


Summer 1996

Summer 1996

NSU Oceanographic Center

Follow this and additional works at: https://nsuworks.nova.edu/occ_currents

 Part of the [Marine Biology Commons](#), and the [Oceanography and Atmospheric Sciences and Meteorology Commons](#)

NSUWorks Citation

NSU Oceanographic Center, "Summer 1996" (1996). *Currents*. 55.
https://nsuworks.nova.edu/occ_currents/55

This Book is brought to you for free and open access by the Publications by HCNSO at NSUWorks. It has been accepted for inclusion in Currents by an authorized administrator of NSUWorks. For more information, please contact nsuworks@nova.edu.

Currents

Summer 1996 • Volume X, Number 3



Dr. Barry Klinger Is Modeling Ocean Basins

Physical Oceanographer **Dr. Barry Klinger** is being funded by the National Science Foundation (NSF) for three years to track the movement of cold water within ocean basins. The model he is working on at present assumes a box-shaped ocean basin, with similarities to the Atlantic Ocean.

Sea surface temperature (SST) and salinity are the forcing functions that drive the model, Klinger explains. "We ignore many complications of the real ocean to isolate the physics of this process. Basically, we force the SST to have a certain value, and we also force the surface salinity but in a different way. We say what we want the SST to be, but we can't say what the salinity is. This is because the atmosphere directly controls the temperature but only indirectly controls the salinity. Salinity depends on the amount of rainfall or evaporation that occurs at a given time. In this model, the surface temperature forcing is given, but the salinity depends on the circulation of the water.

"The interesting thing," Klinger continues, "is that with the same forcing, we can get different circulations. An analogy is if you throw a rock in the air, you think you know what it will do. But in this problem, it could go right or it could go left."

Through his model, Klinger is interested in determining the source of cold water in an ocean basin. In the Atlantic, he explains, most of the

cold, deep water is formed in the north, near Greenland, although the air is cold at both the north and the south ends. The cold water then moves across the equator. "Cold water in all oceans starts in the polar regions as surface water. Then it sinks and spreads out over the whole ocean. In the Atlantic, the northern source pushes more cold water into the deep than the southern source. In the real ocean there are a number of features that could account for this. For instance, land masses are different in the northern and southern oceans. But there is a very odd

element here. Even in an ocean where there is no difference in the forcing between southern and northern cold regions, you can get all of the deep water forming in just one hemisphere and not the other one.

"We are doing a simulation in an artificially simplified ocean," says Klinger. Figure 1a shows an example of the cold, deep water forming at both polar regions (-60 is in the southern hemisphere, 60 is in the northern hemisphere) and being pushed toward the equator (0) in a symmetrical way. Figure 1b shows a different pattern, with all of the cold

(Continued on Page 2)



Dr. Barry Klinger, with computer model.

(Continued from Page 1)

