

CURRENT RESEARCH OF THE
MARINE SCIENCES RESEARCH CENTER

1980 - 81

EDITED BY SUE RISOLI



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THE CENTER

The Marine Sciences Research Center (MSRC) is the coastal oceanographic research center of the State University of New York system. We view ourselves as a vigorous community of scholars engaged in attacking problems of the marine environment on both theoretical and applied levels. One distinguishing feature is MSRC's commitment to translating the results of its own research, and that of others, into forms readily usable by decision makers in resolving important environmental problems of the coastal ocean. Located at the SUNY campus at Stony Brook, the Center offers the only SUNY graduate degree programs in oceanography and marine environmental sciences. All of this has contributed to MSRC's development as an internationally recognized center of research, graduate education, and public service.



FACULTY RESEARCH

E. R. BAYLOR, PROFESSOR

I am investigating the apparent adsorption of viruses and bacteria to air bubbles in the laboratory and in the sea surf. It is well known, for example, that the waxy coat of the tubercle bacillus causes it to adhere to bubbles but the reasons for the apparent adsorption of other organisms are not equally obvious. Moreover, the behavior of *Serratia marcescens* in a fluid containing bubbles (observed under the microscope) suggests that the apparent adsorption of bacteria to bubble surfaces is voluntary and reversible. Individual *Serratia* cells adsorb to and desorb from an air bubble surface but do not adsorb to nitrogen or carbon dioxide bubble surfaces. This chemo-thigmotactic behavior offers a partial explanation of the concentration enhancement phenomenon of Blanchard, in which the aerosol drops from bursting bubbles exhibit a greater concentration of bacteria per ml than was present in the bulk liquid from which the bubble burst.

The paradox of concentration enhancement by non-adsorbing bacteria in aerosol drops from bursting bubbles is harder to explain. Our working hypothesis involves concentration of bacteria by the von Karman vortex, which is closely associated with the rising bubble in the narrow range of bubble Reynolds numbers in which concentration enhancement occurs.

HENRY BOKUNIEWICZ, ASSISTANT PROFESSOR

My research is concerned primarily with the behavior of coastal sedimentary systems. My students and I are doing field work to study the transportation of fine-grained sediments in rivers and estuaries; shore erosion and the partitioning of sediment parti-

cles at the shoreline; and the sedimentary evolution and hydrology of coastal environments. This work is being done in several areas around the Northeast. Projects are being done, for example, to study erosion along the Hudson Estuary, the coastal processes at the south shore of Long Island, and the solubility of sediment layers in New York Harbor.

Much of this research is directly applicable to problems of coastal zone management. I am interested in applying my research to the problems of shore erosion, the dispersion of contaminants, siltation, and the dredging and disposal of dredged sediments. As a result, we are in close contact with federal, state, and local regulatory agencies, such as the U.S. Army Corps of Engineers and the Environmental Protection Agency.



M. J. BOWMAN, ASSOCIATE PROFESSOR

My recent research has been directed towards an interdisciplinary study of tidal and residual circulation, cyclogenesis, mixing, stratification, light attenuation, and buoyancy fluxes near and in frontal zones in shallow seas. I am investigating how these processes control the distribution and productivity of phytoplankton.

Tidal stirring variations in continental shelf seas and estuaries can produce changes from well-stratified to well-mixed conditions over short horizontal distances. These boundaries are significant in determining distributions of phytoplankton, since the same mixing processes which produce weather fronts also determine the availability of light and nutrients necessary for phytoplankton growth.

Exploration of these processes is being achieved through a combination of computer modeling studies of tidal dynamics, the use of continuous surface mapping methods and rapid vertical profiling on oceanographic cruises, and satellite sensing experiments. The use of NIMBUS-7 multispectral imagery for ocean color and chlorophyll *a* determinations, and the use of NOAA 6 and TIROS-N to measure sea surface temperature, form a cornerstone of the experimental program.

B. H. BRINKHUIS, ASSISTANT RESEARCH PROFESSOR

The main focus of my present research is the Marine Biomass Project, which I am directing. This is a study of seaweed growth which, years from now, could result in large-scale production of seaweed-based natural gas. Right now we are analyzing growth patterns of nine common seaweeds being grown in the Flax Pond Lab greenhouse. The eventual aim is to establish seaweed "farms" to produce enough seaweed to satisfy

the natural gas demand for a large area. This year we will attempt to culture seaweed offshore on small raft-like structures that will serve as prototypes for a large-scale test farm raft to be constructed several years from now.

I will also study the effects of mercury on *Gracilaria*, a Chilean seaweed harvested commercially for the production of agar.

D. G. CAPONE, ASSISTANT RESEARCH PROFESSOR

My general research interests are in the areas of marine microbiology and biochemistry--specifically, the estimation of microbial activities and biomass in marine ecosystems. To understand the microbial ecology of these systems, I have adapted and applied methodologies currently used in other biological fields (such as biochemistry, microbiology, and soil biology).

Ongoing research is focused on the importance of nitrogen cycle bacteria in several marine communities. Nitrogen is often the factor that limits primary production in the marine environment. N_2 fixation, nitrification, and denitrification--three strictly bacterial activities--may therefore exert considerable influence on the basic productivity of these systems. We are currently investigating the interactions of bacteria and macrophytes in seagrass (*Zostera*, *Ruppia*) and salt marsh (*Spartina*) communities. Specific work includes improvement in the methodology for assaying these parameters in sediment systems and surveying for specific bacterial-plant associations in the root zone.

A second project will attempt to determine the effect of environmental pollutants on microbial activities in marine sediments. We will determine the

potential for inhibition of these microbial activities by the pollutants that tend to accumulate in the sediments.

