

**CALIFORNIA
SEA GRANT**

CUIMR-D-86-001 C2

**PROGRAM
DIRECTORY
1986-87**

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R-CSGCP-019**

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The California Sea Grant College Program is a statewide,
multiuniversity program of marine research, advisory
services, and educational activities, administered by the
University of California Institute of Marine Resources.
Through the research it sponsors, Sea Grant contributes to
the growing body of knowledge about our coastal and
oceanic resources and helps solve contemporary problems in
the marine sphere. Through its Marine Advisory Program,
Sea Grant transfers information and technology developed in
its research efforts to a wide community of users in
California, the Pacific region, and the nation. Sea Grant also
supports a range of educational programs for students,
teachers, and the general public to promote the wise use of
our coastal and oceanic resources by this and future
generations.

Introduction

Marine resources in the United States potentially represent a major segment of our economy. In 1966 Congress created the National Sea Grant College Program, a three-part program of marine research, education, and advisory activities modeled after the successful Land Grant College Program — a vital link in helping the U.S. become the world's leading agricultural nation.

Sea Grant accelerates the sound development of marine resources by supporting application-oriented research at the nation's leading universities. Sea Grant also sponsors educational activities to communicate the results of its research to government agencies, related industries, scientists, fishermen, and consumers — people who can use the research results to benefit the nation, coastal regions, and states like California that have Sea Grant programs.

California's Sea Grant College Program is the largest of 30 Sea Grant programs in more than half of the nation's states. The California program is administered by the University of California Institute of Marine Resources, headquartered on the University of California, San Diego campus. Policy guidance comes from the Institute of Marine Resources Advisory Council, appointed by the president of the University of California.

The California Sea Grant Committee, composed of representatives from the University of California and state university systems and private universities, provides administrative guidance to California Sea Grant's Program Manager, Dr. James J. Sullivan, on matters pertaining to the conduct of the program and the pursuit of its objectives.

A seafood industry advisory committee, an aquaculture advisory committee, and several other committees advise the Sea Grant Committee in creating program policy. The Resources Agency Sea Grant Advisory Panel provides program planning, development, and coordination efforts to help Sea Grant identify and meet state needs.

This directory presents the 1986-87 research projects and activities supported by the California Sea Grant College Program.

California's Sea Grant Institutions

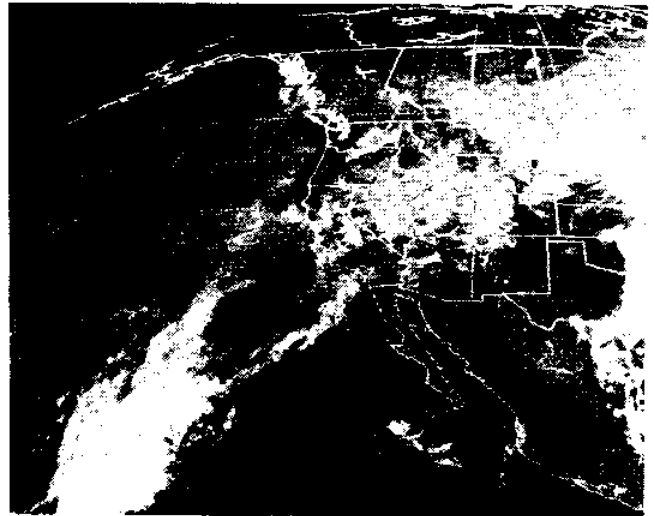
Since 1968, Sea Grant in California has supported a unique combination of marine research, education, and advisory activities at more than 40 California universities and colleges. These institutions have included:

- Bodega Marine Laboratories
- California Academy of Sciences
- California Institute of Technology
- California Maritime Academy
- California Polytechnic University
- California State University, Fresno
- California State University, Long Beach
- California State University, Northridge
- Claremont College
- Humboldt State University
- Immaculate Heart College
- Loyola Marymount University
- Moss Landing Marine Laboratories, a consortium of
 - California State University, Fresno
 - California State University, Hayward
 - California State University, Sacramento
 - San Francisco State University
 - San Jose State University
 - California State University, Stanislaus
- Occidental College
- Point Loma College
- San Diego State University
- San Francisco State University
- San Jose State University
- Santa Barbara Community College
- Southern California Ocean Studies Consortium
 - California State University, Dominguez Hills
 - California State University, Fullerton
 - California State University, Long Beach
 - California State University, Los Angeles
 - California State University, Northridge
 - California State Polytechnic University, Pomona
- Stanford University
- University of California, Berkeley
- University of California, Davis
- University of California, Irvine
- University of California, Los Angeles
- University of California, Riverside
- University of California, San Diego
- University of California, San Francisco
- University of California, Santa Barbara
- University of California, Santa Cruz
- University of San Diego
- University of Southern California