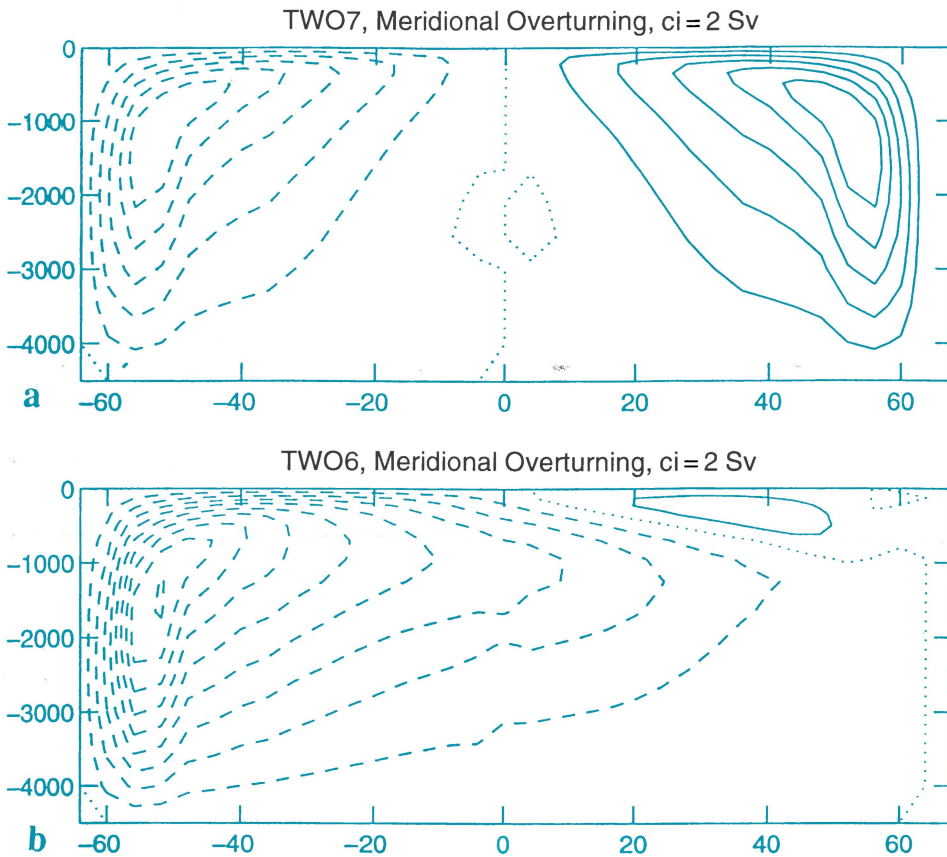


Figure 1: (a) Cold, deep water forming at both polar regions.
(b) Cold water forming at the southern pole, spreading north.

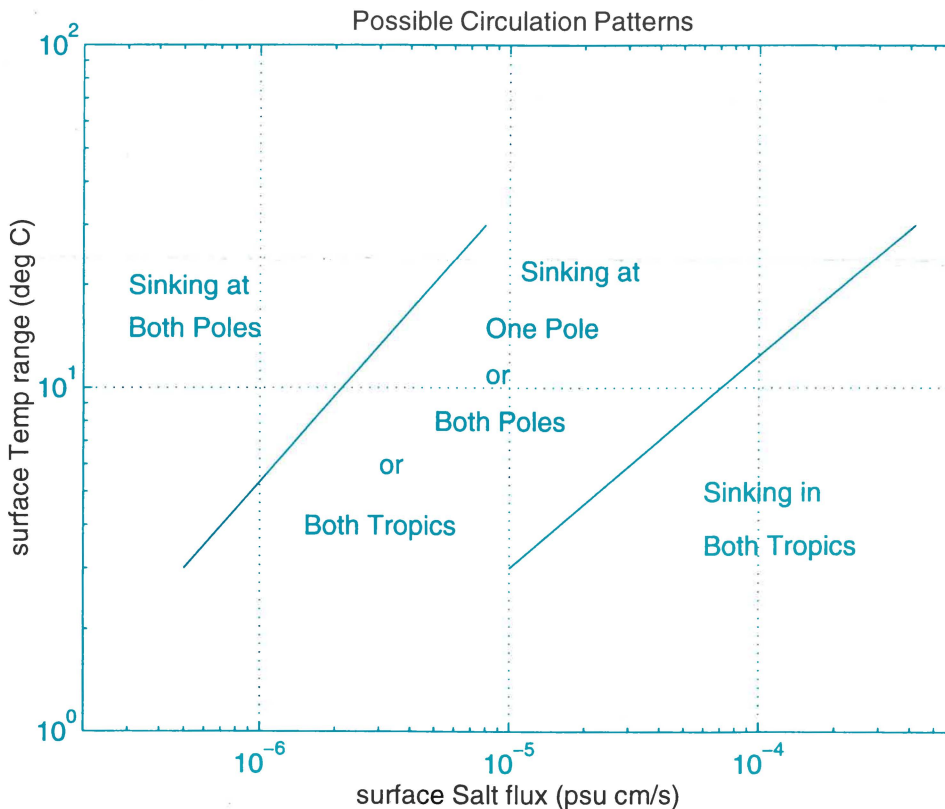


Figure 2: Kinds of sinking for different temperature and salinity forcing.

water forming at the southern pole and spreading to the north. “We are trying to understand when you can get this uneven flow.”

Figure 2 shows what kinds of sinking are possible for different temperature and salinity forcing. If the salinity forcing (surface salt flux) is small and temperature forcing (surface temp range) is large, one can get only symmetrical sinking at both poles. Large salinity forcing and small temperature forcing also produce a symmetrical sinking pattern. For intermediate values, the asymmetrical pattern also is possible.

