manning, F. Micheli, and G. Johnson. 2000. Synthesis of linkages between benthic and fish communities as a key to protecting essential fish habitat. *Bulletin of Marine Science* **66**:759-774.
- Lenihan, H.S. 1999. Physical-biological coupling on oyster reefs: how habitat form influences individual performance. *Ecological Monographs* **69**:251-275.
- Lenihan, H.S., F. Micheli, S.W. Shelton, and C.H. Peterson. 1999. How multiple environmental stresses influence parasitic infection of oysters. *Limnology and Oceanography* **44**:910-924.
- Conlan, K.E., H.S. Lenihan, R.G. Kvitek, and J.S. Oliver. 1998. Iceberg scour disturbance to benthic communities in the Canadian High Arctic. *Marine Ecology Progress Series* **160**:1-16.
- Lenihan, H.S. and C.H. Peterson. 1998. How habitat degradation through fishery disturbance enhances effects of hypoxia on oyster reefs. *Ecological Applications* **8**:128-140.
- Lenihan, H.S. and J.S. Oliver. 1995. Natural and anthropogenic disturbances to marine benthic communities in Antarctica. *Ecological Applications* **5**:311-326.
- Lenihan, H.S., K.A. Kiest, K.E. Conlan, P.N. Slattery, B.H. Konar, and J.S. Oliver. 1995. Patterns of survival and behavior of marine invertebrates exposed to contaminated sediments from McMurdo Station, Antarctica. *Journal of Experimental Marine Biology and Ecology* **192**:233-255.
- Lenihan, H.S., C.H. Peterson, and J.M. Allen. 1995. Does flow also have a direct effect on growth of active suspension feeders: an experimental test with oysters. *Limnology and Oceanography* **41**:1359-1366.

Coastal Marine Institute

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Projects: *Ecological Performance and Trophic Links: Comparisons among Platforms and Natural Reefs for Selected Fishes and their Prey*

Education: B.A. Environmental Biology (Honors), University of California Santa Barbara 1970
M.A. Zoology, UCSB 1974
Ph.D. Zoology, UCSB 1978

Positions: 1985-present Assistant and Associate Research Biologist, Marine Science Institute, UCSB
1993-present Science writer and Science Editor of *Dolphin Log*, Cousteau Society
1978-1988 Project Director, VANTUNA Research Group, Occidental College, Los Angeles

Grants and Awards:

2002-2003 Packard Foundation
2002 Sea Grant
2001-2002 California Artificial Reef Enhancement Program and Biological Resources
Division, U. S. Geological Survey
2000-2001 National Marine Fisheries Service

Selected Publications:

Love, M.S., C.W. Mecklenburg, T.A. Mecklenburg, and L.K. Thorsteinson. 2005. Inventory of marine and estuarine fishes of the eastern North Pacific Ocean from Alaska to Baja California. OCS Study MMS

Berkeley, S.A., M.A. Hixon, R.J. Larson and M.S. Love. 2004. Fisheries sustainability via protection of age structure and spatial distribution of fish populations. *Fisheries* **29**(8):23-32.

Matala, A., A. Gray, A. Gharett and M. Love. 2004. Microsatellite variation indicates population genetic structure of bocaccio (*Sebastes paucispinis*). *North American Journal of Fisheries Management* **24**:1189-1202.

Schroeder, D.M. and M.S. Love. 2004. Ecological and political issues surrounding oil platform decommissioning in the Southern California Bight. *Ocean and Coastal Management* **47**:21-48.

Love, M.S., D.M. Schroeder, and M.M. Nishimoto. 2003. The ecological role of oil and gas production platforms and natural outcrops on fishes in southern and central California: a synthesis of information. U. S. Department of the Interior, U. S. Geological Survey, Biological Resources Division, Seattle, Washington, 98104, OCS Study MMS 2003-032.

Caselle, J.E., M.S. Love, C. Fusaro and D. Schroeder. 2002. Trash or habitat? Fish assemblages on offshore oilfield seafloor debris in the Santa Barbara Channel, California. *ICES Journal of Marine Science* **59**:S258-S265.

Schroeder, D.M. and M.S. Love. 2002. Recreational fishing and marine fish populations in California. *California Cooperative Oceanic Fisheries Investigations Report* **43**:182-190.

Love, M. 2001. Bank rockfish, blackgill rockfish, California scorpionfish, olive rockfish. Page 592 in Leet, W.S., C.M. Dewees, R. Klingbeil, and E. Larson (editors). California's Living Marine Resources: A Status Report. *California Department of Fish and Game*.

De Wett-Oleson, K. and M. Love. 2001. Observations of cleaning behavior of giant kelpfish, *Heterostichus rostratus*, island kelpfish, *Alloclinus holderi*, bluebanded goby, *Lythrypnus dalli*, and kelp bass, *Paralabrax clathratus*, on giant sea bass, *Stereolepis gigas*. *California Fish Game* **87**:87-92.