Participating Institutions, 1986-87

BML	Bodega Marine Laboratory Bodega Bay, California 94923
CSULB	California State University Long Beach, California 90840
HSU	Humboldt State University Arcata, California 95521
IMS	Institute of Marine Sciences University of California Santa Cruz, California 95064
MLML	Moss Landing Marine Laboratories Moss Landing, California 95039
MSI	Marine Science Institute University of California Santa Barbara, California 93106
SDSU	San Diego State University San Diego, California 92182
SIO	Scripps Institution of Oceanography University of California, San Diego La Jolla, California 92093
SJSU	San Jose State University San Jose, California 95192
UCB	University of California Berkeley, California 94720
UCCE	University of California Cooperative Extension Davis, California 95616
UCD	University of California Davis, California 95616
UCI	University of California Irvine, California 92717
UCIMR	University of California Institute of Marine Resources La Jolla, California 92093
UCLA	University of California, Los Angeles Los Angeles, California 90024
UCR	University of California Riverside, California 92521
UCSB	University of California Santa Barbara, California 93106
UCSC	University of California Santa Cruz, California 95064
UCSD	University of California, San Diego La Jolla, California 92093

Coastal Resources Research



— NOAA photo

Modified Watershed Hydrology: Effects on Estuarine Ecosystems

R/CZ-73
J. Zedler/SDSU

Several water management procedures manipulate stream flow (by release of imported water as treated sewage effluent) in southern California's coastal rivers. This, in turn, alters salinities and water quality in coastal estuaries, thus threatening plants and animals that inhabit the wetlands with major habitat changes. Specific objectives in this ongoing project are to determine how estuarine ecosystems respond to increased amounts of stream flow and to establish allowable regimes for freshwater discharge. A new understanding of ecosystem control has developed out of this project, and it is being used to manipulate wetland functioning.

Prediction of Coastal Stratus and Fog

R/CZ-74
G. Vallis/UCSD, SIO

Accurate forecasts of coastal cloud cover and fog will not be possible until the basic physical mechanisms are well understood and it is known how predictable the phenomena are in an ideal and practical sense. By experimenting with mixed-layer models of the boundary layer, researchers are examining the relative roles of the dominant physical mechanisms that govern coastal stratus and fog variability.

Study of Extreme Coastal Sea Level

R/CZ-76

D. Cayan, R. Flick/UCSD, SIO

During the 1982–83 winter, high storm-generated sea levels and waves caused great damage along the California coast. With recurrence of such extreme events likely in the future, it is important to have a better understanding of the physical mechanisms associated with atmospheric forcing of high coastal sea levels. Through case studies and statistical analysis, researchers will develop simple predictive models for forecasting extreme sea-level heights a few days in advance, which will in turn aid in the assessment of flooding risk.

Prediction of Nearshore Sediment Transport Using a Model for Fluid–Sediment Coupling

R/CZ-77

D. Inman/UCSD, SIO

The prediction of nearshore sediment transport is essential for coastal engineering, planning, and beach conservation. Through studies of fluid–sediment interaction under waves, sediment transport will be predicted with greater precision. A model will be developed that would allow prediction of cross-shore and longshore sediment transport. This will permit planners to predict beach form and erosion and engineers to find the best designs for harbor seawalls and other beach structures.

Maintenance of Entrance Channels of Coastal Lagoons and River Mouths

R/CZ-79

H. Chang, D. Stow/SDSU

Coastal management decisions are often made without a full understanding of entrance channel processes and the impact of human intervention on these processes. Field observations will be combined with mathematical modeling in this study to simulate entrance channel processes at lagoons and river mouths. Specific goals are to test various lagoon flushing schemes for wetland rehabilitation and to assess sand delivery rates to the nearshore zone, thus providing valuable information to coastal resource managers and engineers.