Why is this sort of simulation exercise important? Klinger answers that “in the future, when the atmosphere is forcing the ocean in a different way from the present due to the greenhouse effect, it is possible that the ocean could shift into a totally different circulation pattern, where the cold water sinks in a different place from where it does now. That different circulation can have a radical effect on land temperatures on both sides of the Atlantic.

“My simulations have shown that these circulation patterns are more complex than even simpler models have predicted, but it confirms their basic predictions. I’m trying to answer a basic question: how strong are the asymmetrical flows given some set of atmospheric conditions, such as temperature and salinity forcing? We know what the atmosphere is doing, but what is the ocean doing? I am in the process of producing a formula that predicts the rate and location of deep-water sinking, given atmospheric conditions. The idea is to find the simple rules that govern complicated behavior.”



People on the Move

During June 10-13, **Dr. Julian McCreary**, Center Dean, attended a meeting on Climate Variability (CLIVAR) in San Antonio, Texas, sponsored by the World Ocean Circulation Experiment (WOCE). He presented a talk entitled "On the Source Waters of the Pacific Equatorial Undercurrent."

Dr. McCreary spent the month of August mostly on his BMW motorcycle, biking up the east coast of the U.S. On August 9 he visited the Woods Hole Oceanographic Institution, in Woods Hole, Massachusetts. There he presented the same seminar as the one given in San Antonio. From Woods Hole he continued north to Durham, New Hampshire, where he attended a JGOFS (Joint Global Ocean Flux Study) Synthesis and Modelling Project Workshop at the University of New Hampshire, August 13-19. He gave a talk entitled "The Role of Oceanic Processes in the Global Carbon Cycle."

Dr. Richard Spieler traveled to Akumal, Mexico, July 5-13, where he gave a brief course on fish identification to members of Conservation, Education, Diving, and Museums (CEDAM) International.

Dr. Charles Messing and three of his M.S. students, **Charles Featherstone**, **Dana Rankin**, and **Chris White**, traveled to San Francisco August 4-11, where they attended the Ninth International Echinoderm Conference. Messing and Featherstone co-authored a poster for the conference, entitled "The Diets of Two Bathyal Stalked Crinoids: *Neocrinus decorus* and *Endoxocrinus parrae*." Featherstone presented a paper, also co-authored by Messing, entitled "Seasonal Variation in the Biochemical and Energetic Composition of Two Bathyal Stalked Crinoids: *Neocrinus decorus* and *Endoxocrinus parrae*."

Dr. Mahmood Shivji and his wife, Laura, participated in the Geofocus Cloud Forest Project in Baños, Ecuador, August 2-9. This was an extracurricular photo shoot workshop, organized by **Dr. Barry Barker** of NSU's Farquhar College. The project included "seven days of



Charles Featherstone and Dr. Charles Messing, with sea lily *Endoxocrinus parrae*.

Amazonia photographic experiences in the Andes Mountains of Ecuador....Located approximately four hours from Quito, Baños is the

primary gateway to the Amazon basin and is situated at the base of the Tungurahua Volcano," according to the itinerary sheet. Sounds like fun.

Kathy Maxson, Center Librarian, also traveled to Baños, Ecuador, August 9-16, as part of NSU's Biogeography Field Project: Cloud Forest Biodiversity. Dr. Barker is the instructor for this undergraduate course as well. This project's itinerary sheet specifies that it "combines research with an international community service project. Participants will learn about the ecology of Amazonia, the geography of the region, the cloud forest ecosystem, biodiversity, and man's impact upon the Upper Amazon Region. Research will focus on census of the species found in the San Martin Zoo and upon local habitat destruction." Field trips just aren't what they used to be—fortunately. 🌿

Recent Seminars

Several seminars and thesis defenses have been held at the Center in recent weeks. They are:

June 6: "On the Influence of Bottom Topography on the Agulhas Eddy," by **Dr. Vladimir Kamenkovich**, of the Lamont-Doherty Earth Observatory, Columbia University.

June 12: "Using Marine Invertebrates to Identify Centers of Evolutionary Diversification in Coral Reef Ecosystems," by **Dr. James D. Thomas**, Division of Crustacea, Smithsonian Institution.

