Spring 1995

Spring 1995

NSU Oceanographic Center

Nova Southeastern
Oceanographic Center

Currents

Spring 1995 • Volume IX, Number 2

Cooperative Habitat Study in Planning Stage

Dr. Gary Kleppel, Associate Professor of Marine Biology at the Oceanographic Center, has announced the formation of a cooperative project with Broward County and the Marine Industries Association of South Florida (MIASF). The purpose of the study is to mitigate the destruction of local fish habitats.

The project will bring together three normally disparate elements of our society: the marine industry (representing commerce), government (representing the public), and academe (representing the knowledge that society possesses). One resource is shared by all three elements: fish. To scientists, fish are steps in the food web. To those in the business community, fish represent their bread and butter. And to about 90 percent of the boating public, fish provide recreation and a reason to go boating. In Florida, fishing happens to be a multi-billion-dollar recreational industry.

According to Dr. Kleppel, Florida is experiencing stress on its fisheries. "One reason is over-fishing, but this is not the only pressure. Most fisheries are in trouble because of habitat destruction. Restoration of habitats is what we plan to address. We know that in the tropics and subtropics, 70 to 90 percent of all fish spend at least part of their lives in mangrove forests. In Fort Lauderdale we can't rebuild an ecosystem, but we can build habitats that provide refuge from predators, food, and nurseries for young fishes. We have seen in the last five years mitigation projects that have restored habitats (not ecosystems), and that have recovered forage fishes—prey for larger game fish—right here in Port Everglades. The data we have is from our own master's program, particularly the work of **Karen Roberts**."

Still in the planning stage, the study will take place in the Fort Lauderdale-Hollywood area. Dr. Kleppel explains, "We will be building little islands, which will provide mangrove forests and seagrasses for fishes and shrimps. They will furnish habitats for birds as well." For the present, it is important to make sure that the students, who will be making some very important ecological measurements, are ready to go. "We will start with a 'blank slate' so we can measure the rates of biological recolonization and community formation. We hope to be in the water in six to nine months."

As for the overall importance of the project, Dr. Kleppel comments that "we will gain both a fundamental understanding of ecological processes, and also the opportunity to apply this understanding to societal problems by learning how to efficiently develop and engineer wetlands systems. We can create both habitats for wildlife and buffers to human impacts."

Karen Roberts, with wetlands restoration poster.

MIASF/NSU Hold Annual Barbecue

On April 27, the Marine Industries Association of South Florida (MIASF) and the Oceanographic Center held their annual barbecue under a tent at the Center. Notwithstanding an out-of-order bridge and a line of omnipresent rainclouds, about 240 souls attended the feast. Major menu items, beautifully catered by Daka Restaurants, included those mandatory, messy morsels—ribs, chicken, and corn on the cob.

Jan Witte was chief organizer of the event, ably assisted by **Melissa Dore, Kathy Maxson, Helene Taylor, Ruth Lazarus**, and a host of graduate students. **Diego Rodriguez** and a team from NSU's Physical Plant orchestrated the physical setup. An abundance of lively music was provided by Board of Governors member **Will Connelly** and his River Liffey Saloon Jazz Band, whose members donated their time and considerable energies for our enjoyment.

The major donation of the evening came to us from the MIASF in the form of a check for $1,000, to be added to the Center's Scholarship Fund. Our Coastal Studies students are most appreciative.

The now-traditional raffle followed the presentation ceremony. A long list of terrific prizes that were donated by local businesses and concerned individuals kept the attention of our guests. Major prizes included dinner certificates from Tugboat Annie's, Martha's, Burt and Jack's, The Chart House, Rolling Hills Hotel, and McGuire's Pub and Restaurant; two Fun Day Cruise tickets from Discovery Cruise Line; two nights at the Sheraton Fort Lauderdale Airport Hotel; four sets of airboat rides at Sawgrass Recreation Park; one U.S. Air airline ticket from Universal Travel; gift certificates from Grif's Western Wear and Holland Nursery; as well as numerous other items of art, clothing, and liquid consumption.

Dean Julian McCreary accepts check from John Clark, president of MIASF.

Dr. Gary Kleppel announces cooperative habitat project at MIASF barbecue.

