Fall 2000

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NSU Oceanographic Center

Nova Southeastern University
Oceanographic Center

Currents

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Coral Reef News

Coral reefs have been much the focus of NSU researchers this past quarter. The following covers meetings, new and old research projects, and innovative equipment that NSU researchers and students have been involved with regarding coral reefs.

NSU Researchers Begin Reef Restoration Project

On February 25, 1993, the *USS Memphis* ran aground on the second reef terrace, three miles south of the Port Everglades entrance. The initial grounding, and subsequent attempts to free the submarine from the impacted reef, resulted in extensive damage to the reef substrate and benthic communities. Staff members from the Broward County Department of Planning and Environmental Protection determined that an area of 1,205 m^2 had been totally destroyed as a result of the grounding incident.

Funding from Broward County's settlement with the Navy will enable researchers from the Oceanographic Center to conduct a hypothesis-based restoration study using the *Memphis* grounding site. Three restoration strategies will be examined in this project: 1) the potential of enhancing coral recruitment through the use of coral larval attractants, 2) the effect of reef structure on the associated fish assemblages, and 3) the interaction between fish assemblages and coral recruitment and survival.

Reef Balls being deployed at the Memphis *grounding site.*

Artificial reef modules (Reef Balls™) will be used as the experimental platforms in this study. With the help of the Reef Ball Foundation and numerous staff members and student volunteers, 160 Reef Ball units were constructed this summer at the Oceanographic Center. For more information on the Reef Ball Foundation, Inc., check out their Web site at *www.reefball.org*.

The deployment of the Reef Balls will take place this fall. The artificial reefs will be positioned on a sandy flat between the second and third reef tracts, adjacent to the grounding site. The Reef Balls will be divided into 40 four-module reef units (quads); each Reef Ball in a quad will display a different coral larval attractant. The attractants include iron additive, algal extract, coral transplants, and a control (no treatment). Effects of reef structure on fish assemblages will be examined using different levels of complexity of fill inside the Reef Ball units. Differing structural complexity will be achieved by placing either small fill, mixed fill, large fill, or no fill within the center cavity of the Reef Balls. The effects of the resulting fish assemblages on coral recruitment and growth will then be recorded bimonthly by divers.

Richard Spieler, Ph.D., is the principal investigator on this four-year project. Three NSU students will be completing their thesis work on various aspects of this project. **Pat Quinn** will be working on his Ph.D. dissertation with Spieler. Quinn's work will investigate the effects of various fish commu-

(continued on page 2)

Reef Restoration *(continued from page 1)*

nities and larval attractants on coral recruitment to the artificial modules. **Judy Robinson** will be conducting her Ph.D. dissertation as well. Robinson, with **Andrew Rogerson, Ph.D.**, will investigate biofilm production on artificial substrates treated with the attractants. **Elizabeth Glynn**, a master's student working with **Richard Dodge, Ph.D.**, will examine the growth and mortality of corals transplanted to the artificial reef habitats.

National Coral Reef Institute (NCRI) Team Completes Ship Grounding Project

NCRI research scientist **David Gilliam**, **Ph.D.,** research associate **Susan Thornton**, **M.S.,** and graduate student **Elizabeth Glynn** recently completed a project funded by the state of Florida Marine Research Institute. The research utilized NCRI's research vessel the *R/V Researcher*, captained by **Lance Robinson** with the assistance of recent graduate, **Brian Ettinger, M.S.** The purpose of the project was to perform a baseline assessment of a Broward County coral reef

Project team members aboard R/V Researcher *(left to right, top to bottom): Elizabeth Glynn, Susan Thornton, David Gilliam, Brian Ettinger, and Lance Robinson*

area that experienced grounding damage by the vessel *C/V Hind* in March 1998. The grounding dislodged and fragmented many reef-building corals and created flat-topped, scarified, reef substrate in several places. In May 1998 a contractor reattached more than 300 stony corals in 12 zones back to the reef surface. The contractor did not, however, provide information on the species, size, and condition of the reattached corals. Using DGPS and state planar data, the NCRI team identified and assessed the physical condition (secure, loose, or missing) and health (living, percent tissue loss, disease, bleaching, lesions, dead) status of 333 reattached corals within the 12 zones. A subset of 157 representative reattached corals as well as 30 naturally occurring reference corals were mapped and tagged. Underwater photographs of each of the reattached and control corals were taken to provide a visual reference. The team also established permanent transects on scarified and on nearby undamaged substrate to compare recruitment of new stony corals.