EDWARD J. CARPENTER, ASSOCIATE PROFESSOR

My recent research interests are rather broad, but I am interested basically in nitrogenous nutrient transformations in aquatic habitats. My research is concentrated in Great South Bay on the south shore of Long Island. Nitrogen availability is a major factor affecting the growth of marine phytoplankton in this bay. Research here is concerned with all aspects of the marine nitrogen cycle (N_2 fixation, denitrification, uptake, excretion, etc.) and how various factors such as nutrient loading, physical events, and toxic substances affect those processes. Since much of my past work has been with phytoplankton, these organisms receive the bulk of my attention in the Great South Bay work.

H. H. CARTER, PROFESSOR

Since 1964 I've been working on methods for measuring and mitigating man's impact on his estuaries and coastal waters. This has involved fundamental studies of turbulent mixing (i.e., mixing in estuaries and coastal waters), the design of waste water outfalls, studies of plumes associated with heated cooling water discharges from electric generating stations, and the development of models for predicting the distribution in the receiving waters of this heated cooling water. Most recently Schubel, Wilson, and I developed a scientifically defensible rationale for evaluating the biological response of organisms to thermal plumes.

At the present time I am working with Wilson and Bokuniewicz on circulation and mixing of Great South

Bay. Great South Bay is of great importance to New York State inasmuch as it supports a major U.S. hard clam fishery. In addition, I am working on fundamental problems associated with turbulent diffusion in the coastal waters off Long Island with Pritchard, Wilson, and Okubo. Last year, Pritchard, Schubel, and I visited the People's Republic of China to identify scientists and organizations with interests mutual to those of the MSRC. As a result of our trip, we expect to collaborate in the near future with scientists at the Shanghai Normal University and the Shanghai Waterways Bureau in a study of the circulation, mixing, and sedimentation of the Yangtze River.



Satellite view of the mouth of the Yangtze

ROBERT M. CERRATO, ASSISTANT RESEARCH PROFESSOR

My research centers primarily around the response of individual organisms, populations, and communities to physical disturbances. A physical disturbance can be created by a variety of processes, both natural and man-made, such as storm waves, tidal scour seafloor

mining, and the dumping of dredged sediment. Study of this response is important for both conservation and management, and provides interesting information about the dynamics of biological systems.

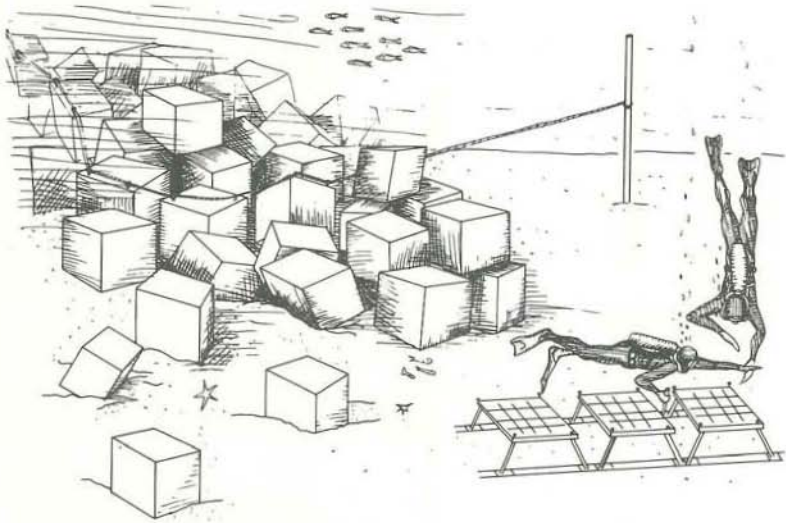
At present, I am studying with others at the Center the feasibility of using dredged sediments to backfill subaqueous borrow pits in New York Harbor. My chief concern is to determine the manner in which benthic organisms will colonize the newly created surface. In the near future, I hope to be able to assess the impact on benthic macrofauna of the now-closed breach in the barrier beach at Moriches Bay. In this study, microgrowth records stored in the shell of the hard clam, *Mercenaria mercenaria*, would be used as a means of comparing pre- and post-disturbance environmental conditions.

I have also been working to estimate the age of mussels collected near deep-sea hydrothermal vents along the Galapagos Rift. My analysis has determined that the age of the largest collected individual is approximately 18.7 years. Interestingly, a large assemblage of shells of dead individuals is not found at the sites thus far examined. This suggests that the age of the oldest living individuals in the mussel population may also reflect the age of the associated vents.

I. W. DUEDALL, ASSOCIATE PROFESSOR

I maintain interests in marine geochemistry, and the physical chemistry of seawater and other aqueous systems. I have also studied the behavior of wastes in the marine environment. My recent work involves the monitoring of an artificial fishing reef constructed from blocks of compacted fly ash and scrubber sludge. These are wastes produced by coal-fired electric power-

generating plants. It is hoped that the reef will provide a habitat for fish and crustaceans. I am also coordinating an international exchange program of students and professors between the U.S. and Chile.



Artist's conception of coal waste artificial reef

M. DENNIS HANISAK, ASSISTANT RESEARCH PROFESSOR

My research centers on the physiological ecology of seaweeds. Currently I am working on the Marine Biomass Project with Brinkhuis. Although the main purpose of this project is the development of an alternative source of energy, it also gives me the opportunity to explore many facets of the physiology and ecology of these algae, including their primary production, nutrient uptake, and photobiology. My other research interests include: the interactions of seaweeds with other trophic levels, hormonal regula-

tion in algae, the biology of coenocytic algae, and aquaculture.