June 21: "Coral Survivors of the 1982-83 El Niño Southern Oscillation," by **Dr. Joshua Feingold**, NSU faculty.

July 12: "Pompano Aquaculture Past, Present, Future," by **Brian Hicks**, Center Ph.D. student.

July 19: "The Hydrology and Geochemistry of Florida Bay Mud-Islands," by **Dr. Phil Kramer**, Research Associate at the Center.

May 24: "A Preliminary Study of the Population Density, Size Distribution, Age and Growth of the Stingray, *Urolophus jamaicensis*, in Southeast-

ern Florida," thesis defense by **James Sulikowski**, Center M.S. candidate. Committee members: **Drs. Richard Spieler (chair), Richard Dodge, and William Hamlett** (of Indiana University).

May 28: "Evaluation of an Inland Decay Model (IWDM) for Tropical Cyclones: Thesis Proposal Defense and Preliminary Results," by **Michael Hopkins**, Center M.S. candidate. Committee members: **Drs. Richard Dodge (chair), Barry Klinger, Andrew Moore, and Mark DeMaria** (NOAA/National Hurricane Center).

June 14: "Seasonal Variation in the Biochemical and Energetic Composition and Diets of Two Bathyal Stalked Crinoids," by **Charles Featherstone**, M.S. Thesis Proposal Defense. Committee members: **Drs. Charles Messing (chair), Patricia Blackwelder, and James McClintock** (University of Alabama at Birmingham).

July 12: "Indications of Phosphorus Limitation and Trophic Status in Limestone Quarry Lakes, Dade County, Florida," thesis defense by **Isaac Chase**, Center M.S. candidate. Committee members: **Drs. Curtis Burney (chair), Richard Dodge, and Bart Baca** (Center adjunct). 🌿

The Faculty: Goings and Comings

This summer has seen a flurry of activity involving Center faculty. Two faculty members, **Drs. Gary Kleppel** and **Andrew Moore**, have decided to take positions elsewhere. Dr. Kleppel left on July 1 for the University of South Carolina in Columbia, where he is a faculty member in the Department of Environmental Health Sciences. Dr. Moore left on August 1 for the CIRES division of the University of Colorado in Boulder. We miss them both.

After extensive advertising and some serious searches, the Oceanographic Center has hired two new faculty members: **Dr. Alexander Soloviev** and **Dr. James Darwin Thomas**.

Dr. Soloviev joined our faculty with the rank of Associate Professor on July 1. He comes to us from the Department of Oceanography at the University of Hawaii. He remains in Hawaii this summer, where he is working with former colleagues on a research grant with the Office of Naval Research. He will continue the research work here, after he arrives in early October. His primary interests include physical processes at the ocean-air interface, turbulent boundary layers, molecular sublayers and air-sea gas transfer, as well as marine techniques and instrumentation.

Dr. Thomas will join the faculty with the rank of Associate Professor on January 1, 1997. Since 1992, he has been a Research Zoologist and Curator in the Department of Invertebrate Zoology, within the National Museum of Natural History, Smithsonian Institution, in Washington, DC. He will spend approximately one-half of his time teaching undergraduate marine biology in NSU's Farquhar Center. The rest of his time will be devoted to research here at the Oceanographic Center. His research interests are many and varied, some of which are temperate coastal and estuarine ecology, marine biodiversity, environmental monitoring and assessment, policy development and research/education priorities in tropical and temperate marine systems, marine invertebrate zoology, and taxonomy.



Dr. Alexander Soloviev, in Hawaii.

We welcome both scientists aboard with great enthusiasm. More detailed accounts of their accomplishments and new directions will appear in the next issue of *Currents*, along with a report on other activity among the faculty. 🌊

Philip Kramer Studies Geochemistry of Great Bahama Bank

Dr. Philip Kramer is a recent addition to our staff. He was hired as a Research Associate early this year, after receiving his Ph.D. in marine geology and geophysics from the University of Miami. He spent mid-February to mid-April at sea aboard the *JOIDES Resolution*, a large deep-drilling vessel operated by the Ocean Drilling Program (ODP), which is sponsored by the National Science Foundation and administered by Texas A&M University.