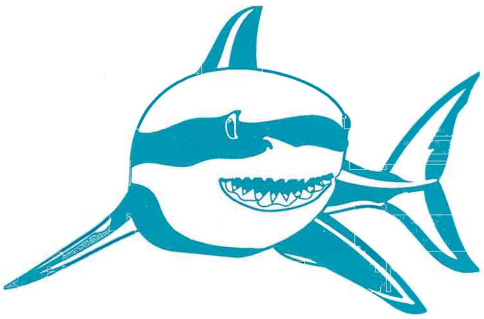
Forklift Donated Just in Time

An almost-new forklift was donated to the Oceanographic Center just in time to clean out the warehouse for our annual MIASF Barbecue. We thank the W.E. Johnson Equipment Company for their generosity, and **Robert Morales**, Sales Manager, in particular, for accompanying the machine on delivery day. Our old forklift (U.S. Air Force surplus), vintage '50s, I would guess, had to be deep-sized a few months ago. It was elderly when our lab started in 1967, so we really can't complain about its service record.

Study of Shark Genetics Is Planned

Dr. Mahmood Shivji is collaborating with **Dr. Scott Rogers**, of the State University of New York at Syracuse, to develop a genetic key for identifying shark species.

Of particular interest is the accurate identification of shark carcasses and separated fins to the species level. Shark carcasses are being heavily exploited in the Gulf of Mexico and U.S. South Atlantic waters, causing shark populations to decline. According to Dr. Shivji, "one of the problems in formulating effective shark management plans for these areas is the difficulty of accurately identifying many sharks to the species level. This is an effort to assist in developing species-specific management plans for the shark fishery."



Robert Morales presents forklift to Dr. Richard Dodge.

Peng Lu Looks at Intermediate Waters in Ocean Circulation Model

Dr. Peng Lu, on the houseboat.

Dr. Peng Lu, a physical oceanographer, is developing an ocean model with **Dr. Julian McCreary** to study the circulation of intermediate water. According to Dr. Lu, "Intermediate water makes up a unique water mass that forms the boundary between wind-driven and thermohaline circulations. Among other things, in our study we are sorting out the source waters of the Equatorial Undercurrent and trying to understand the relationship between intermediate water and upper-ocean circulation in the equatorial ocean. We want to learn how the tropical thermal structure is maintained, and to understand how and why water is exchanged between the equatorial and subpolar regions."

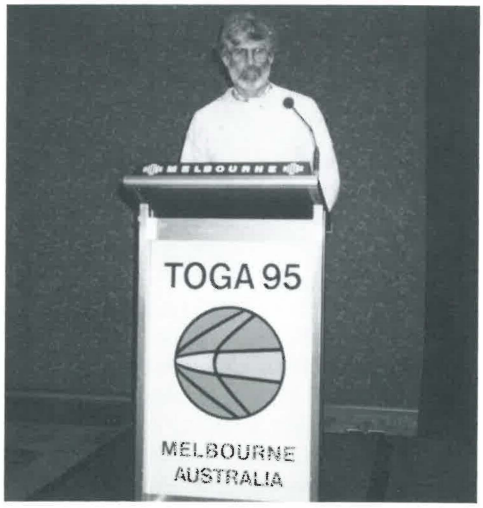
Dr. Lu explains that over the past several decades, modelers of wind-driven circulation have made a great deal of progress. The same is true for modelers of thermohaline circulation. He emphasizes that "not so much progress has been made in the study of intermediate water. This study is very important to our understanding of the heat balance of the ocean. It provides us with knowledge of some fundamental mechanisms of climate variability, such as El Niño. Through this model we hope to better understand the circulation of water properties, such as oxygen, salinity, and nutrients."

At present the model is concerned only with the dynamical aspects of ocean circulation, not its thermodynamics. "After we have gained a fundamental understanding of the dynamics," Dr. Lu concludes, "a later project will involve the consequences of heat exchange and the distribution of water properties."

People on the Move

Dr. Julian McCreary attended a conference named TOGA95 (Tropical Ocean Global Atmosphere) in Melbourne, Australia, April 2-7, to celebrate the end of a successful 10-year program. He served as convener of a conference session entitled "Simulation and Predictability." Also attending from the Center were **Jan Witte** and **Kathy Maxson**. The week of presentations was capped off by a "toga party," held at the Old Melbourne Gaol, and participants (with a few exceptions) dressed as the Romans did. Costumes ranged from rented gladiator attire to hotel bedsheets (and at least one shower curtain). The gaol had held condemned prisoners during the last century, and their actual cells contained real death masks, photographs, and other accoutrements signifying a very harsh prison life. It seemed an appropriate venue for the toga party. There was even a brief "Nova Night" assembly, at which were gathered the current Center participants as well as former Novaites, including one-time director **Dr. Dennis Moore, Dr. Peter Niiler,** and former student **Dr. Zuojun Yu** (see photo, compliments of **Dr. Michael McPhaden**).