H. HERMAN, PROFESSOR

My work involves ocean engineering and I am particularly interested in habitats and submersibles--both manned and remote. I also study marine materials, marine corrosion, and mineral accretion technology. Right now I'm working in Florida and the Bahamas with the Coral Reef Society on a study of mineral accretion. However, most of my research takes place in Long Island Sound. I hold a joint appointment with the Department of Materials Science.

B. KINSMAN, VISITING PROFESSOR

My primary research interests include: waves and wave generation, estuarine circulation and dynamics, micrometeorology, and mathematical and statistical techniques for turbulence.

I've completed a study on wave energy in the lower New York Harbor, and have written texts on mathematical and statistical techniques for turbulence.

L. E. KOPPELMAN, PROFESSOR

My major research over the past decade and a half generally has been concerned with the environmental policy aspects of regional planning, and specifically directed towards coastal zone management. This has included project managership over almost \$20 million in directed research including coastal regional planning, comprehensive water management, shoreline erosion practices, and related studies. In addition to the development of legislation related thereto, and the design of administrative mechanisms for policy implementation, I am particularly involved in the de-

velopment of synthesis techniques for relating coastal zone science into the regional planning process. The most current efforts include a National Urban Runoff study funded by the Environmental Protection Agency, and the completion of a book titled *The Long Island Coastal Zone Plan*. I also serve as Executive Director of the Long Island Regional Planning Board.

PATRICIA LAPENNAS

My research has involved hydrography and phytoplankton species composition and enumeration. With Bowman, I am presently attempting to develop an ability to predict the productivity of fisheries by studying tidal mixing and how it affects the productivity and concentration of the phytoplankton at the base of the marine food chain.

GLENN LOPEZ, ASSISTANT PROFESSOR

Marine benthic ecology, particularly the trophic relations of animals and microorganisms in benthic communities, comprises the bulk of my work, as do the functional morphology and behavior of deposit-feeding animals. These interests have carried me into the study of the various adaptations that animals display for feeding on detritus- and sediment-associated microorganisms. I am also interested in the study of population dynamics of animals as it relates to competition and succession in the soft-bottom benthos. In this regard, I plan to study the population dynamics of the opportunistic and often pollution-indicating capitellid and spionid polychaetes.

BRUCE MACLER, ASSISTANT RESEARCH PROFESSOR

In the past I have studied the growth and metabolism of hydrogen-producing photosynthetic bacteria.

I have also been concerned with the biochemistry of marine algae, particularly the characterization of end products. In addition, I am interested in the characterization of metabolic pathways in symbiotic systems. I am currently working with Brinkhuis and Hanisak on the Marine Biomass Project; my primary task is to develop methods for open ocean cultivation of seaweeds.

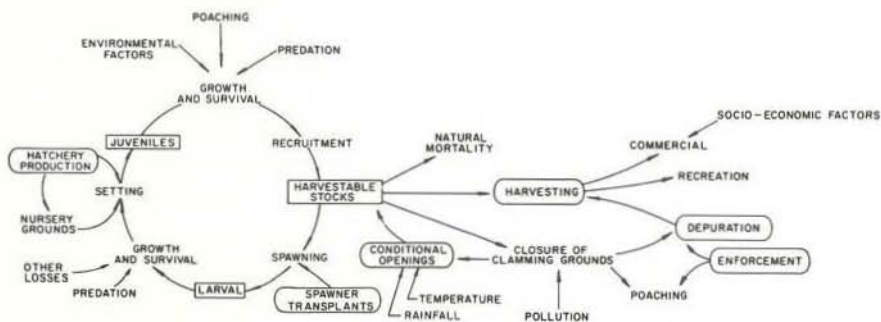
R. E. MALOUF, ASSISTANT PROFESSOR

The coastal waters of Long Island, particularly Great South Bay, produce more hard clams (*Mercenaria mercenaria*) than any other area in the world. The fishery has been estimated to contribute \$100 million annually to the local economy. It is this huge, but relatively unstudied resource that is the object of my research efforts.

With support primarily from the New York Sea Grant Institute, and with considerable cooperation from local government agencies as well as from the shellfish industry, I have initiated a research program to study a number of different aspects of the biology of the hard clam. These studies to date have included: histological examination of thin sections collected over a two-year period to determine the clams' spawning cycle in local waters, studies of size-specific fecundity in hard clams, and studies of the influence of adult clams of various species on larval hard clams. In addition, a two-year study of the feasibility of enhancing natural reproduction by planting "seed" clams was initiated in the spring of 1980.

An important part of this developing research program has been the alteration of the Flax Pond seawater lab for use in studies of the reproduction, behavior, and physiology of natural and cultured

populations of hard clams. With use of this facility, studies of factors influencing the growth and survival of juvenile hard clams will receive increased emphasis. These studies will include examination of the energy partitioning of hard clams with the eventual goal of providing a partial explanation for observed differences in growth rates of clams from different sites within the Bay. Studies of some of the important clam predators are receiving additional emphasis.



Schematic representation of Great South Bay Clam Fishery

J. L. McHUGH, PROFESSOR

My present interests lie in several major areas: history of the fisheries of the Middle Atlantic Bight, attempts to manage these fisheries by the Mid-Atlantic Fishery Management Council, knowledge of all aspects of the biology of the hard clam, and the history of the whaling industry.

The first set of projects involves a continuing attempt to develop an inventory of all that is known about the fisheries, culled from all sources. Problems of these fisheries, and for that matter all fisheries of the United States, are perceived differently by

different people. Many of the commonly believed facts are not, or at best are only partially, true. For example, the belief that all problems of the fisheries were caused by foreign fishing is not true; this is just beginning to be recognized dimly as the Regional Fishery Management Councils develop fishery management plans. Performance of the Mid-Atlantic Council is being evaluated and improved techniques will be recommended.