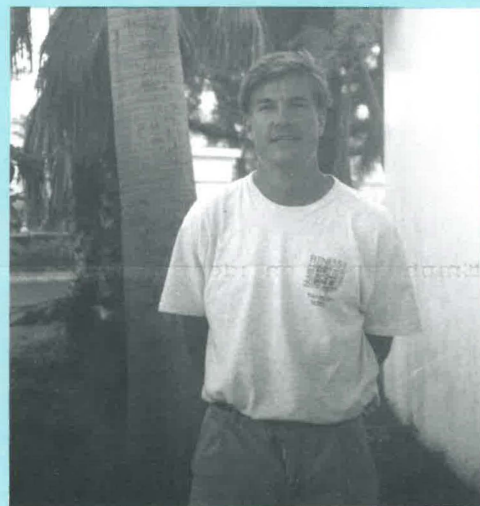
Kramer was on the *Resolution* as an inorganic geochemist, and was responsible for analyzing the chemistry of sediments and pore fluids brought up during the drilling. The purpose of the cruise was to examine the geology and geochemistry of the Great Bahama Bank.

Drilling for core samples took place in a transect from shallow water west out into the Gulf Stream. "We were trying to determine how carbonate platforms have responded to sea level

The Center Plays Host

On May 31, the Center hosted a luncheon for the Florida Coastal Management Program (FCMP) and the Governor's Coastal Advisory Committee (CAC), part of the State of Florida Department of Community Affairs. The committee members were joined by **Margaret Kempel**, Chairperson of the Port Everglades Association, Inc., and several other guests from the Port, as well as Center faculty and staff. Following the luncheon, a number of faculty members, teaching adjuncts, and graduate students presented brief descriptions of their research work during a tour of the facilities.

The FCMP receives an annual grant from NOAA to support coastal management activities. A large portion of the grant funds is passed on to local governments and state and regional agencies. The mission of the FCMP is to coordinate government activities related to the protection, preservation, and development of Florida's natural, cultural, and economic coastal resources. 🌊



Dr. Philip Kramer, at the Center.

changes over the past 10 million years," Kramer says. Evidence of sea level changes are recorded as distinct sediment packages deposited on the slope of the Bank. These packages can be dated using the microscopic fossils found in sediments to reveal a high-resolution history of sea level changes.

(Continued on Page 6)

UNDERCURRENTS

INSTITUTE OF MARINE AND COASTAL STUDIES

FALL TERM SCHEDULE

M.S. degree specialties are **Marine Biology** and **Coastal Zone Management**. Each course carries three credit hours or may be audited. Tuition is \$355 per credit hour (50 percent less for audit). Classes meet once a week from 6:30-9:30 p.m. at the Oceanographic Center. The fall term is from September 30 through December 20, 1996. For further information, call **Helene Taylor** at (954) 920-1909.

Marine Ecosystems (OCOR-5602): This is a CORE course. Focuses on marine ecological processes and functions. Provides an overview of the basic concepts of marine ecology, along with more detailed elements including diversity of organisms, feeding relationships, ecological roles, growth, and reproduction. Emphasis is on coastal marine communities. Instructor: **Dr. Curtis Burney** (Center faculty). Begins Monday, September 30.

Tropical Marine Fish Ecology (OCMB-6120): Covers the ecology of tropical fishes, including coastal, estuarine, mangrove and pelagic fishes. Emphasis is on identification and natural history of local species. Current theories on distribution and abundances, as well as ecological theory, are discussed. Class will meet just once at the Oceanographic Center on Tuesday evening, October 1. The remainder of the course will be taught at The Keys Marine Laboratory, Long Key, Florida, from October 20 to 27. After returning to the Center, self-directed and self-scheduled laboratory study will be required. Extra costs include \$250 for room and boat fee at Long Key. Instructor: **Dr. Richard Spieler** (Center faculty). Begins Tuesday, October 1.

Florida Environmental Regulation (CZMT-0621): Introduces students to

the complexities of environmental regulations, regulatory agencies, and regulatory activities that deal with Florida's environment. Topics include environmental resource permitting, wetland delineation methodologies (vegetation and soils), hazardous waste permitting, and air and water quality permitting. Numerous guest lectures will be highlighted. This course is valuable for future environmentalists, planners, regulators, environmental lawyers, and environmental consultants. Instructor: **Mr. Stacy Myers** (South Florida Water Management District; Center adjunct). Begins Wednesday, October 2.