Acoustic Doppler System for Directional Wave Measurements

R/OE-4

R. Lowe, R. Guza/UCSD, SIO

Surface gravity waves are the largest single source of energy dissipated on the exposed coasts of the United States and thus have serious implications for coastal structures and resources. This project is concerned with the technology of economically measuring the directional properties of waves. Researchers will develop a compact prototype instrument that uses Doppler acoustic technology and measures surface wave spectra in shallow water with good directional resolution.

Aquaculture Research and Development

Reproduction and Growth in Crustacean Aquaculture

R/A-61

E. Chang et al./UCD, BML

If aquaculture is to meet the challenge of supplying a significant portion of mankind's growing need for animal protein, greater control over reproduction and growth is necessary. Researchers in this ongoing project are working to promote the development of crustacean aquaculture through elucidation of basic biological processes. Specifically, they are investigating gamete activation in shrimp, the role of Vitamin C in embryonic development, and molt-controlling factors in commercially important crustaceans.

Control of Reproduction in Crustaceans

R/A-59

P. Talbot/UCR

The domestication of crustaceans in aquaculture systems requires increasingly advanced understanding of new technologies to allow for the control of reproduction. Technologies for gamete regulation and control of egg loss are much needed in lobster aquaculture facilities. Researchers have successfully begun to develop and implement techniques for artificial insemination and sperm storage and to identify and control the causes of egg loss from captive females.

Cryopreservation of Crustacean Gametes

**R/A-62
J. Crowe/UCD**

A key problem in shrimp aquaculture today is the limited seasonal availability of gametes for starting shrimp cultures. Researchers in this ongoing study intend to increase the availability of seed stock by using cryopreservation of gametes and embryos. Thus far, they have identified two molecules that are superior to commonly used cryoprotectants in preserving the intact cells during freezing and which may be of widespread use in cryobiology.

Development of Pacific Oyster Broodstock

**R/A-65
D. Hedgecock/UCD, BML**

Two problems in the Pacific oyster industry, particularly in California, poor set of larvae and loss of product value during the summer spawning season, greatly reduce the number of marketable oysters. The researchers have begun to apply recent advances in oyster genetics and breeding to these problems in the hope of increasing oyster yields.

Culture of Marine Bivalves: Utilization of Dissolved Amino Acids

**R/A-60
G. Stephens/UCI**

Dissolved free amino acids are organic compounds that are removed from seawater by larval and juvenile bivalve molluscs and are necessary constituents of their diets. Researchers are using these amino acids to supplement the diets of cultured bivalves to increase survival and growth rates and to improve larval and juvenile development. Investigations have demonstrated the nutritional significance of amino-acid uptake in bivalves. This research will create predictable culture conditions, thus maximizing the effectiveness of bivalve mariculture.

Absorption of Nutrients by Fish

**R/A-63
J. Diamond/UCLA**

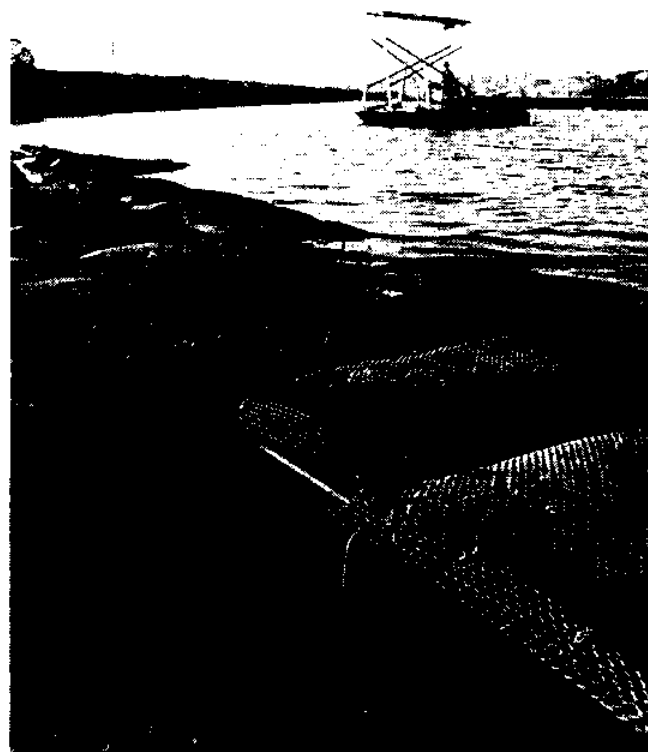
Aquaculture feeds are a major cost of fish production, yet efforts to find cheaper protein sources without decreasing fish growth are hampered by insufficient knowledge of nutrient absorption in fish intestines. In this project, researchers are measuring how nutrient absorption is affected by varying amounts of protein

and carbohydrates in the diet and by amino-acid supplements. Studies on how young versus old fish differ in their uptake of nutrients have been initiated. Information from these studies, coupled with growth trials, will be used to design fish feeds.