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- Love, M. S., J.E. Caselle, and L. Snook. 2000. Fish assemblages around seven oil platforms in the Santa Barbara Channel. *Fisheries Bulletin* **98**:96-117.
- Love, M. S., J.E. Caselle, and L. Snook. 1999. Fish assemblages on mussel mounds surrounding seven oil platforms in the Santa Barbara Channel and Santa Maria Basin. *Bulletin of Marine Science* **65**:497-513.
- Love, M. S., J.E. Caselle, and W. Van Buskirk. 1998. A severe decline in the commercial passenger fishing vessel rockfish (*Sebastes* spp.) catch in the southern California Bight, 1980-1996. *California Cooperative Oceanic Fisheries Investigations Reports* **39**:180-195.
- Love, M., J. Hyland, A. Ebeling, T. Herrlinger, A. Brooks, and E. Imamura. 1994. A pilot study of the distribution and abundance of rockfishes in relation to natural environmental factors and an offshore oil and gas production platform off the coast of Southern California. *Bulletin of Marine Science* **55**:1062-1085.
- Love, M., P. Morris, M. McCrae, and R. Collins. 1990. Life history aspects of 19 rockfish species (Scorpaenidae: *Sebastes*) from the Southern California Bight. NMFS Tech. Rept. 87, 38 pp.
- Love, M. and W. Westphal. 1990. A comparison of fishes taken by a sportfishing party vessel around oil platforms and adjacent natural reefs near Santa Barbara, California. *Fisheries Bulletin* **88**:599-605.

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Projects: *Simulation of a Subsurface Oil Spill by a Hydrocarbon Seep (SSOS-HYS)*
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Education: B.S. Geology/ Geophysics, San Diego State College, California 1965
Ph.D. Oceanography/ Marine Geophysics, Scripps Inst. of Oceanography, 1969
San Diego, California.

Positions: 1997-2003 Chair, Department of Geological Sciences, University of California, Santa Barbara
1988-1997 Director, Institute of Crustal Studies, UC Santa Barbara
1987-1988 Acting Director, Institute of Crustal Studies, UC Santa Barbara
1981-Present Professor, Department of Geological Sciences, UC Santa Barbara
1975-1981 Associate Professor, Department of Geological Sciences, UC Santa Barbara
1973-1975 Assistant Professor, Department of Geological Sciences, UC Santa Barbara

Selected Publications:

- Siddoway, C.H. and B.P. Luyendyk. Crustal structure and Cenozoic tectonics on the eastern margin of the Ross Sea, Marie Byrd Land. *Antarctic J. of the U.S.* (in press).
- Leifer I., T. Del Sontro, B. Luyendyk and K. Broderick. 2005. Time evolution of beach tar, oil slicks, and seeps in the Coal Oil Point seep field, Santa Barbara Channel, California. *Proc. Internat. Oil Spill Conf.*, May 15-19, 2005, Miami, FL, EIS Digital Publishing, 14718A.
- Leifer, I., J. Boles, J.F. Clark and B.P. Luyendyk. 2004. The dynamic nature of marine hydrocarbon seepage. *Environmental Geology* **46**(8):1038-1052.
- Clark, J.F., I. Leifer, L. Washburn and B.P. Luyendyk. 2003. Compositional changes in natural gas bubble plumes: observations from the Coal Oil Point marine hydrocarbon seep field. *Geo. Mar Lett.* **23**:187-193.
- Leifer, I., J.F. Clark, B. Luyendyk and D. Valentine. 2003. Identifying future directions for subsurface hydrocarbon migration research, *EOS (American Geophysical Union Transactions)* **84**(37):364-371.
- Luyendyk, B.P., C.H. Smith, and G. Druivenga. 2003. Gravity measurements on King Edward VII Peninsula, Marie Byrd Land, West Antarctica, during GANOVEX VII, *Geolog. Jahrb.*, B **95**:101-126.
- Larson, R.L., R.A. Pockalny, R.F. Viso, E. Erba, L.J. Abrams, B.P. Luyendyk, J.M. Stock, and R.W. Clayton. 2002. Mid-Cretaceous tectonic evolution of the Tongareva triple junction in the southwestern Pacific basin. *Geology* **30**:67-70.
- Hamilton, R., B.P. Luyendyk, C.C. Sorlien, and L.R. Bartek. 2001. Cenozoic Tectonics of the Cape Roberts Rift Basin, and Transantarctic Mountains Front, Southwestern Ross Sea, Antarctica. *Tectonics* **20**:325-342.
- Luyendyk, B.P. and E.T. Eglund. 2001. Variation in discharge from marine hydrocarbon seeps at Coal Oil Point, CA: Implications for offshore oil production, Contribution #418-137 TC of the Institute for Crustal Studies, UCSB, 42 pp.
- Luyendyk, B.P., C.C. Sorlien, D. Wilson, L. Bartek, and C.H. Siddoway. 2001. Structural and tectonic evolution of the Ross Sea rift in the Cape Colbeck region, Eastern Ross Sea, Antarctica. *Tectonics* **20**:933-958.
- Clark, J., L. Washburn, J.S. Hornafius, and B.P. Luyendyk. 2000. Natural Marine Hydrocarbon Seep Source of Dissolved Methane to California Coastal Waters. *J. Geophys. Res. - Oceans* **105**(11):509-11,522.