Marine Mammals (OCMB-6330): Deals with a variety of topics, including physiological profiles, anatomical structure, energetics, feeding habits, population dynamics, and interactions of marine mammals with man and other species. Comparisons are made for the four major marine mammal groups. Instructor: **Dr. Keith Ronald** (Center adjunct). Begins Thursday, October 10.

Fundamentals of Aquatic Ecotoxicology (CZMT-0650): Covers the fate of chemicals and their biological effects on aquatic organisms. Presents the history of aquatic toxicology and the general mechanisms of transport and transformation of chemicals in water/sediment systems and within aquatic organisms. Examines basic aquatic toxicological concepts and principles, concentration-response relationships, criteria and approaches to single-species laboratory tests and multispecies field studies, the importance of good laboratory practices, and considerations for analyzing and interpreting aquatic toxicity data. Also discussed are special types of organismal and media tests, biomarkers and biomonitoring, mathematical modeling, structure-activity relationships, and aquatic risk assessment. Instructor: **Dr. Gary Rand** (Center adjunct). Begins Friday, October 4.

The 5000 Days: Environmental Futures and Human Choices (CZMT-0665) and *Beyond 5000 Days (CZMT-0633)*: Distance Education courses. Instructor: **Dr. Keith Ronald** (Center adjunct). Begins Thursday, October 10.

WINTER TERM SCHEDULE

The winter term extends from January 6 through March 28, 1997. Course descriptions and late additions will appear in the next issue of *Currents*.

Descriptive Marine Physics (OCOR-5601). Instructor: **Dr. Barry Klinger** (Center faculty). Monday, January 6.

Coastal Water Resource Impacts (CZMT-0622). Instructor: **Dr. Stacy Myers** (Center adjunct). Tuesday, January 7.

Phytoplankton Ecology. Instructor: **Dr. Burton Jones** (Center faculty). Wednesday, January 8.

Fish and Wildlife Management (CZMT-0805): Instructor: **Dr. Keith Ronald** (Center adjunct).

5000 Days: Environmental Futures (CZMT-0665) and *Beyond 5000 Days (CZMT-0633)*: Distance Education courses. Instructor: **Dr. Keith Ronald** (Center adjunct). Thursday, January 9.

Ph.D. Degree Offered

The Oceanographic Center offers the Ph.D. degree in Oceanography. The program requires a minimum of 66 credits beyond the baccalaureate, 42 of which may be applied from the master's program. The remaining credits are made up of at least 24 dissertation research credits and 6 credits from upper-level course work, usually taught in the tutorial mode. Tuition is \$2,360 per quarter.

Brian Hicks Nears Ph.D. in Aquaculture Studies

Ph.D. candidate **Brian Hicks** is finishing up his course work and looking ahead to his comprehensive exams this fall. His research proposal, submitted in 1995, is entitled "Experiments to Maximize Growth and Food Conversion Rates in Captive Florida Pompano."

Hicks is hard at work on his aquaculture project, under the direction of **Drs. Bart Baca** and **Richard Spieler**. Pompano culture has been deemed infeasible by many researchers in the past, due primarily to a food conversion increase and growth rate slowdown. In his words, the fish in effect "eat themselves out of economic practicality before reaching a reasonable market size of about one pound." His intent, he says, "is to investigate the parameters of nutrition, feeding, high-density confinement, and hybrid development. Pragmatically, these parameters are inherently tied to food conversion rates and could provide valuable insights toward solving this problem."

Hicks notes, "The first experiment that I attempted to induce pompano to spawn using a synthetic time-released gonadotropin-releasing hormone was a smashing success. Two of the three experimental replicates had dramatic spawning. In those tanks over 60 percent of the eggs were fertilized, and



Brian Hicks assembles his data.

almost 100 percent of the fertilized eggs hatched. None of the control fish produced any eggs during the course of the experiment."