(Continued on Page 4)



Dr. Julian McCreary convenes a session of TOGA 95.

"Nova Night" at the Old Melbourne Gaol: Dr. Peter Niiler, Kathy Maxson, Dr. Julian McCreary, Dr. Zuojun Yu, Dr. Dennis Moore, and Jan Witte.

CONTRACTS AND GRANTS: UPDATE

Since the publication of the Spring 1994 issue of *Currents*, Center investigators have been awarded a number of grants and contracts by federal, state, and county funding agencies, as well as private sources. These awards continue to serve as the life blood of the research arm of the Oceanographic Center.

C. Burney: "Sea Turtle Monitoring FY 94," Broward County Commissioners (9/20/94-4/3/95, Supplement). $22,811.

C. Burney: "Sea Turtle Monitoring FY95," Broward County Commissioners (4/4/95-4/3/96). $56,758.

R. Dodge: "Port Everglades Macroinvertebrate Study," Port Everglades Authority (8/1/94-7/31/95, Year 4). $34,539.

R. Dodge: "Materials and Services to Provide Data for Corrosion Testing and Provide Technical Support at the Fort Lauderdale Marine Corrosion Test Site," Naval Surface Warfare Center (3/1/95-8/31/95). $10,000.

R. Dodge: "10 Year Follow-up Monitoring Assessment of Tropical Oil Pollution Investigations," Marine Spill Response Corp. (9/9/94-12/31/94). $156,083.

G. Kleppel: "The State of Florida's Estuaries and Future Needs in Estuarine Research," Florida Sea Grant (1/17/95-12/31/95). $19,339.

G. Kleppel: "Conservation of Carotenoid Pigments during Passage through the Guts of Calanoid Copepods: Specificity and Physiological Induction," National Science Foundation (NSF) (7/1/94-12/31/95, Year 2). $71,625.

J. McCreary: "Meridional Circulation Cells and the Maintenance of Tropical-Ocean Thermal Structure," NSF (7/1/95-6/30/96, Year 1). $165,000.

J. McCreary: "Dynamics of Equatorial Coastal and Subtropical Ocean Circulation," NSF (7/1/94-12/31/95, Year 3). $235,000.

J. McCreary/J. Proehl: "Dynamics of Tropical Instability Waves," NSF (11/1/94-10/31/95, Year 1). $51,000.

(Continued from Page 3)

Dr. Gary Kleppel traveled to Columbia, South Carolina, on April 10 to visit the University of South Carolina. There he presented a talk entitled "Zooplankton Feeding and Its Relation to Production."

On May 3, Dr. Kleppel visited the campus of the University of Georgia, in Athens. There he joined other researchers from Florida, Georgia, and South Carolina in a conference of COBIA (Coastal Ocean Boundaries Interactions and Assessments) participants. The cooperative organization is sponsored by NOAA's Coastal Ocean Program.

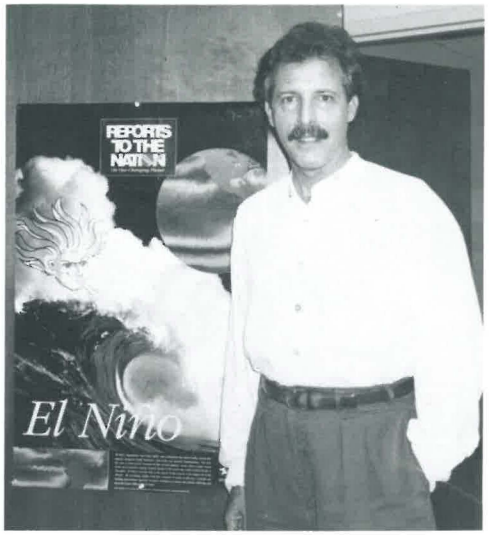
From May 31 to June 2, Dr. Kleppel represented the state of Florida at a Sea Grant Week workshop in Humacao, Puerto Rico. This was a gathering of Sea Grant program representatives from all over the U.S. The purpose of the workshop was to discuss the role that Sea Grant will be playing in future research throughout the country.