- Sorlien, C.C., J.P. Gratier, B.P. Luyendyk, J.S. Hornafius, and T.E. Hopps. 2000. Map restoration of folded and faulted late Cenozoic strata across the Oak Ridge fault, onshore and offshore Ventura basin, California, Geological Society of America Bulletin, v. 112, p. 1080-1090
- Hornafius, J.S., D. Quigley, and B.P. Luyendyk. 1999. The World's Most Spectacular Marine Hydrocarbon Seeps (Coal Oil Point, Santa Barbara Channel, California): Quantification of Emissions. *Journal of Geophysical Research - Oceans* **104**(C9):20,703-20,711.
- Quigley, D.C., J.S. Hornafius, B.P. Luyendyk, R.D. Francis, J. Clark, and L. Washburn. 1999. Decrease in Natural Marine Hydrocarbon Seepage near Coal Oil Point, California Associated with Offshore Oil Production. *Geology* **27**(11):1047-1050.
- Sorlien, C.C., C.N. Nicholson, and B.P. Luyendyk. 1999. Miocene Extension and Post-Miocene Transpression Offshore of South-Central California. In Keller, M.A. ed., Evolution of Sedimentary Basins, Onshore Oil and Gas Investigations - Santa Maria Province: *U.S. Geological Survey Bulletin*, 11995-Y, 38p.
- Hamilton, R., C.C. Sorlien, B.P. Luyendyk, L.R. Bartek, and S. A. Henrys. 1998. Tectonic regimes and structural trends off Cape Roberts, Antarctica. *Terra Antarctica* **5**:261-272.
- Henrys, S.A., L.R. Bartek, G. Brancolini, B. Luyendyk, R.J. Hamilton, C.C. Sorlien, and F.J. Davey. 1998. Seismic stratigraphy of the pre-Quaternary strata off Cape Roberts and their correlation with strata cored in the CIROS-1 drill hole, McMurdo sound. *Terra Antarctica* **5**:273-279.
- Luyendyk, B.P. 1998. Structure under the Santa Barbara Channel: The thick and thin of it, in, Kunitomi, D. S., Hopps, T. E., and Galloway, J. M., eds., Structure and Petroleum Geology, Santa Barbara Channel, California, Amer. Assoc. Petroleum Geol., Pacific Section, Misc. Pub. 46, 75-78.
- Luyendyk, B.P., P. Gans, and M.J. Kamerling. 1998. ⁴⁰Ar/³⁹Ar Geochronology of Southern California Neogene Volcanism, in. Weigand, P. W., ed., Contributions to the Geology of the Northern Channel Islands, Southern California: American Association Petroleum Geol., Pacific Section, Misc. Pub. 45, 9-35.
- Luyendyk, B.P. 1997. Slab capture versus ridge collision as an explanation for Cretaceous extension and rifting of east Gondwana. in Ricci, C. A., ed., The Antarctic Region: Geological Evolution and Processes, Proceed. VII Symp. on Antarctic Earth Sci., Siena, 467-474.
- Luyendyk, B.P., S. Cisowski, C.H. Smith, S. Richard, and D.L. Kimbrough. 1996. Paleomagnetic study of the northern Ford Ranges, western Marie Byrd Land, West Antarctica: A middle Cretaceous pole, and motion between West and East Antarctica. *Tectonics* **15**:122-141.
- Schermer, E., B.P. Luyendyk, and S. Cisowski. 1996. Late Cenozoic structure and tectonics of the northern Mojave Desert. *Tectonics* **15**:905-932.
- Van Der Wateren, F.M., A.L.L.M. Verbers, B.P. Luyendyk, C.H. Smith, H.C. Hofle, F.J.M. Vermeulen, H. De Wolf, U. Herpers, W. Klas, P.W. Kubik, W. Suter, and B. Dittrich-Hannen. 1996. Glaciation and deglaciation of the uplifted margins of the Cenozoic West Antarctic rift system, Ross Sea, Antarctica. *Geologisches Jahrbuch* **B89**, Polar issue no. 6, p. 123-155.
- Luyendyk, B.P. 1995. Hypothesis for Cretaceous Rifting of East Gondwana caused by Subducted Slab Capture. *Geology* **23**:373-376.
- Nicholson, C., C.C. Sorlien, T. Atwater, J.C. Crowell, and B.P. Luyendyk. 1994. Microplate capture, rotation of the western Transverse Ranges, and initiation of the San Andreas transform as a low angle fault system. *Geology* **22**:491-495.
- Richard, S.M., C.H. Smith, D.L. Kimbrough, P.G. Fitzgerald, B.P. Luyendyk, and M.O. McWilliams. 1994. Cooling history of the northern Ford Ranges, Marie Byrd Land, West Antarctica. *Tectonics* **13**:837-857.