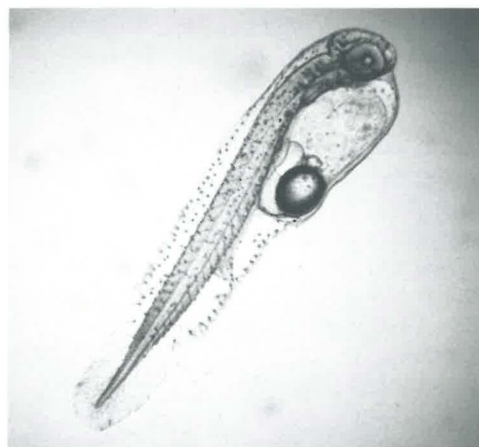
At present Hicks is trying to organize the data that he has collected over the years, do the statistical analysis, and prepare a manuscript for publication. He also has the second and third proposed experiments underway. "The second experiment compares the food conversion and growth rates for an experimental marine fish diet," he explains. "It will be compared against the standard trout chow diet traditionally used in pompano aquaculture. The third experiment compares three different growout environments. The tanks use a combination of recirculating/water replacement pumping to supply high-volume flow rates to the individual tanks."

Center Graduates and Affiliates Active at Broward County

Over the years, the Broward County Department of Natural Resource Protection (DNRP) has hired several Oceanographic Center graduates and students still matriculating in the Institute of Marine and Coastal Studies (IMCS) program. A teaching affiliation between the County and the IMCS continues to thrive as well.

Nikolas Camejo, who received the M.S. degree from the IMCS program in 1984, was the first graduate to work for

Hicks comments that in Florida, pompano comprise only about one percent of the total commercial catch of marine fish by weight, yet they account for five percent of the total dollar value. "The consistently high price paid for pompano makes it an attractive species for culture. This is especially promising for aquaculture interests in Florida," which seems to be the only state that has the right climate in which to grow pompano. 🐟



A pompano emerging from its egg (top), and at one day old (bottom).

Kramer

(Continued from Page 4)

Another objective of the drilling was to study the evidence of fluid circulation through the platform. "Recently there has been a lot of speculation that fluids may be actively pumping through these giant carbonate platforms," Kramer continues. "We were examining that possibility using temperature probes and chemical analyses of the pore fluids."

Kramer will continue working on the Bahamas drilling project over the next six months, using samples collected on the cruise. He also has proposed a research project to continue working on mangrove islands in Florida Bay, which he studied as part of his Ph.D. dissertation. He wants to understand how the hydrological dynamics of these islands influences the nesting patterns of birds and crocodiles that utilize the islands. 🐊

Broward County. Until recently, he held the title of Energy Manager at DNRP. **Donald Stone**, who received the M.S. degree in 1986, currently has the title Senior Planner in the Comprehensive Neighborhood Planning Division of the DNRP. **Kevin Carter** received the M.S. degree in 1995. His current title is a mouthful: Natural Resource Specialist II in the Surface and Ground Water Assessment Program of the Water Resources Division of the DNRP. **Steve Higgins** and **David Stout**, who have been with the County for some time, are still enrolled as students in the IMCS program. Higgins is part of the Beach Erosion

(Continued on Page 7)

Broward County Offers Rich Opportunities to Students

The Broward County Department of Natural Resource Protection (DNRP) has entered into a terrific symbiotic relationship with the Oceanographic Center. Starting with the winter 1996 term, the DNRP has offered Center M.S. students what is called a Water Resources Internship. The program provides participating students with course work for credit, as well as an opportunity to get hands-on training in water resource management.

Dr. Nancy Gassman, Adjunct Professor at the Center, serves as Water Resources Manager for Broward County and has spearheaded the internship program from the beginning. She says that the program fills mutual needs for both the DNRP and students in oceanography. "DNRP acquires competent

people to help with their work load, and the program also provides students with an opportunity for real-life work experience," she says.

There usually are one to two slots open for student participation each term. The program is treated as a regular course, and students earn three credits per term by being on the job one full day per week.

This summer's two internships concern (1) gaining familiarity with Geographic Positioning Systems (GPS) technology and basic surveying techniques, and (2) having exposure to the regulatory and policy aspects of marine, freshwater, and coastal science, with emphasis on surface water quality assessment. For one project, water level readings are being taken in certain canals in Pompano Beach, to determine how much water they can store. "The overall purpose of the operation," according to Specialist **Kevin Carter**, "is to become more efficient at keeping water within areas that will 'recharge' the Biscayne Aquifer, where we get our drinking water, instead of sending it out to tidal waters."