The belief that the 200-mile extension of jurisdiction over fisheries will eliminate foreign fishing, and that domestic fishermen will be able to fish freely anywhere in the area, is equally untrue. American fishermen have been regulated to ensure optimum yields; this has resulted in a reduction, but by no means a cessation, of foreign fishing off our shores.

For the past five years a search has been made of the literature and all titles referring to the hard clam have been listed and abstracted. Over 2,100 titles have been found and the study is being completed for publication. I am also producing a book on whales and whaling which will try to present the subject in an unbiased manner.

W. J. MEYERS, ASSOCIATE PROFESSOR

I am conducting a petrographic and geochemical study of diagenesis of ancient carbonates. Much of the work to date has been on calcite cements in Mississippian skeletal limestones from New Mexico and Arizona, with the goal of establishing regional diagenetic models that may be widely applicable. Trace elements and isotopes are being studied in these cements to characterize the chemistry of precipitational ground waters, and to test for regional and stratigraphic gradients in chemistry of the cement zones.

These gradients are used as paleocurrent indicators of groundwater flow directions and as a test for cross-formational flow during cementation, and to interpret sources of trace elements and isotopic signatures.

I hold a joint appointment with the Department of Earth and Space Sciences.

A. OKUBO, PROFESSOR

Physical diffusion in natural environments and the diffusional aspect of living organisms are my research interests. The study of physical diffusion includes Lagrangian description of dispersing particles and mathematical modeling for the dispersion of contaminants in the sea by oceanic diffusion and mixing.

With regard to the diffusional aspect of organisms I am interested in mathematical modeling for animal swarms such as insect swarms, zooplankton swarms, and fish schools. To properly model animal swarming it is necessary to take into account the behavioral effect in addition to the general process of diffusion due to randomness in animal movement.

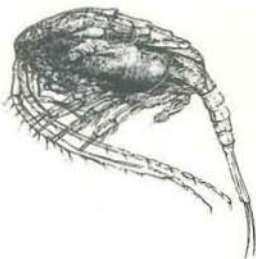
I am also interested in models of interacting populations in spatially heterogeneous environments, e.g., turbulent sea. In particular, attempts have been made to model the patchy distribution of plankton ("patchiness") in the sea.

W. T. PETERSON, ASSISTANT PROFESSOR

I have a number of research interests, all involving coastal zooplankton ecology. I am particularly interested in two problems. The first is the effects of tidal stirring on ecological zonation of coastal copepods. The second is the effects of predation of larval and juvenile planktivorous fishes on copepod

population dynamics. I have a continual interest in life history strategies, particularly of those organisms whose populations live along clines.

Another research interest falls under the general area of subtle, sublethal effects of toxicants and pollutants on copepod fitness parameters. I plan to study the effects of PCB and perhaps heavy metals on fecundity and development time of the copepods *Acartia tonsa*, *A. clausii*, and *Temora longicornis*. Someday, I also want to test the hypothesis that copepod populations from Raritan Bay, NJ are more resistant to toxic chemical stress than populations from more pristine areas. Evolution of resistance would be highly adaptive to individuals living in a system as stressed as Raritan Bay. Some population genetics measurements are planned.



Copepod *Temora longicornis*

D. W. PRITCHARD, ASSOCIATE DIRECTOR FOR RESEARCH, PROFESSOR

My research interests are directed towards an improved understanding of the motion and mixing in estuaries, other coastal tidal water bodies, and continental shelf waters. In order to attain these goals, I am involved in several activities. One is the development of a method to predict the effects of a break in the barrier islands of Long Island's south shore. The initial effort involves Moriches Bay,

where a break occurred last year after a severe winter storm. I am also measuring the concentrations of fluorescent tracer dyes that are introduced into natural water bodies to study diffusion processes.

In addition, I'm participating in studies of circulation and mixing in Great South Bay, and in studies of the relationship between certain stochastic properties of water motion as revealed by fixed current meters.

O. A. SCHAEFFER, PROFESSOR

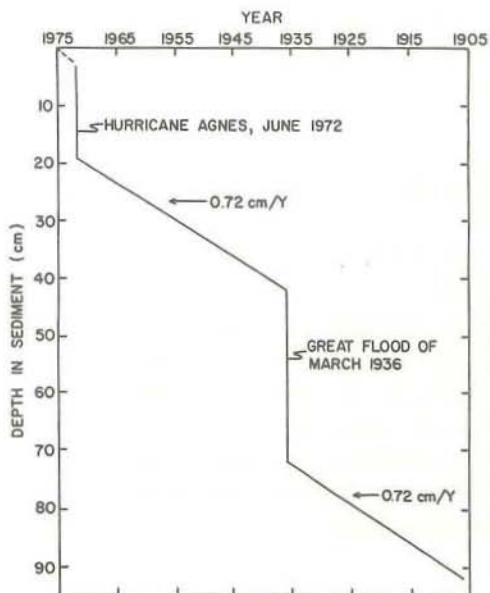
My research interests include the outgassing of the earth's mantle. In progress is an investigation of nitrogen in rapidly cooled rims of deep-sea basalts near or on mid-ocean rises. The nitrogen is an indicator of the release of volatiles at the present time from the earth's mantle. Another interest is laser K-Ar dating of individual mineral grains in polished rock surfaces. So far the work has been applied to lunar rocks, but I plan to study meteorites and terrestrial rocks as well. I hold a joint appointment with the Earth and Space Sciences Department.