Coastal Marine Institute

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University of California
Santa Barbara, CA

Projects: *Habitat Value of Shell Mounds to Ecologically and Commercially Important Benthic Species*
Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine
Natural Products
Ecological Performance and Trophic Links: Comparisons Among Platforms and Natural Reefs for
Selected Fishes and their Prey

Education:	B.S.	University of Southern California	1973
	M.A.	University of California, Santa Barbara	1977
	Ph.D.	University of California, Santa Barbara	1984

Positions:	2004-present	Associate Research Biologist, Marine Science Institute, University of California, Santa Barbara
	1998-present	California Coastal Commission SONGS mitigation scientist (wetlands)
	1985-2004	Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara
	1984-present	Lecturer in Summer Session, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
	1994-1997	Instructor, Department of Biological Sciences, Santa Barbara City College
	1983-1985	Postgraduate Research Biologist, Marine Science Institute, University of California, Santa Barbara

Selected Publications:

- Galindo-Bect, M. S., H.M. Page, R.L. Petty, M. Hernandez-Ayon, E.A. Aragon-Noriega, and H. Bustos-Serrano. Temporal variation in the abundance of postlarval and juvenile blue shrimp (*Litopenaeus stylirostris*) and brown shrimp (*Farfantepenaeus californiensis*) in the Colorado River Estuary. *Fishery Bulletin* (submitted).
- Bram, J.B., H.M. Page and J.E. Dugan. 2005. Spatial and temporal variability in early successional patterns of an invertebrate assemblage at an offshore platform. *Journal of Experimental Marine Biology and Ecology* **317**:223-237.
- Bomkamp, R.E., H.M. Page and J.E. Dugan. 2004. Role of food subsidies and habitat structure in influencing benthic communities of shell mounds at sites of existing and former offshore oil platforms. *Marine Biology* **146**:201-211.
- Page, H.M. and M. Lastra. 2003. Diet of intertidal bivalves in the Ria de Arosa (Galicia, NW Spain): evidence from stable C and N isotope ratio analysis. *Marine Biology* **143**:519-532.
- Page, H.M., S. Schroeter, D. Reed, R.F. Ambrose, J. Callaway and J. Dixon. 2003. An inexpensive method to identify the elevation of tidally inundated habitat in coastal wetlands. *Bulletin of the Southern California Academy of Sciences* **102**:130-142.
- Galindo-Bect, M.S., E.P. Glenn, H.M. Page, L.A. Galindo-Bect, J.M. Hernandez-Ayon, R.L. Petty, and J. Garcia-Hernandez. 2000. Analysis of penaeid shrimp landings in the northern Gulf of California in relation to Colorado River discharge. *Fishery Bulletin - NOAA* **98**(1):222-225.
- Page, H.M., J.E. Dugan, D. Dugan, and J. Richards. 1999. Effects of an offshore oil platform on the distribution and abundance of commercially important crab species. *Marine Ecology Progress Series* **185**:47-57.
- Page, H.M. 1997. Importance of vascular plant and algal production to macroinvertebrate consumers in a southern California salt marsh. *Estuarine, Coastal and Shelf Science* **45**:823-834.

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- Dugan, J.E., D.M. Hubbard, and H.M. Page. 1995. Scaling population density to body size: tests in two soft sediment intertidal communities. *Journal of Coastal Research* **11**:849-857.
- Page, H.M. 1995. Variation in the natural abundance of ¹⁵N in the halophyte, *Salicornia virginica*, associated with ground water subsidies of nitrogen in a southern California salt marsh. *Oecologia* **104**:181-188.
- Page, H.M., R.L. Petty, and D.E. Meade. 1995. Influence of watershed run-off on nutrient dynamics in a southern California salt marsh. *Estuarine, Coastal and Shelf Science* **41**:163-180.
- Page, H.M., J.E. Dugan, and D.M. Hubbard. 1992. Comparative effects of infaunal bivalves on an epibenthic microalgal community. *Journal of Experimental Marine Biology and Ecology* **157**:247-262.
- Page, H.M., A. Fiala-Medioni, C.R. Fisher, and J.J. Childress. 1990. Experimental evidence for filter-feeding by the hydrothermal vent mussel, *Bathymodiolus thermophilus*. *Deep-Sea Research* **38**:1455-1461.
- Page, H.M., C.R. Fisher, and J.J. Childress. 1990. The role of filter-feeding in the nutritional biology of a deep sea mussel with methanotrophic symbionts. *Marine Biology* **104**:251-257.
- Page, H.M. and D.M. Hubbard. 1987. Temporal and spatial patterns of growth in mussels, *Mytilus edulis*, on an offshore platform: relationships to water temperature and food availability. *Journal of Experimental Marine Biology and Ecology* **111**:159-179.
- Page, H.M. 1986. Differences in population structure and growth rate of the stalked barnacle, *Pollicipes polymerus* between a rocky headland and an offshore oil platform. *Marine Ecology Progress Series* **29**:157-164.