Since the program's inception, the following students have worked as interns: **Michelle Zurawski**, **Achim Kretschmer**, **Carrie Nelson**, **Heather Balchowsky**, and **Molly Row**. Ms. Zurawski was the first intern, during the winter term, and she also landed a job with the DNRP this summer, working a 20-hour week.

Dr. Gassman feels that students enjoy terrific "practice" time, in that they must get their resumes together before applying, and they must go through real interviews before they can be selected. Thus, they get a good taste of what goes on in the real world of

work. All interns are given a primary project to complete, but they also are involved in a variety of activities. At the end of the term, they must write summaries on all of the activities that they participated in and how their experiences might be useful later on. "We hope to continue this program in the future," Dr. Gassman states. "This experience allows the students to round out their course programs. And also, we are really happy with their work."

Dr. Richard Dodge, Director of the Center's Institute of Marine and Coastal Studies, concurs. "From my perspective," he says, "this internship program is a great addition to the M.S. program. It provides a structured work experience in the chosen field of endeavor—either marine biology or coastal zone management. Students learn practical, real-world skills, gain professional contacts, and develop expertise in new areas of study. We are most appreciative of Broward County's providing this opportunity to our M.S. students." 🐟

Graduates

(Continued from Page 6)

administration, and one of his jobs is Assistant Director of the Biological Resources Division. Stout is a Natural Resource Specialist II with the Marine Research Section of the Biological Research Division.

Steve Somerville, Director of the DNRP, is an Honorary Adjunct Faculty member of the Oceanographic Center, and he has close ties with the IMCS. **Dr. Nancy Gassman** is a teaching Adjunct Faculty member of the Oceanographic Center. Her title at the DNRP is Water Resource Manager.

Besides student and faculty affiliations, the Center has had a contract with Broward County/DNRP for sea turtle monitoring for 17 of the past 18 years since the inception of the program. The project for 1996 got underway in April, at a cost of \$72,589, and will continue through the nesting/hatching season, which ends in November. This year's contract employs 14 students and one recent IMCS graduate, **Bill Margolis**, who serves as Project Manager. The Principal Investigator is **Dr. Curtis Burney**, of the Center's faculty. As reported each winter in *Currents*, this project has proven to be highly successful in protecting sea turtle nests and hatchlings on Broward County beaches. 🐢



Michele Zurawski, taking water level readings at a canal in Pompano Beach.



Heather Balchowsky, taking similar readings. (Photos courtesy of Broward County DNRP.)

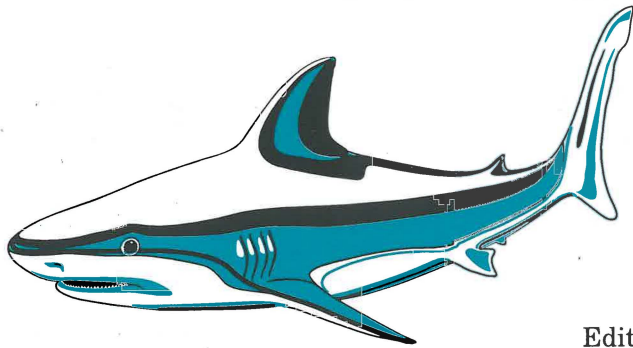
Underwater Antics

On May 10, WZTA-FM radio disc jockey **Paul Castronova** (appropriately named) aired his morning show from the Oceanographic Center. At one point during the show he donned a wet suit and SCUBA gear and submerged into the murky basin, where he broadcast underwater. The point of all of this madness was to publicize the second annual Fort Lauderdale Shell Air and Sea Show, which began a magnificent two-day run the following day on Fort Lauderdale Beach.

Shown in the photo at right is **Dr. Richard Dodge**, being interviewed by Castronova. The early-morning live performance was well attended by Center staff and students. 🐟



*Paul Castronova (left) interviews Dr. Richard Dodge (far right) for WZTA-FM.
(Photo by Rob Seitz.)*



Published quarterly by
Nova Southeastern University
3301 College Avenue
Fort Lauderdale, Florida 33314-7796

Editor: **Jan Witte**



**Recycled
Paper**



Nova Southeastern University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097; Telephone number 404-679-4501) to award bachelor's, master's, educational specialist, and doctoral degrees.