J. R. SCHUBEL, DIRECTOR AND PROFESSOR

My current research is concentrated in two general areas--coastal sedimentation and coastal zone management. I am involved in a number of studies to characterize geological processes in the coastal ocean, to assess man's impacts on the coastal marine environment, and to develop strategies to ensure the continued multiple use of these areas with predictable, acceptable risks to the environment and its biota. With Bokuniewicz, Brinkhuis, Cerrato, and Mr. David Hirschberg, I am studying the sand and gravel deposits

of the Lower Bay of New York Harbor. We are assessing the feasibility of combining sand mining with the disposal of contaminated dredged materials in the borrow pits. Hirschberg and I are continuing studies of sedimentation in the Chesapeake Bay. We are using Pb-210 and other radioactive tracers to investigate the processes that control sedimentation in the Chesapeake Bay. I am also involved in studies of shore erosion on Long Island, and dredging and dredged material disposal in New York's coastal waters.

With Koppelman and Weyl, I am coordinating a United Nations-sponsored project to demonstrate to developing countries how to use science in coastal zone planning and management. This year we will present an intensive short course in Ghana for 19 West African countries. One of our graduate students, Jeffrey Schaefer, will use part of this project as his master's thesis.



Interpretation of sedimentation at a site in northern Chesapeake Bay (39°23'N, 76°05'W) based upon the observed distribution of Pb-210 (not shown). The two storm events contributed about one-half of the total sediment accumulation since 1900.

MARY I. SCRANTON, ASSISTANT PROFESSOR

My research interests lie in the area often called biogeochemistry--the study of the interactions between biological and chemical systems and the effect of these interactions on the distribution of chemical species in the oceans. Past work focused on the distribution of methane; more recent research is devoted to investigating aspects of the hydrogen system. Two environments are being studied. Work in an anoxic salt pond aims to discover the role of interspecies hydrogen transfer in controlling hydrogen concentrations and, in turn, in identifying effects of hydrogen concentrations on the fermentative pathways carried out by other bacteria.

A second area of interest is an investigation of the source of hydrogen to tropical ocean surface waters. We have hypothesized that *Trichodesmium*, a nonheterocystous cyanobacterium, may produce hydrogen during nitrogen-fixation. I am working in Long Island Sound salt marshes to investigate the role of nitrogen-fixing organisms in the hydrogen cycle in a more temperate climate.

L. B. SLOBODKIN, PROFESSOR

My central concern is: given the enormous complexity, variability, variety, and fragility of ecological systems, can a theory of ecology actually answer questions or must it be a discussion of oversimplified and arbitrary models, suggested by, but not representing, nature? This is approached by three paths. One is an attempt to so thoroughly describe a simple group of organisms (Hydra) that their responses, both ecological and evolutionary, to ecological perturbations in the field may be predicted. For reasons related to their develop-

mental constraints they are, I believe, more amenable to such a description than almost any other metazoans.

The second is my participation in a joint study of the global bio-geochemistry of carbon. Lastly, I'm working on a study of epistemological problems related to theories of complex biological systems.

I maintain a joint appointment with the Department of Ecology and Evolution.

D. F. SQUIRES, PROFESSOR

I'm interested in marine policy and marine affairs. In addition to teaching at the Center I serve as Director of the New York Sea Grant Institute.

O. W. TERRY, ASSOCIATE RESEARCH PROFESSOR

Over the long term I am interested primarily in the management of living marine resources. At present I am working with local staff of the National Oceanic and Atmospheric Administration's Office of Marine Pollution Assessment on studies of the ecological impact



of marine pollution. Past research dealt with various aspects of tidal wetlands ecology and preservation, and also with the technical aspects of several different kinds of marine aquaculture. The most recent such activity was participation in the Marine Biomass Project.

Future plans include continuation of marine pollution studies, limited consulting relative to assessing ecological impacts on marine and freshwater wetlands and on mitigation techniques, and research on a few ideas in wetlands ecology and the practical utilization of solar energy. I hope to find time to do an increasing amount of writing, namely in these areas.

F. F. Y. WANG, PROFESSOR

Coastal reinforcement--the design and installation of cost-effective systems to protect the coastlines--is one of my interests. I am also involved in devising material systems to consolidate municipal and industrial waste for ocean disposal. This includes dealing with sewage and industrial waste in both liquid and solid forms. In addition, I am interested in the energy systems of aquaculture. I hold a joint appointment with the Department of Materials Science.

PETER K. WEYL, PROFESSOR

In the past I've done research in various areas of science including nuclear physics, the physical chemistry of seawater, the transformation of marine sediments into sedimentary rocks, the interaction between carbonates and sea water, the role of the ocean in climatic change, descriptive oceanography, and the origin and early development of life. Recently I

have become concerned about the application of scientific information about the ocean environment to the societal decision-making process.

In order for scientific information to have an impact on decision making, the relevant information must be extracted from the vast accumulation of data. It must then be transformed into parameters applicable to the decision-making process and translated into a form intelligible to the decision makers.

Current projects involve development of coastal zone information systems on coastal structures in the town of East Hampton, on coastal hazards in Chile's Region 8, and for economic development of 19 coastal countries in West Africa. Another project will analyze data on the coliform bacterial contamination of Great South Bay so that we can learn about the circulation of that bay and infer the consequences of possible remedial actions.

A proposal to examine information on the steady-state nature of the CO₂ budget in the Atlantic Ocean has been submitted for possible funding.