Coastal Marine Institute

PETER T. RAIMONDI

Department of Biology- Ecology and Evolution
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Projects: *Effects of Produced Water on Complex Behavior Traits of Invertebrate Larvae and Algal Zoospores*
Effects of Temporal and Spatial Separation of Samples on Estimation of Impacts
Shoreline Inventory of Intertidal Resources of San Luis Obispo and Northern Santa Barbara Counties

Education: B.A. Philosophy, Northern Arizona University 1976
Ph.D. Biology, University of California, Santa Barbara 1988

Positions: 2003-Present Chair, Department of Ecology and Evolutionary Biology, UC Santa Cruz
2002-Present Professor, Department of Ecology and Evolutionary Biology, UC Santa Cruz
1999-2002 Associate Professor, Department of Biology, University of California, Santa Cruz
1996-1999 Assistant Professor, Department of Biology, University of California, Santa Cruz
1992-1996 Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara
1991-1992 Post-doctoral Research Biologist, Marine Science Institute, University of California, Santa Barbara
1989-1991 Research Fellow, Australian Research Council Fellowship, University of Melbourne, Department of Zoology
1988-1989 Research Fellow, University of Melbourne Research Fellowship
1987-1988 Post-doctoral Researcher, University of California, Santa Barbara
1986-1990 Environmental Consultant, Marine Review Committee

Distinctions: 1976 President's Scholarship for Academic Excellence. Northern Arizona University
1981-1982 Dean's Award for Academic Excellence, University of Arizona
1984 Sigma Xi Grant-in-Aid of Research
1986 University of California Patent Fund
1987-1988 Office of Naval Research Postdoctoral Fellowship
1988-1989 University of Melbourne Research Fellowship
1989-1991 Australian Research Council Fellowship

Selected Publications:

Reed, D.C., P.T. Raimondi, L. Washburn, B. Gaylord, B.P. Kinlan, and P.T. Drake. 2005. A metapopulation perspective on patch dynamics and connectivity in giant kelp. In: P. Sale and J Kritzer eds. Marine metapopulations. *Academic Press* (in press).

Raimondi, P.T., D.C. Reed, L. Wasburn, and B. Gaylord. 2004. Effect of self-fertilization in the giant kelp *Macrocystis pyrifera*. *Ecology* **85**:3267-3276.

Menge, B.A., C. Blanchette, P.T. Raimondi, S. Gaines, J. Lubchenco, D. Lohse, G. Hudson, M. Foley, and J. Pamplin. Geographic variation in keystone predation: a whole-coast experiment. *Ecological Monographs* **74**:663-684.

Reed, D.C., S.C. Schroeter and P.T. Raimondi. 2004. Spore supply and habitat availability as sources of recruitment limitation in giant kelp, *Macrocystis Pyrifera*. *Journal of Phycology* **40**:275-284.

Forde, S.E. and P.T. Raimondi. 2004. An experimental test of the effects of variation in recruitment intensity on intertidal community structure. *Journal of Experimental Marine Biology and Ecology* **301**:1-14.

Luengen, A.C., C.S. Friedman, P.T. Raimondi, and A.R. Flegal. 2004. Evaluation of immune responses as indicators of contamination in San Francisco Bay, CA; Development of a novel phagocytosis and phagocytic index method for mussels. *Marine Environmental Research*. **57**(3):197-212.