Determination of Optimum Dietary Protein, Lipid, and Carbohydrate Levels of Hatchery Produced Juvenile Sturgeon

**R/A-67
S. Hung/UCD**

A major problem facing commercial sturgeon aquaculture today is the lack of information available on the nutritional needs of juvenile white sturgeon under hatchery conditions. In a series of growth experiments, researchers will determine the quality of protein, lipid, and carbohydrate from some commonly used feed ingredients and will determine optimum dietary levels. These studies will aid fish-feed manufacturers in formulating and producing cost-effective rations for hatchery production of sturgeon.



— Los Angeles Times



Fisheries Research and Development

Development and Enhancement of Fisheries

Kidney Diseases of Pacific Salmon

R/F-100
R. Hedrick/UCD

Proliferative kidney disease (PKD) and bacterial kidney disease (BKD) have both caused huge losses in Pacific salmon. To prevent the spread of these diseases, researchers are working on determining the nature, source, and seasonality of the parasite that causes PKD and on examining the effect of BKD on saltwater adaptation. The parasite causing PKD has been found among salmon and trout at several sites in California, and its stages in the host have been described, leading to the first definitive information on the taxonomic status of this parasite.

Ceratomyxa shasta: Geographic and Seasonal Distribution, Salmon Strain Susceptibility, and Transmission

R/F-105
G. Hendrickson/HSU

Ceratomyxosis, an infectious fish disease carried by the parasite *Ceratomyxa shasta*, causes severe

losses among salmon in hatcheries and in nature. Because there is no known treatment, the only means of control is through proper containment and management. In this project, seasonal and geographic distribution of the infective stage of the parasite and the susceptibility of different salmon strains are being studied.

Endocrine Control of Salmonid Development and Seawater Adaptation

R/F-101
H. Bern, C. Nicoll/UCB

Researchers in this project hope to increase the contribution of hatchery-raised fish to the salmon fishery by identifying optimal conditions for thyroid-gland activation and thus the optimal times for release of fish into the ocean. This will help to reduce losses resulting from failure of the fish to adapt to seawater. Endocrine-control mechanisms involved in smoltification are being investigated, and studies of optimal release times for coho salmon based on the lunar cycle are being continued.

Stunting in Coho Salmon: An Investigation of Apparent Abnormalities in Ion Regulation

R/F-104
T. Kerstetter/HSU

Cessation of growth and early mortality, together termed "stunting," often occur when young salmon are transferred to saltwater from fresh water, which is done routinely in net pen culture and ocean ranching. Researchers have obtained evidence that a failure in intracellular ionic regulation may play a role in this phenomenon. They are investigating the causes of stunting and are seeking ways to prevent or minimize it by varying both the season of transfer to saltwater and the water salinity prior to transfer.

Biochemical Indices of Activity in the Northern Anchovy, *Engraulis mordax*

R/F-102
G. Somero/UCSD, SIO

Energy budgets are crucial in commercial fisheries for understanding environmental carrying capacities, the best uses of resources, and proper management policies. Costs of locomotion may be the major energy expenditure of fish, yet there are no reliable estimates of these costs. Researchers have shown the validity of using biochemical indices to estimate field energy budgets, and have begun analysis of

locomotory costs as a function of season, reproductive stage, life stage, and forage. The results will be used in an energy budget for the species.

Estimation of Larval Fish Starvation Rates in the Sea with Application to Northern Anchovy Larvae

R/F-107
A. Benson/UCSD, SIO

Using the northern anchovy as a model, the researchers are testing several theoretical models that are crucial to an understanding of recruitment in fish. A fast, new, and sensitive lipid analysis is being used to determine the nutritional conditions of anchovy larvae. This will enable researchers to determine mortality rates with respect to fish size, the spatial distribution of starvation, and the best ocean habitats for growth and survival of anchovy larvae.