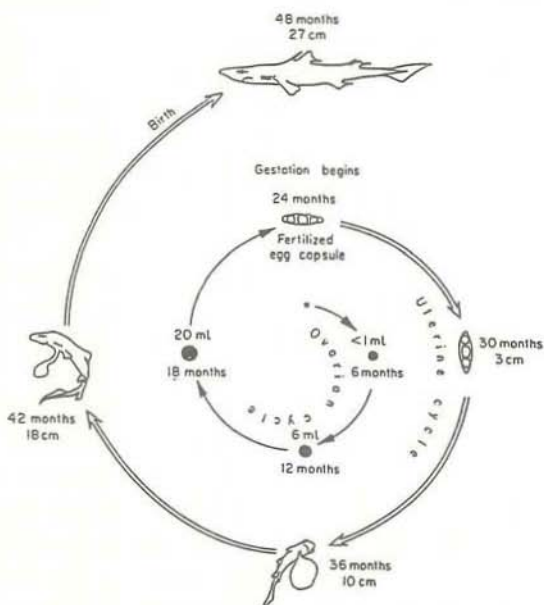
R. E. WILSON, ASSOCIATE PROFESSOR

My work involves estuarine and coastal ocean dynamics. Current research interests include low frequency meteorological forcing of Long Island Sound and exchange processes between Great South Bay and the adjacent shelf at subtidal frequencies. I am also making dispersion estimates on the inner shelf from Eulerian current measurements, and am studying low frequency circulation and exchange processes within the Hudson-Raritan Estuary.

PETER M. J. WOODHEAD, RESEARCH PROFESSOR

I study the ecology of reef systems, both natural and man-made. Currently I am co-director with Duedall of the coal waste artificial reef program.

I have long-standing interests in fishes and fisheries. Present research addresses the biology and reproductive ecology of spiny dogfish and black sea bass. The dogfish is ovoviviparous and has a two-year pregnancy from fertilization to birth of



Reproductive cycle of spiny dogfish

offspring. The black sea bass is a sequential hermaphrodite, the individual fish being first female and then male. Their unusual life histories may have profound implications for the national management of these fishes when they are commercially

fished. Another newly funded program considers the differentiation of the stocks on sub-populations of the yellow-tail flounder in the New England-New York Bight region. Techniques of gel electrophoresis and measurement of meristic characters are being used to attempt to assess the degree of separation of four sub-populations of flounder; the results may have direct application to the current fishery regulations for this flounder. I am interested in long-term climatic fluctuations in the ocean, which I believe cause profound changes in many fish stocks.

CHARLES F. WURSTER, ASSOCIATE PROFESSOR

My research has concerned the effects of stable chlorinated hydrocarbon pollutants on marine plankton communities. Focusing on those chemicals found regularly in the environment (polychlorinated biphenyls, DDT, DDE, and dieldrin), we have studied the effects on individual species, mixed cultures, and natural phytoplankton and zooplankton communities in an attempt to understand the impact of these chemicals on aquatic ecosystems.

These pollutants may aggravate the problems of eutrophication, sometimes leading to "blooms" of undesirable species. The growth of some species of algae is inhibited by chlorinated hydrocarbon concentrations as low as the parts per trillion range. This sensitivity varies with the species, and the supply of various nutrients. Selective toxicity may alter the species composition within the community. Recently we have concentrated our efforts on natural plankton communities from Long Island Sound.

At 1 to 10 parts per billion PCBs reduce average cell size in natural phytoplankton assemblages, producing a community of smaller-sized algae. Whereas

large phytoplankton are believed to favor large zooplankton, short food chains, and the production of fish, small phytoplankters are thought to lead to smaller zooplankters, longer food chains, and jellyfish production. PCB pollution therefore could have important implications for the production of harvestable fish resources.

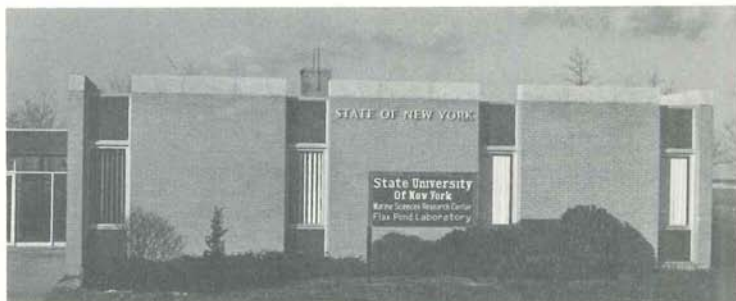
Since most chlorinated hydrocarbon pollutants in natural waters are found to be associated with particulates, we are also studying the dynamics of PCB transfer between various particulates, water, and cells. Further, we are developing a two-species phytoplankton bioassay system for identifying chemical pollutants with toxicity to planktonic communities.

RESEARCH FACILITIES

MSRC is located in three buildings on the South Campus of the State University of New York at Stony Brook. Its 73,600 square feet of space include over 20 research laboratories, a teaching laboratory, a SUNY-wide laboratory, office space, reference room, and chart and publications rooms. In addition, the Center houses a graphic arts department and a computer "mini-center".

Research Laboratories - each lab is equipped for specialized studies in microbiology, seawater chemistry, geochemistry, biochemistry, biology, physical oceanography, and other allied disciplines. The Center's 15,000 square feet of research space hold such equipment as atomic absorption spectrophotometers, gas chromatograph, CHN analyzer, technicon autoanalyzer, particle counter, and liquid scintillation counter.

Flax Pond Seawater Laboratory - a lab maintained by MSRC on a 142-acre salt marsh near Long Island Sound. The Flax Pond Lab contains 28 heavy-duty fiberglass sea tables that are equipped with a continuous seawater flow, and an environmental control chamber used for algal culturing. An 820-square-foot greenhouse with running seawater was added to the lab in 1980



for large-scale culture experiments.

SUNY-wide Laboratory - a 1,600-square-foot facility that is available to all State University schools for research and teaching purposes. In addition to standard services, this lab is equipped with drying ovens, incubators, autoclave, centrifuge, and a number of balances and stereo microscopes.