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- Gaylord, B., D.C. Reed, L. Washburn and P.T. Raimondi. 2004. Physical-biological coupling in spore dispersal of kelp forest macroalgae. *Journal of Marine Systems* **49**:19-39.
- Raimondi, P.T., D. Lohse, and C. Blanchette. 2003. Unexpected dynamism in zonation and abundance revealed by long-term monitoring on rocky shores. *Ecological Society of America Annual Meeting* **88**:275.
- Gaylord, B., D.C. Reed, P.T. Raimondi, L. Washburn, and S.R. McLean. 2002. A physically based model of macroalgal spore dispersal in the wave and current-dominated nearshore. *Ecology* **83**(5):1239-1251.
- Raimondi, P.T., C.M. Wilson, R.F. Ambrose, J.M. Engle, and T.E. Minchinton. 2002. Continued declines of black abalone along the coast of California: are mass mortalities related to El Nino events? *Marine Ecology Progress Series* **242**:143-152.
- Raimondi, P.T. and A.N.C. Morse. 2000. The consequences of complex larval behavior in a coral. *Ecology* **81**(11):3193-3211.
- Raimondi, P.T., S.E. Forde, L.F. Delph, and C.M. Lively. 2000. Processes structuring communities: evidence for trait-mediated indirect effects through induced polymorphisms. *Oikos* **91**(2):353-361.
- Reed, D.C., P.T. Raimondi, M.H. Carr, and L. Goldwasser. 2000. The role of dispersal and disturbance in determining spatial heterogeneity in sedentary organisms. *Ecology* **81**(7):2011-2026.
- Carr, M.H. and P.T. Raimondi. 1999. Marine protected areas as a precautionary approach to management. *California Cooperative Oceanic Fisheries Investigations Report* **40**:71-76.
- Raimondi, P.T., A.M. Barnett, and P.R. Krause. 1997. The effects of drilling muds on marine invertebrate larvae and adults. *Environmental Toxicology and Chemistry* **16-6**:1218-1228.
- Altstatt, J.A., R.F. Ambrose, J.M. Engle, P.L. Haaker, K.D. Lafferty, and P.T. Raimondi. 1996. Recent declines of black abalone *Haliotis cracherodii* on the mainland coast of central California. *Marine Ecology Progress Series* **142**:185-192.
- Keough, M.J. and P.T. Raimondi. 1996. Responses of settling invertebrate larvae to bioorganic films: Effects of large-scale variation in films. *Journal of Experimental Marine Biology and Ecology* **207**:59-78.
- Raimondi, P.T. and D. Reed. 1996. Determining the spatial extent of ecological impacts caused by local anthropogenic disturbances in coastal marine habitats. Pp. 179-198 in: *Detecting Ecological Impacts: Concepts and Applications in Coastal Habitats*, R.J. Schmitt and C.W. Osenberg, eds. Academic Press, San Diego, CA.
- Keough, M.J. and P.T. Raimondi. 1995. Responses of settling invertebrate larvae to microbial films, II: Effects of different types of films. *Marine Ecology Progress Series* **185**:235-253.
- Morse, D.E., A. Morse, N. Hooker, and P.T. Raimondi. 1994. Morphogen-based chemical flypaper for *Agaricia humilis* larvae. *Biological Bulletin* **186**:172-181.
- Lively, C.M., P.T. Raimondi, and L.F. Delph. 1993. Intertidal community structure: space-time interactions in the Northern Gulf of California. *Ecology* **74**:162-173.
- Keough, M.J. and P.T. Raimondi. 1992. Robustness of estimates of recruitment rates for sessile marine invertebrates. Recruitment Workshop Proceedings. *Australian Society of Fisheries Biologists*.
- Raimondi, P.T. 1992. Adult plasticity and rapid larval evolution in a recently isolated barnacle population. *Biological Bulletin* **182**:210-220.

Coastal Marine Institute

DANIEL C. REED

Marine Science Institute
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Projects: *An Experimental Evaluation of Methods of Surfgrass (Phyllospadix torreyi) Restoration Using Early Life History Stages*
Population Genetics of surfgrass (Phyllospadix torreyi) for use in restoration

Education: B.A. Moss Landing Marine Laboratories and San Francisco State University 1978
M.A. Moss Landing Marine Laboratories and San Francisco State University 1981
Ph.D. University of California, Santa Barbara 1989

Positions: 1999-present Research Biologist, Marine Science Institute, University of California, Santa Barbara
1994-99 Associate Research Biologist, Marine Science Institute, UCSB
1989-94 Assistant Research Biologist, Marine Science Institute, UCSB
1990 Biological Consultant, Woodward-Clyde Consultants
1987-90 Biological Consultant, Marine Review Committee
1988-89 Biological Consultant, Michael Brandman Associates
1986-87 Biological Consultant, Chambers Consultants

Distinctions: 1989 Lancaster Award for Outstanding Dissertation, University of California, Santa Barbara
1984 Antarctic Service Medal of the United States of America, National Science Foundation

Selected Publications:

Reed, D.C., B.P. Kinlan, P.T. Raimondi, L. Washburn, B. Gaylord and P.T. Drake. A Metapopulation Perspective on Patch Dynamics and Connectivity of Giant Kelp in J.P. Kritzer and P.F. Sale, eds. Marine Metapopulations. *Academic Press. San Diego* (in press).

Bull, J.S., D.C. Reed, and S J. Holbrook. 2004. An experimental evaluation of different methods of restoring *Phyllospadix torreyi* (Surfgrass). *Restoration Ecology* **12**:70-79.

Reed, D.C., S.C. Schroeter and P.T. Raimondi. 2004. Spore supply and habitat availability as sources of recruitment limitation in giant kelp. *Journal of Phycology* **40**:275-284.

Raimondi P.T., D.C. Reed, B. Gaylord and L. Washburn. 2004. Effects of self-fertilization in the giant kelp, *Macrocystis pyrifera*. *Ecology* **85**:3267-3276.

Gaylord, B., D.C. Reed, L. Washburn and P.T. Raimondi. 2004. Physical-biological coupling in spore dispersal of kelp forest macroalgae. *Journal of Marine Systems* **49**:19-39.

Page, H.M., S.C. Schroeter, D C. Reed. R.F. Ambrose, J. Callaway and J. Dixon. 2003. An inexpensive method to identify the elevation of tidally inundated habitat in coastal wetlands. *Bulletin of the Southern California Academy of Sciences* **102**:130-142.

Gaylord, B., D.C. Reed, P.T. Raimondi, L. Washburn, and S.R. McLean. 2002. A physically based model of macroalgal spore dispersal in the wave and current-dominated nearshore. *Ecology* **83**(5):1239-1251.