Dr. Charles Messing donned his traveling shoes again this spring. He visited Puerto Princesa, on the Island of Palawan in the Philippines, during April 14-28. There he met **Patrick and Lori Colin** of the Coral Reef Research Foundation. They have a contract with the U.S. National Cancer Institute to collect marine invertebrates and algae in search of possible new anti-cancer pharmaceuticals. Dr. Messing spent about 10 days diving from a 100-foot dive boat in the Sulu Sea, collecting crinoids for his own research and contributing to the Colins' research work as well. On this trip he collected almost 40 species of crinoids, one of which may be new.

Dr. Messing then traveled to the Galapagos Islands, off the coast of Ecuador, during May 12-24. He was invited by the International Oceanographic Foundation (IOF) to present a series of lectures during an ecological tour of the islands aboard the M/V *Isabela*. The program was sponsored jointly by the IOF, the World Wildlife Fund, and the Los Angeles County Museum. He spoke on plate tectonics and the geologic history of the Galapagos, the underwater life around the islands, and El Niño ("even though I'm not a physical oceanographer") and the oceanography of the eastern Pacific.

J. McCreary/J. Witte: "*Journal of Geophysical Research* Editorial Office," American Geophysical Union (10/1/94-6/30/95, Year 6). $27,233.

R. Spieler: "Wetlands Mitigation and Lake Enhancement Research at Rinker Lakes, FEC Quarry," Rinker Materials Corp. (6/1/94-5/31/96). $99,985.



Dr. Charles Messing bones up on El Niño.

Dr. Barry Klinger attended a conference on Atlantic Climate Change held at the Rosenstiel School of the University of Miami, May 2-3. The meetings were sponsored by NOAA.

On May 12 at the Rosenstiel School, **Dr. Richard Spieler** presented a talk to Southeast artificial reef coordinators and interested students and faculty. He described the artificial reef research experiments that he has been performing here at NSU.

Dr. Mahmood Shivji will attend a NOAA-sponsored Grant and Cooperative Agreements Workshop, to be held June 12-14 in Tampa, Florida. During the latter part of the workshop, the National Marine Fisheries Service will provide guidelines for developing and documenting the technical portions of applications for federal assistance.

Dr. Richard Dodge will attend a conference of the Society of Economic Petrologists and Mineralogists in St. Petersburg, Florida, August 13-16. He will present a paper entitled "The Effects of Oil and Oil Dispersants on Tropical Ecosystems: A 10-year Update."

UNDERCURRENTS
INSTITUTE OF MARINE AND COASTAL STUDIES

SUMMER TERM SCHEDULE

M.S. degree specialties are **Marine Biology** and **Coastal Zone Management.** Each course carries 3 credit hours or may be audited. Tuition is $333 per credit hour (50 percent less for audit). Classes meet once a week from 6:30 to 9:30 P.M. at the Oceanographic Center. The summer term extends from July 3 to September 15, 1995. For further information, call Helene Taylor at (305) 920-1909.

Marine Chemistry (OCOR-5605): A CORE course that is required for both specialties. Reviews the properties and composition of seawater; the importance, distribution, relationships, and cycling of major nutrients; dissolved gasses; trace metals; and organic compounds. A self-paced laboratory is offered. Problem-solving is supplemented by interactive microcomputer work. Instructor: **Dr. Curtis Burney** (Center faculty). Begins Monday, July 3.

Law and the Coastal Zone (CZMT-0603): General instruction in legal fields and in selected environmental sciences, combined with in-depth study of administration of maritime industries and coastal activities. Focuses on the regulation of marine and maritime pursuits that pertain to the coastal zone and adjacent territorial waters. Instructor: **Stephen King, J.D.** (Center adjunct). Begins Tuesday, July 11.

Coral Reef Ecology (OCMB-7012): General ecology of corals and coral reefs. Includes discussion and description of distributions, abundance, and physiology of corals and coral reef animals. Describes effects from important natural and anthropogenic events and causes. Emphasis is on coral reefs of the Caribbean and Florida Keys. Instructor: **Dr. Joshua Feingold** (Center adjunct). Begins Wednesday, July 12.