Seagoing Facilities - include the R/V ONRUST, a 55-foot steel-hulled ship built specifically for MSRC. The ONRUST has a range of 775 miles at a cruising speed of 10 knots, and is equipped with a "wet" lab and an electronics dry lab. MSRC also has a number of small boats to support field work in local embayments and near-shore waters. These include a 23-foot Penn Yan shallow draft boat with cabin, two 16-foot Boston whalers, equipped for over-the-side work, and a 20 by 10-foot pontoon platform boat.

Computing Facilities - A computing "mini-center" is maintained in "G" building and consists of: two remote entry terminals for direct communication with UNIVAC 1110 housed in the main campus computer center, three

CRTs (ONTEL OP/1), two hardcopy high speeds (DECWRITER II and III), and two programmable calculator systems (HEWLETT PACKARD 9830A's), each with digital cassette storage, printer, and x-y plotter. There is also an Apple II Plus micro-computer with 48K RAM memory, two 140K byte floppy disc drives, and a 132 column line printer. For high resolution graphic data printout as well as cartographic applications, there is a Calcomp 910/563 30 inch drum plotter, and an Imlac Dynagraphic interaction graphics terminal. For the input of x-y coordinates there is a GRAF/PEN Model GP-3 digitizer. All oceanographic data collected since the Center was founded has been placed in a central data storage bank.

ADJUNCT FACULTY

The following is a list of MSRC adjunct faculty, their affiliations, and their areas of expertise:

BAYLOR, M. B. - Adjunct Professor. Biology Dept., SUSB. Microbiology, airborne viruses.

CHUECAS, L. A. M. - Adjunct Professor. Universidad de Concepcion, Chile. Chemical oceanography, descriptive physical oceanography.

COOLEY, A. P. - Adjunct Associate Professor. Bellport High School. Natural history of Long Island.

DAGG, M. J. - Adjunct Assistant Professor. Brookhaven National Laboratory(BNL). Zooplankton ecology, continental shelf ecosystems.

DAYAL, R. - Adjunct Associate Research Professor. BNL. Geochemistry of coastal sediments, clay mineral-seawater interactions, sediment-water interface interactions.

DUGUAY, L. - Adjunct Assistant Professor. Invertebrate zoology, protozoology, algal-invertebrate symbiosis, gelatinous zooplankton.

ESAIAS, W. E. - Adjunct Associate Professor. NASA Langley Center. Phytoplankton ecology, photobiology.

FALKOWSKI, P. G. - Adjunct Assistant Professor. BNL. Marine phytoplankton ecology, phytoplankton physiology.

GOLD, K. - Adjunct Professor. Asst. Director, Osborne Laboratories of Marine Sciences, NY Aquarium. Marine protozoan ecology, invertebrate zoology, coastal oceanography, scanning electron microscope.

GOODMAN, J. M. - Adjunct Professor. Frederic R. Harris, Inc. Coastal zone management, aquaculture.

HOPKINS, T. S. - Adjunct Associate Professor. BNL. Coastal current structure, water mass analysis, air-sea interaction.

LIKE, I. - Adjunct Professor. Reilly, Like, and Schneider, Attorneys. Environmental law.

MAYER, G. F. - Adjunct Assistant Professor. NOAA Marine Ecosystems Analysis Project. Pollution

ecology, ichthyology, evolution and function of morphology.

MEADE, R. H. - Adjunct Professor. U.S. Geological Survey. Coastal and fluvial sedimentation, ground water.

NAIDU, J. R. - Adjunct Associate Professor. BNL. Radioecology, radionuclides in the environment.

NAJARIAN, T. - Adjunct Assistant Professor. Najarian, Thatcher, and Associates. Water quality modeling, physical oceanography.

O'CONNOR, J. S. - Adjunct Associate Professor. NOAA Marine Ecosystems Analysis Project. Estuarine and coastal ecology, integration of science into management systems.

REEBURGH, W. S. - Adjunct Professor. Chemical oceanography, gases in marine sediments, sediment-water interactions.

SETHURAMAN, S. - Adjunct Associate Professor. BNL. Air-sea interactions, meteorology.

SMITH, S. - Adjunct Associate Professor. BNL. Plankton ecology, nutrient regeneration by zooplankton.

STANFORD, H. M. - Adjunct Assistant Professor. Project Manager, NOAA Marine Ecosystems Analysis. Marine pollution in estuarine and coastal waters, marine geochemistry.

SWANSON, R. L. - Adjunct Professor. Head, NOAA Office of Marine Pollution Assessment. Physical oceanography of coastal waters and estuaries, ocean dumping, coastal zone management.

VAUGHN, J. M. - Adjunct Associate Professor. BNL. Transport, fate, and effects of viruses in the aquatic environment.

WALSH, J. J. - Adjunct Professor. BNL. Upwelling ecosystems, phytoplankton ecology, modeling of continental shelf ecosystems.

WHITLEDGE, T. E. - Adjunct Associate Professor. BNL. Nutrients, chemistry of seawater, stimulation of primary productivity by sewage effluent, ecosystem dynamics.

VISITING FACULTY, 1980-81

ARCOS, DAGOBERTO - biology, physical oceanography.

CONNELL, D. W. - environmental toxicology and effects of oil on the environment and living organisms.

FUJITA, I. - sediment transport and harbor management.

LOPEZ, J. - fluvial hydraulics, river basin management.

SHIGESADA, N. - mathematical ecology and modeling animal dispersion.