Holbrook, S.J., D.C. Reed, and J.S. Bull. 2002. Survival experiments with outplanted seedlings of surfgrass (*Phyllospadix torreyi*) to enhance establishment on artificial structures. *Ices Journal of Marine Sciences* **59**:S350-S355 Suppl. S.

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- Schroeter, S.C., D.C. Reed, D.J. Kushner, J.A. Estes, and D.S. Ono. 2001. The use of marine reserves in evaluating the dive fishery for the warty sea cucumber (*Parastichopus parvimensis*) in California, USA. *Canadian Journal of Fisheries and Aquatic Sciences* **58**(9):1773-1781.
- Holbrook, S.J., D.C. Reed, K. Hansen, and C.A. Blanchette. 2000. Spatial and temporal patterns of predation on seeds of surfgrass, *Phyllospadix torreyi*. *Marine Biology* **136**(4):739-747.
- Reed, D.C., P.T. Raimondi, M.H. Carr, and L. Goldwasser. 2000. The role of dispersal and disturbance in determining spatial heterogeneity in sedentary kelp-forest organisms. *Ecology* **81**(7):2011-2026.
- Blanchette, C.A., S. Worcester, D. Reed, and S.J. Holbrook. 1999. Algal morphology, flow and spatially variable recruitment of surfgrass, *Phyllospadix torreyi*. *Marine Ecology Progress Series* **184**:119-128.
- Reed, D.C., M.A. Brzezinski, D.A. Coury, W.M. Graham, and R.L. Petty. 1999. Neutral lipids in macroalgal spores and their role in swimming. *Marine Biology* **133**:737-744
- Reed, D.C., S.J. Holbrook, E. Solomon, and M. Anghera. 1998. Studies on germination and root development in the surfgrass *Phyllospadix torreyi*: Implications for habitat restoration. *Aquatic Botany* **62**: 71-80.
- Reed, D.C., T.W. Anderson, A.W. Ebeling, and M. Anghera. 1997. Role of reproductive synchrony in the colonization potential of kelp. *Ecology* **78**:2443-2457.
- Canestro, D., P.T. Raimondi, D.C. Reed, R.J. Schmitt, and S.J. Holbrook. 1996. A study of methods and techniques for detecting ecological impacts. Pp. 53-67 in: *Methods and techniques of underwater research, Proceedings of the American Academy of Underwater Scientists symposium*. AAUS, Nahant, MA.
- Raimondi, P.T. and D. Reed. 1996. Determining the spatial extent of ecological impacts caused by local anthropogenic disturbances in coastal marine habitats. Pages 179-198 in *Detecting Ecological Impacts: Conceptual Issues and Applications in Coastal Marine Habitat*, R.J. Schmitt and C.W. Osenberg, editors. Academic Press, San Diego, CA, USA.
- Reed, D.C., A.W. Ebeling, T.W. Anderson, and M. Anghera. 1996. Differential reproductive responses to fluctuating resources in two seaweeds with different reproductive strategies. *Ecology* **77**:300-316.
- Ambrose, R.F., J. Boland, W.W. Murdoch, P.T. Raimondi, and D.C. Reed. 1995. The San Onofre nuclear generating station mitigation reef: monitoring issues. Pp. 587-592 in: *Proceedings from the International Conference on Ecological System Enhancement Technology for Aquatic Environments*. Japan International Marine Science and Technology Federation, Tokyo.
- Reed, D.C. 1994. Giant forests of the sea. *The World and I*. 202-207.
- Reed, D.C. and R.J. Lewis. 1994. Effects of an oil and gas production effluent on the colonization potential of giant kelp (*Macrocystis pyrifera*) zoospores. *Marine Biology* **119**:277-283.
- Reed, D.C., R.J. Lewis, and M. Anghera. 1994. Effects of an open coast oil production outfall on patterns of giant kelp (*Macrocystis pyrifera*) recruitment. *Marine Biology* **120**:26-31.
- Brzezinski, M., D.C. Reed, and C.D. Amsler. 1993. Neutral lipids as major storage products in *Macrocystis pyrifera*. *Journal of Phycology* **29**:16-23.
- Carr, M.H. and D.C. Reed. 1993. Conceptual issues relevant to marine harvest refuges: examples from temperate marine fishes. *Canadian Journal of Fisheries and Aquatic Sciences* **50**:2019-2028.
- Amsler, C.D., D.C. Reed, and M. Neushul. 1992. The microclimate inhabited by algal propagules. *British Phycological Journal* **27**:253-270.
- Carr, M.H. and D.C. Reed. 1992. Harvest refuges and their potential for enhancing reef fisheries in southern California. Pp. 63-68 in: *Perspectives on the Marine Environment*, P.M. Grifman and S.E. Yoder, Eds. Sea Grant Program, University of California, Los Angeles.