Aquaculture (OCMB-6200): A survey course providing direct, practical, hands-on training in the latest methods of commercial shrimp, fish, and other animal culture. Course work includes activities with live animals in each life history state, as well as instruction in hatchery design and management, culture of larval foods, larval culture techniques, stocking and growout, disease and problems, sourcing of breeders, maturation, and marketing and finance. Species studied include catfish, tilapia, shrimp, and clams. Instructor: **Dr. Bart Baca** (Center adjunct). Begins Thursday, July 6.

Fall Term Schedule

The fall term extends from September 25 to December 15, 1995. Course descriptions will appear in the next issue of *Currents*.

Marine Ecosystems (OCOR-5602): A CORE course. Instructor: **Dr. Curtis Burney** (Center faculty). Begins Monday, September 25.

5000 Days: Environmental Futures (CZMT-0665). Instructor: **Dr. Keith Ronald** (Center adjunct). Begins Tuesday, September 26.

Functional Morphology and Physiology (OCMB-6220). Instructor: **Dr. Richard Spieler** (Center faculty). Begins Wednesday, September 27.

Dynamic Biological Oceanography (OCMB-6195). Instructor: **Dr. Gary Kleppel** (Center faculty). Begins Thursday, September 28.

Fundamentals of Aquatic Ecotoxicology (OCMB-0650). Instructor: **Dr. Gary Rand** (Center adjunct). Begins Friday, September 29.

Ph.D. Degree Offered

The Oceanographic Center offers the Ph.D. degree in Oceanography. The program requires a minimum of 60 credits beyond the baccalaureate, 30 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 $2,225 per quarter.

Undergraduate Seminars Held at Center

On April 28, several undergraduate students who are enrolled in the Joint Science Program with Nova College presented seminars on topics in their specific areas of interest. The following talks were held in the Richardson Library.

"Distribution of Glauconite in the NECOP Study Area from the Gulf of Mexico," by **Dan Covino**

"Sea Turtle Hatching Success," by **Lisa Csuzdi**

"Fish Distribution in Created Wetlands," by **Sean Heiss**

"Interphotoreceptor Retinoid-Binding Protein Gene Conservation among Vertebrate Classes," by **Davida Herman**

"Coral Distribution in the Galapagos Islands," by **Brian Sharpe**

Faculty members attending the seminars were **Naomi d'Alessio** and **Dr. Joshua Feingold**, from the Farquhar Center, and **Drs. Curtis Burney, Richard Dodge, Mahmood Shivji,** and **Richard Spieler** from the Oceanographic Center.

Several M.S. Theses Defended

Three thesis defenses have been presented at the Oceanographic Center during the spring months, and one is planned for June. They are

March 10: "An Investigation of the North Atlantic Boundary Layer as Impacted by Air Pollution Originating from Eastern North America," by **Michelle Patricia Zetwo**. Committee: **Drs. Curtis Burney, Richard Dodge, Donald McCorquodale,** and **Thomas Carsey** (NOAA/AOML).

March 24: "Equilibrium Profile Response to Restored and Renourished Beaches in South Florida," by **Jeffrey Lee Andrews**. Committee: **Drs. Burney, Dodge, Norman Beumel** (Coastal Planning and Engineering), and **Kim Beachler** (Coastal Planning and Engineering).

May 19: "Alkaline Phosphatase Activity and Phosphorous Limitation in Marine Macroalgae from the Florida Keys and the Bahamas." by **Christine M. Urnezis**. Committee: **Drs. Dodge, Burney,** and **Brian La Pointe** (Harbor Branch Oceanographic Institution).

June 8: "A Descriptive Study on the Percussive Behavior of Orcas, *Orcinus Orca*, in Johnstone Strait, British Columbia," by **Nicole Marie Adimey**. Committee: **Drs. Dodge, Bart Baca, Keith Ronald,** and **Naomi Rose** (Humane Society of the United States).

Michelle Zetwo defends her thesis.

Christine Urnezis at her thesis defense.

Christine Urnezis Defends Thesis

On May 19, **Christine Urnezis** successfully defended her thesis for the M.S. degree in Ocean Science, with a specialty in Coastal Zone Management. The title of her thesis is "Alkaline Phosphatase Activity and Phosphorus Limitation in Marine Macroalgae from the Florida Keys and the Bahamas."