ADMINISTRATION AND STAFF

J. R. SCHUBEL - Director
D. W. PRITCHARD - Associate Director for Research
F. G. ROBERTS - Assistant Director
JERI SCHOOF - Assistant to the Director
PETER K. deNYSE - Assistant to the Director

— VIVIAN ABOLINS - Graphic Arts
— LAURA ANTONACCI - Secretary
C. LEE ARNOLD - Research Technician
— GEORGE CARROLL - Director of Computing Services
— STEVE COVELL - Research Technician
SUSAN CURTIS - Technical Assistant
CHARLES deQUILLFELDT - Technical Specialist
— MARIE EISEL - Director of Graphic Arts
— GLORIA FALANGO - Graduate Program Coordinator
CLIFFORD FIRSTENBERG - Research Technician
PAUL FLAGG - Assistant Staff Oceanographer
— MARIE GLADWISH - Graphic Arts
— ANDREW HAMILTON - Associate Staff Oceanographer
DAVID J. HIRSCHBERG - Assistant Staff Oceanographer
— CONNIE HOF - Secretary
CLIFFORD JONES - Technical Specialist
— MARY ANN LAU - Secretary
— STEVE LEFFERT - Small Boats Captain
MAREIKE LUDKEWYCZ - Librarian
MICHAEL MARCINAK - Research Assistant
ANDREW MIRCHEL - Research Technician
ALISON MITCHELL - Research Technician
MARGARET MORGAN - Research Technician
JOSEPH MURATORE - Technical Assistant
RICHARD MURTAGH - Research Technician
JEFF PARKER - Associate Staff Oceanographer
EILEEN QUINN - Secretary

- JACKIE RESTIVO - Administrative Assistant
- SUE RISOLI - Public Information Officer
- R. GEORGE ROWLAND - Research Technician
- H. CHRISTIAN STUEBE - R/V ONRUST Captain
- MARJORIE SUMNER - Secretary
- JAY TANSKI - Research Technician
- HELEN ULREICH - Secretary

GRADUATE STUDENT THESES IN PROGRESS

Ph.D.

CAPRIULO, Gerard M., The Ecological Significance of Microzooplankton in Temperate Zone Coastal Waters (E. Carpenter)

NINIVAGGI, Dominick, Feeding and the Trophic Position of Some Bering Sea Euphausiids (M. Dagg)

ROETHEL, Frank J., The Interactions of Stabilized Power Plant Coal Waste with the Marine Environment (I. W. Duedall)

M.S.

ARCOS, Dagoberto, The Role of Upwelling on the Distribution of Chlorophyll *a* within the Bay of Concepcion, Chile (R. E. Wilson)

ARNOLD, C. Lee, Modes of Fine-Grained Sediment Transport in a Large Estuary (H. B. Bokuniewicz)

CASTENEDA, Raoul, Age and Growth in the Spiny Dogfish, *Squalus acanthias* L. (P. M. J. Woodhead)

CHU, Gordon, Behavior and Transport of Anthropogenic Radionuclides in the Peconic River, NY (R. Dayal)

DREW, Cathy, Sex Determination in Fishes (W. Peterson)

FIRSTENBERG, Clifford, A Survey of Currents in Long Island Sound between Northport, NY and Norwalk, CT (H. H. Carter)



- FLAGG, Paul, Effects of Culture Methods and Environmental Factors on the Growth and Survival of Hatchery-Produced Seed Clams (*Mercenaria mercenaria*) (R. E. Malouf)
- FOGEL, Richard A., Growth, Fecundity, and Behavior of the American Eelpout on the Fire Island Artificial Reef, Long Island (P. M. J. Woodhead)
- GIBBONS, Mary, Factors Influencing Predation of Juvenile Hard Clams (*Mercenaria mercenaria*) by Crabs (R. E. Malouf)
- GOODRICH, David, The Tides of the New York Bight (T. Hopkins)
- KAUFMAN, Zena Gold, Nitrogenous Nutrient Uptake by Marine Phytoplankton in a Coastal Embayment (E. Carpenter)
- KELPIN, Geri, The Role of Depuration as a Management Technique for the Great South Bay Clam Industry (D. F. Squires)
- KURKOWSKI, Kenneth, Effects of Filtration by Adult *Mercenaria mercenaria* upon its Larvae (R. E. Malouf)
- LIU, James T., Deformation of Layered Systems of Sediments (H. B. Bokuniewicz)
- LIVELY, John, Spatial and Temporal Variability of Phytoplankton Production and Biomass in Great South Bay, NY (E. Carpenter)
- LOUNSBURY, Margaret, Is Extended Jurisdiction Working: An Analysis of the Surf Clam and Ocean Quahog Fishery Management Plan (J. L. McHugh)
- LUNDY, Paul, The Development and Application of a Bioassay to Evaluate the Impact of Chemical Pollutants on Marine Phytoplankton (C. F. Wurster)
- McMANUS, George, Elimination of PCB Residues by the Estuarine Copepod *Acartia tonsa* and Effects on Fecundity, Hatching Success, and Naupliar Survival (W. Peterson)
- ROSE, Hal, Temporal and Spatial Variations of Phytoplankton Community Composition and Primary Production in a Nearshore Zone (W. Peterson)

SAROKIN, David, Phytoplankton Ecology of the Carmans River(E. Carpenter)

SCHAEFER, Jeffrey, Contributions to a Coastal Zone Management Information System(P. Weyl)

TANSKI, Jay, Episodic Bluff Erosion on the North Shore of Long Island(H. B. Bokuniewicz)

ZERTUCHE-GONZALEZ, Jose, Identification of Biological Fluorescent Background in Rhodamine Dye Tracer Technique(D. W. Pritchard)

ZION, Phillip, Remote Sensing of Chlorophyll and Particulate Levels in Surface Waters of Great South Bay(B. H. Brinkhuis)

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