Coastal Marine Institute

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Projects: *Population Trends and Trophic Dynamics in Pacific OCS Ecosystems: What Can Monitoring Data Tell us?*
Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine Natural Products

Education: B.A. Environmental Biology, University of Colorado 1972
M.S. Marine Science, University of the Pacific 1975
Ph.D. Biology, University of California, Los Angeles 1979

Positions: 1995-present Professor, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara
1994-present Program Director, Coastal Marine Institute, University of California, Santa Barbara
1991-present Program Director, Coastal Toxicology Program, UC Toxic Substances Research and Teaching Program
1989-2005 Program Director, Southern California Educational Initiative, University of California, Santa Barbara
1987-present Director, Coastal Research Center, Marine Science Institute, University of California, Santa Barbara
1993-1995 Associate Professor, Department of Biology and Environmental Studies Program, University of California, Santa Barbara
1987-1992 Associate Research Biologist, Marine Science Institute, University of California, Santa Barbara
1981-1987 Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara

Distinctions: 1989 George Mercer Award for 1989, Ecological Society of America (best published research in field of Ecology by a scientist under age 40; Awarded for "Indirect interactions between prey: apparent competition, predator aggregation and habitat selection," *Ecology* **68**:1887-1897)

Selected Publications:

Holbrook, S.J. and R.J. Schmitt. 2005. Growth, reproduction and survival of a tropical sea anemone (*actinaria*): benefits of hosting anemonefish. *Coral Reefs* (in press).

Holbrook, S. J. and R. J. Schmitt. 2004. Population dynamics of a damselfish: effects of a competitor that also is an indirect mutualist. *Ecology* **85**:979-985.

Schmitt, R. J. and S. J. Holbrook. 2003. Mutualism can mediate competition and promote coexistence. *Ecology Letters* **6**:898-902.

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Coastal Marine Institute

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Project: *Weathering of Aromatic Compounds in the Coastal Marine Environment: Quantifying Rates of Microbial Metabolism*

Education:

B.S.	Chemistry/Biochemistry, Revelle College, U.C. San Diego	1995
M.S.	Chemistry, University of California, San Diego	1996
M.S.	Earth System Science, University of California, Irvine	1998
Ph.D.	Earth System Science, University of California, Irvine	2000

Positions: 2001-Present Assistant Professor, Department of Geological Sciences, University of California, Santa Barbara, California.

Selected Publications:

- Adams, C. and D.L. Valentine. Bioenergetics of secondary fermentations involving glycolate, butyrate, and alanine. (in preparation)
- Wardlaw G.W. and D.L. Valentine. 2005. Evidence for salt diffusion from sediments contributing to increasing salinity in the Salton Sea, California. *Hydrobiologia* **533**:77-85.
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Projects: *Observing the Surface Circulation Along the South-Central California Coast Using High Frequency Radar: Consequences for Larval and Pollutant Dispersal*
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Education: B.S. Mechanical Engineering, University of Arizona 1974
M.S. Engineering Science, University of California, San Diego 1978
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Positions: 1998-present Professor, Department of Geography and ICES, University of California, Santa Barbara, CA
1993-1998 Associate Professor, Department of Geography and ICES, University of California, Santa Barbara, CA
1991-1993 Assistant Professor, Department of Geography, University of California, Santa Barbara, CA
1985-1990 Research Assistant Professor of Physical Oceanography, Center for Earth Sciences, University of Southern California, Los Angeles, CA
1982-1985 Postgraduate Research Oceanographer, Scripps Institution of Oceanography, San Diego, CA

Selected Publications:

- Warrick, J.A., L. Washburn, M.A. Brzezinski and D.A. Siegel. 2005. Nutrient contributions to the Santa Barbara Channel, California, from the ephemeral Santa Clara River. *Estuarine, Coastal and Shelf Science* **62**:559-574.
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- Project:** *Advancing Marine Biotechnology: Use of OCS Oil Platforms as Sustainable Sources of Marine Natural Products*
- Education:** B.S. Pharmacy, Massachusetts College of Pharmacy & Allied Health Sciences, Boston, MA 1963
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- Positions:** 1995-present Professor of Biochemistry and Pharmacology, Department of Molecular, Cellular, and Developmental Biology, University of California, Santa Barbara, CA
1978-1995 Professor of Biochemistry and Pharmacology, Division of Molecular, Cellular, and Developmental Biology, Department of Biological Sciences, University of Santa Barbara, CA
1987-1991 Chair, Department of Biological Sciences, University of California, Santa Barbara, CA
1976-1978 Associate Professor, Department of Biological Sciences, University of California, Santa Barbara, CA
1969-1975 Assistant Professor, Department of Pharmacology, Stanford University School of Medicine, Stanford, CA

Selected Publications:

- Wilson, L. and M.A. Jordan. New microtubule / tubulin-targeted anticancer drugs and novel chemotherapeutic strategies. *Journal of Chemotherapy (Suppl)* (in press).
- Feinstein, S.C. and L. Wilson. Inability of Tau to Properly Regulate Neuronal Microtubule Dynamics: A Loss-of-Function Mechanism by which Tau Might Mediate Neuronal Cell Death. *Biochimica et Biophysica Acta* (in press).
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The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The **MMS Royalty Management Program** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.