Larval Feeding and Year-Class Strength of the Northern Anchovy, *Engraulis mordax*

R/F-106
M. Huntley, et al./UCSD, SIO

Certain dinoflagellate species associated with red tides are known to suppress feeding, growth, and survival of planktonic herbivores, and there is reason to believe that they have the same effect on larval anchovy. Researchers are quantifying the relationship between larval anchovy feeding and year-class strength by determining whether these dinoflagellates suppress the larval feeding rate. They are also determining if growth and survival are reduced on a diet of these dinoflagellates. This work aims to improve forecasts of fish abundance.

Correlation Between the Whiting Fishery and the Biomass of Whiting Food

R/F-111
M. Mullin/UCSD, SIO

An important question in the management of fisheries is whether the removal of the catch alters the growth and reproductive rates of the uncaught fish by reducing competition for food. In this study, researchers will use sieving techniques and statistical tests to determine whether the biomass of euphausiids (whiting food) in the northern California area of the fishery was different after initiation of the fishery than before. This will aid managers of the whiting fishery by providing a better understanding of the degree to which growth dynamics of whiting have been changed as a result of the fishery's effect on whiting food.

New Methods in Stock Abundance Estimation

R/F-109
M. Mangel/UCD

The proper management of marine fisheries is tied to accurate and timely estimates of stock abundance. Through mathematical, statistical, and computer analyses, this study will examine current methods for estimating abundance and will develop improved methods. Specific objectives are to develop design schemes for hydroacoustic surveys, and methodologies for estimating abundance based on encounter rates. These methods will be tested and refined. This research will result in a general theory that relates catch per unit effort to abundance, and that can be used as a predictive tool.

Fisheries Product Development

Quantitative Evaluation of *Clostridium botulinum* Growth Risk in Seafood Stored at Low Temperatures Under Modified Atmospheres

R/F-99
C. Genigeorgis/UCD

Modified atmospheres (MA) are new technologies involving vacuum, air, or CO₂ environments that delay spoilage of highly perishable foods such as fish. The potential of botulism during MA storage remains the only limitation to expansion of its use. Successful methods for quantifying the probability of *C. botulinum* growth as it is affected by time duration and temperature in fish stored under MA have been established. Time to toxigenesis can now be predicted. This research will be used to establish guidelines for safe application of MA technology to the seafood industry.

The Effects of Freezing and Frozen Storage on the Status of Fish Tissue

R/F-110
D. Reid/UCD

The freezing and frozen storage of fish leads to physical, chemical, and biochemical changes in the tissues that can damage the product. A better understanding of the processes of freeze damage is of value to the design of new and improved freezing processes. Through techniques in cryomicroscopy, isothermal freeze fixation, and biochemistry, researchers have begun to obtain knowledge that will allow them to characterize tissue component

deterioration in fish and eventually to predict optimal freezing methods.

New Marine Products Research and Development



Marine Chemistry and Pharmacology: Pharmacological Screening and Evaluation

**R/MP-38
R. Jacobs/UCSB**

With the objective of discovering new drugs useful in the treatment of human diseases, researchers have been testing compounds of marine origin with potential as pharmaceuticals. Objectives of this effort are to describe the site and mechanism of action of substances from marine organisms and evaluate them for their potential therapeutic value. Thus far, several agents have been discovered that have anticancer, anti-inflammatory, and analgesic properties.

Marine Chemistry and Pharmacology Program: Development of New Drug Leads from Marine Plants and Gorgonian Corals

**R/MP-39
W. Fenical/UCSD**

In this project, researchers will isolate and define novel bioactive metabolites from marine sources.

Specifically, they will collect and extract tropical marine algae and gorgonian corals and will isolate and purify bioactive metabolites from them. New compounds will be submitted to collaborators for comprehensive biotesting in a number of pharmacological assays.

Marine Chemistry and Pharmacology Program: Development of New Pharmaceutical Agents from Marine Invertebrates

**R/MP-40
D. J. Faulkner/UCSD, SIO**

Researchers in this cooperative project will isolate and characterize new natural products from marine sponges, molluscs, and other invertebrates with potential medicinal properties.

Marine Natural Products in Pharmacology: Development of Leads from Marine Animals

**R/MP-41
P. Crews/UCSC**

Employing a bioassay-guided approach to isolating substances from coral reef marine animals, researchers in this project will use structural chemistry to find new molecular structures with activity in several important pharmacological areas, such as antifungal, anti-inflammatory, antitumor, and antiviral activity.