According to Ms. Urnezis's thesis Introduction, "Worldwide, marine macroalgae are becoming increasingly prevalent in coral reef environments influenced by local human activities and associated nutrient inputs. The relative dominance of corals and algae is controlled by complex biological interactions between competition and grazing, the outcomes of which are influenced by abiotic factors including nutrient availability.... In order for reefs to be dominated by corals and to maintain high reef coral productivity and biodiversity, low concentrations of water column dissolved inorganic nitrogen (N) and phosphorus (P) are required. The typically low dissolved nutrient concentrations on coral reefs results in nutrient limited productivity of reef macroalgae.... Accordingly, increases in water column nutrient concentrations via coastal eutrophication leads to nutrient-enhanced productivity of macroalgae and overgrowth of reef environments with excessive algal biomass."

There are several abiotic factors that regulate the growth and productivity of macroalgae. The most important are light, temperature, and nutrient availability. "Light limitation of macroalgal productivity is quantified by the photosynthetic-irradiance (P vs. I) curve that was originally developed for higher plants.... Temperatures within the ambient water column also play an important role... by regulating enzymatic activities that control the dark reactions of photosynthesis.... Finally, and most importantly for macroalgal productivity, is nutrient availability. Nutrients in the form of dissolved organic nitrogen and soluble reactive phosphorus as well as vitamins and other trace elements are required to synthesize proteins and amino acids for growth and reproduction."

Ms. Urnezis concludes that "Local human activities and associated nutrient inputs worldwide are influencing the balance between marine macroalgae and corals. The effects of human impacts on changing an ecosystem dynamics by adding nutrients is called

(Continued on Page 7)

New Students Welcomed to M.S. Program

The following students have registered in the Institute of Marine and Coastal Studies in recent months. Welcome aboard!

Barbara Bolwell, MB: Stockton College
Denise Bristol, MB: University of North Carolina at Wilmington
Peter Cappola, MB: Nova Southeastern University
Ying Chen, CZM: Ocean University, Qingdao
Nancey Fisher, MB: Dartmouth College
Susan Gay, Sp: Douglas College
Marika Hanushevsky, CZM: Barnard
Ronald Lauck, CZM/MB: Fairleigh Dickinson
Bettina Lemmon, CZM/MB: California University of Pennsylvania
Molly McCarty, CZM: Nova Southeastern University
Peter McElwain, CZM: Nova Southeastern University
Susan Manship, MB: Florida Atlantic University
Keith Overton, Sp: University of Washington
Jon Sandelin, CZM: University of Maryland
Robin Sherman, MB: Nova Southeastern University
Rebecca Smith, Sp: Dickinson College

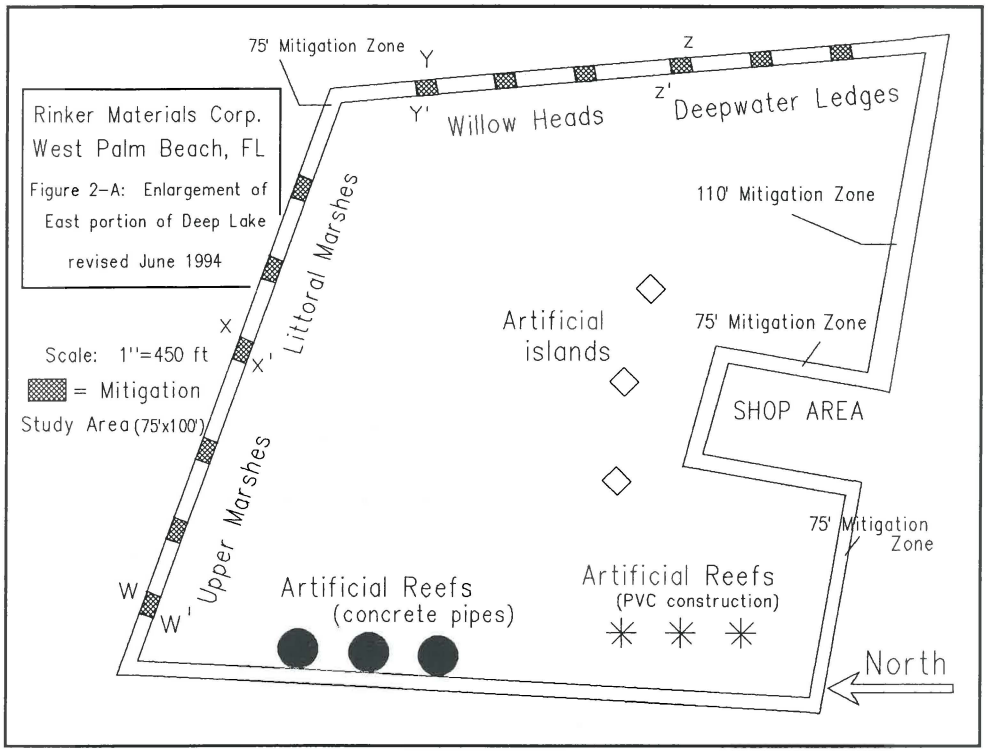
CZM: Coastal Zone Management
MB: Marine Biology
Sp: Special Student