Insect Control Agents from Marine Organisms

**R/MP-35
I. Kubo/UCB**

Because many agricultural crops cannot be grown economically without pesticides, there is a constant need to replace compounds whose usefulness has expired as a result of insect adaptation or unsuitable toxicity. This project is directed toward isolating and identifying naturally occurring insecticides from marine algae. Algae are being collected and extracted and their active components purified. Work has been completed on the structures of several compounds.

Molecular Probes for Improving Marine Algal Polysaccharide Quality

**R/MP-36
W. Laetsch/UCB**

Because of their distinctive thickening and gelling properties, marine algal polysaccharides are an

important marine resource with wide applications in food production, industry, and biotechnology. New methods are needed to rapidly assess the quality of these substances so they can be put to greater use. Researchers are engaged in developing new biochemical tools, such as molecular probes, for characterizing and assessing these polysaccharides.

GABA-Mimetic Peptides from Marine Algae and Bacteria: A New Class of Potential Diagnostic and Therapeutic Agents

**R/MP-37
D. Morse/UCSB, MSI**

Certain marine red algae and cyanobacteria produce a type of small peptide that mimics the action of the principal neurotransmitter of the human brain (known as GABA). Researchers are working to identify and develop GABA-mimetic substances useful for improving medical diagnosis and treatment of the brain. They have developed methods for the purification of these peptides and have begun biochemical characterization of their structures.

Ocean Engineering

Capsizing of Semi-Submersible Platforms

**R/OT-12
J.-L. Armand/UCSB**

Semi-submersible platforms used in offshore oil and gas exploration are inherently stable, but can become unstable and dangerous in severe storms and other extreme conditions. Researchers are working to improve the safety of semi-submersible platforms by investigating the basic mechanisms of stability. They have derived mathematical formulas to describe the dynamic behavior of a twin pontoon semi-submersible platform under hostile sea conditions; a model platform will be used to test these formulas.

Time-Domain Analysis of Large Motions of Offshore Platforms

**R/OT-14
W. Webster, J. R. Paulling/UCB**

Increased oil drilling off the California coast will increase the risk of accidents resulting from the capsizing of drilling vessels, and methods for assessing platform safety are currently not well

developed. Researchers are using large-amplitude hydrodynamic force prediction methods to improve the prediction of capsizing and to achieve insights into its prevention.

Evaluating the Fatigue Behavior of High Strength Reinforced and/or Prestressed Concrete, Both Normal-weight and Lightweight, Under Marine Conditions

**R/OE-1
B. Gerwick, W. Hester/UCB**

Concrete structures are used extensively in marine environments and are subjected to wave action for their entire life span. In the last 10 years, there has been a move toward higher-strength and lower-weight concrete for sea structures. Researchers are concerned with the fatigue behavior of these structures and hope to improve their efficiency and safety by investigating marine concrete under both low- and high-cycle loading and by evaluating the properties of high strength, lightweight concrete versus normal concrete.

Stability of Submarine Pipelines Against Breakout Failure

**R/OE-2
M. Foda/UCB**

Submarine pipelines, extensively used in ocean outfall systems, are constantly subjected to pressure forces from ocean currents and waves. Objectives of researchers in this study are to enhance understanding of the mechanism by which a pipe breaks loose from the seafloor and to examine the effectiveness of various protection measures against breakout failure. The stability of various proposed protection measures will be assessed.

Numerical Bathymetry in Shallow Water

**R/OE-3
R. Seymour/UCSD, SIO**

Limited knowledge of water depths prevents full utilization of a harbor by deep-draft vessels, and shortages of dredging funds make the need for data more critical. By adapting deep-water wide-swath and sidescan sonar technology to shallow water, researchers hope to substantially improve and reduce the cost of shallow bathymetric surveys. Their objective is to develop a hybrid sonar system capable of wide-swath surveying with good spatial resolution in very shallow water. They will use computer

simulation to pretest the system performance and will demonstrate the effectiveness of the system in field trials.

Marine Affairs

Forecasting Commercial Passenger Fishing Vessel Angler Participation

R/MA-27
W. Johnston, J. Wilen/UCD

This study will aid in the management and enhancement of the commercial fishing industry by analyzing patterns of participation in angling activities. Researchers will develop and statistically estimate models that predict how changes in resource abundance affect angler response and how changing participation rates affect harvest levels.

The U.S., Japan, and the Pacific Fisheries: Economic Relations, Diplomacy, and Ocean Law, 1945-85

R/MA-28
H. Scheiber/UCB

Despite the importance of Japanese-American relations in marine affairs, there has been no study of the post-World War II origins and development of this relationship. Policy planners and scholars need this historical perspective of policy problems that have been shaped by inherited institutional factors. Investigators in this project will provide an empirical study and an interpretive analysis of relationships



between Japan and the United States with regard to fisheries, ocean law, and diplomacy since World War II.

Rapid Response

Rapid Response Capability

R/NP-1
J. J. Sullivan/UCIMR

Because conditions in the marine sphere fluctuate as a result of both human and natural causes, problems that need immediate attention can arise unexpectedly. The rapid response project was established to provide prompt support for intense, short-term, marine-related research projects as needs arise.

Education

Sea Grant Trainees

E/G-2
J. J. Sullivan/UCIMR

Sea Grant's dual commitment to furthering marine-oriented research and education that will benefit industry, academia, and the general public is met by the Sea Grant trainee project. Graduate students participate in marine research and work on problems relating to marine resources while fulfilling thesis requirements. This on-the-job training prepares trainees to enter positions in government and industry, enhancing the nation's trained manpower resource.

John D. Isaacs Memorial Sea Grant Scholarship

E/UG-4
J. J. Sullivan/UCIMR

The John D. Isaacs Memorial Sea Grant Scholarship was established in 1981 to recognize excellence in research by high school seniors, to encourage interest in marine science at the high school level, and to encourage pursuit of scholastic excellence in higher education. Each year a graduating California high school senior who presents an outstanding marine science project at the California State Science Fair receives a scholarship to study at a college or university in California.

Advisory Services

Marine Advisory Program

A/EA-1
R. J. Price/UCCE

One of Sea Grant's major objectives is to provide educational opportunities for all the people of California, particularly those who depend on oceanic and coastal resources for their livelihoods and who use these resources for recreational purposes. Through the Marine Advisory Program, citizens learn about and benefit from the latest scientific technology pertaining to the development, management, utilization, and conservation of the state's oceanic and coastal resources.

Communications, Publications, and Public Advisory Services

A/P-1
J. J. Sullivan/UCIMR

Disseminating research results and information on oceanic and coastal resources is the task of Sea Grant's communications and publications program. The audience includes scientists, technical researchers, academicians, legislators, user groups, industry, and the general public. By effectively informing such a varied audience, Sea Grant seeks to promote the wise use, management, and development of our marine resources.

California and the Pacific: Marine Sciences for the Public

A/PE-1
D. W. Wilkie/UCSD, SIO
M. Love/UCSB, MSI
W. T. Doyle/UCSC, CMS
Bernd B. Würsig/SJSU, MLML
R. Chaney/HSU

In order to encourage California teachers to incorporate marine information into their curricula, workshops and symposia will be offered. The workshops will highlight available ocean education resources for teachers, while symposia will focus on current issues and advances in ocean science within the context of their social, political, economic, and Pacific ramifications.

Sea Grant Marine Advisors



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*The Marine Advisory Program is coordinated by Robert J. Price at the program's main office in the Department of Food Science and Technology, University of California, Davis, CA 95616, (916) 752-2193.

Management

Program Management

M/A-1
J. J. Sullivan/UCIMR

The California Sea Grant management project ensures effective dissemination of new research information and technology by developing and coordinating the program's research, education, and advisory activities. Effective management allows continued development of the California Sea Grant College Program, ensures fiscal control and efficient program administration, allows the development of cooperative activities and scientific workshops, and permits liaison with local, state, and national agencies, industries, and the National Sea Grant College Program.

Program Planning and Development

M/P-1
J. J. Sullivan/UCIMR

The California Sea Grant College Program sponsors marine science projects that have local, national, and international impact. With these projects, Sea Grant is able to meet the changing needs of user groups through responsive program planning and development. The planning and development project provides staff support for program advisory committees, supports educational programs, promotes the wise use and conservation of coastal and marine resources, and assists government regulatory agencies and industry in applying research results.

Administrators and Committees

Aquaculture Industry Advisory Committee

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