Mitigation Methods Being Tested for Use in Area Lakes

Dr. Bart Baca and **Dr. Richard Spieler** have received a grant for nearly $100,000 from Rinker Materials Corporation to study different mitigation methods for use in about 50 man-made lakes in Dade County. Concrete companies have created these lakes over the past 20 years by mining for sand and rock to be used in building materials. This process alters wetland habitats and requires mitigation.

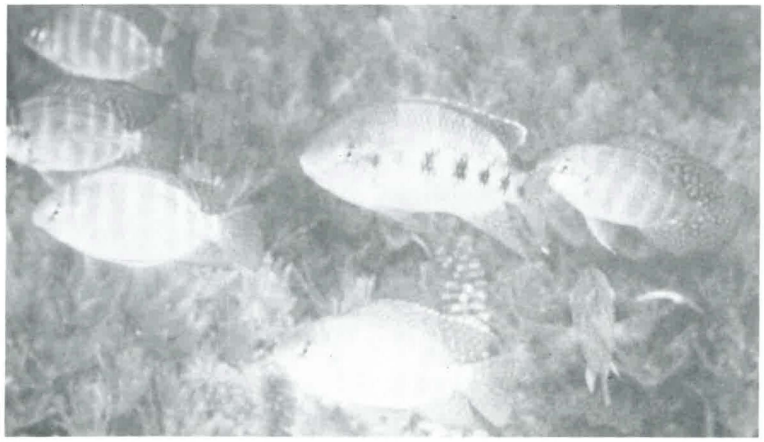
Two M.S. students in marine biology, **Heather Balchowsky** and **Joe Lindstrom**, are engrossed in the research project. They helped design the mitigation areas and are now involved in monitoring the implementation of the design. To that end, several methods are being tested to determine which would be the best ones to use in all area lakes. The methods include planting high marshes, littoral marshes, and willow heads; and constructing deepwater ledges to attract spawning fish, as well as artificial reefs and islands that might enhance fish and bird habitats.

So, according to Dr. Baca, "whichever ones work best from the standpoint of wildlife and fishery use will be the ones Rinker will focus on in future. The successful mitigation methods will be used on other lakes in South Florida, including future lakes. At present, under one land management plan proposed by the mining companies, called the 'Lake Belt Plan,' much of Dade County west of the turnpike will become a series of giant lakes." It is hoped that one or more of the methods now being tested will prove to be workable.



Mitigation zones around a test lake. (Drawing by Heather Balchowsky.)

Researchers explore one of the mitigation areas. (Photo courtesy of Joe Lindstrom.)



The exotic spotted tilapia: one of the more common fish that use shoreline and artificial habitats. (Photo courtesy of Dr. Bart Baca.)

(Continued from Page 6)

'cultural eutrophication' and it leads to shifts in the structure or 'stable-state' of the communities."

The Bahamas were chosen to test for alkaline phosphatase activity (APA) because of their pristine (nonpolluted) waters. They were found to contain elevated APA levels that then could be compared with those found in areas of carbonate-rich waters, such as the Florida Keys. The study examined several different marine habitats and a variety of genera in an effort to establish a viable baseline tool for managing coral reefs.

Oceanographic Center
8000 North Ocean Drive
Dania, Florida 33004

Currents, Spring 1995

NOVA SOUTHEASTERN UNIVERSITY

A motherly manatee with offspring. (Photos by Joe Lindstrom.)

Editor: **Jan Witte**

Recycled Paper

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

5-227/95