Coral colonies are frequently dislodged and/or fragmented as the result of vessel groundings. Damaged corals may be susceptible to tissue death, disease, and algal overgrowth. Many of these damaged colonies can be saved if they are reattached to the substrate. It has been more than two years since the corals that were dislodged and fragmented from this grounding event have been reattached, and 74 percent of them have survived. In addition to simply saving the loose colonies and fragments, it is hoped that reattaching corals may facilitate the recovery of a damaged area by releasing larvae for recruitment, attracting recruits, and maintaining substrate complexity for fisheries. The assessment and continued monitoring of the damaged area and restoration is vital to evaluate the success of the activities, to determine if additional effort is required, and to follow reef recovery.

Results from this project were presented at the AAUS Diving for Science in the 21st Century Meeting (St. Petersburg, October 11–15, 2000), and at the Ninth International Coral Reef Symposium (Bali, Indonesia, October 23–27).

New Underwater Computer Tested

Two scientists from Australia arrived in September to field test an underwater computer used for mapping and monitoring coral reefs. Peter Moran, Ph.D., managing director of WetPC Pty Ltd. from Garran, Australia, and Stephen John, senior systems engineer for Nautronix Ltd. of Fremantle, Australia, were invited by **James D. Thomas, Ph.D.,** research director for the National Coral Reef Institute (NCRI). Thomas describes the tool as "bringing all the capabilities that computers can bring us into once piece of equipment that can go into the water with scientist-divers for instantaneous recording, measuring, video, and still imaging of any number of parameters, linking them with their exact location by a differential global positioning system (DGPS)." The SeaPC® is revolutionary because other underwater specialty devices have only one use, which forces divers who are performing multiple tasks to use several pieces of equipment.

The computer looks like something you would see in a video arcade. You wrap one hand around a control flanking a flat monitor. The screen logs the diver's swim path and depth, and maps the position of objects on the seabed. Divers may access reference

Richard Dodge (left) gets pointers from Peter Moran as to the finer points of the SeaPC® during Dodge's orientation to using the computer.

material from a database and funnel data through the water to the surface over long distances. The SeaPC® is

powered by batteries that last eight hours, and it is neutrally buoyant so the diver can transport it almost anywhere underwater.

Stephen John (left) and Peter Moran (front) preparing the SeaPC® and its floating antenna system for testing in the Boat Basin. Thomas is behind Moran.

David Gilliam photographs and maps the location of a coral colony with the SeaPC®.

U.S. Coral Reef Task Force

The Honorable Tauese P.F. Sunia, governor of American Samoa, and Richard Dodge take a moment to chat during the Fifth Meeting of the U.S. Coral Reef Task Force.

Richard Dodge, Ph.D., executive director of NSU's National Coral Reef Institute (NCRI) attended the Fifth Meeting of the U.S. Coral Reef Task Force (CRTF) held in American Samoa, August 4–7. Dodge was accompanied by Greg McIntosh, NCRI's director for Latin Affairs. The CRTF was created in June 1998 by President Clinton for the purpose of protecting coral reefs for tomorrow. Working with many partners (NCRI among them), the CRTF developed the first comprehensive roadmap to U.S. action to help conserve coral reefs. Titled the "National Action Plan for Coral Reef Conservation," this plan identifies 13 major actions and calls for immediate and sustained national action. These 13 actions address two fundamental steps needed to reverse the coral reef crisis: increase understanding of coral reef ecosystems and the natural and human processes that determine their health and viability, and reduce the adverse impacts of human uses of coral reef resources and habitats.

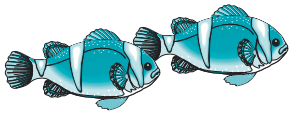
The Web site for the task force is *http://coralreef.gov*.

Ninth International Coral Reef Symposium

Members of the National Coral Reef Institute (NCRI) of NSU attended the Ninth International Coral Reef Symposium in force. Those attending the International Society for Reef Studies' (ISRS) quadrennial symposium, held in Bali, Indonesia, October 23–27, were Ph.D.s **Richard E. Dodge** (executive director), **Joshua S. Feingold**, **David S. Gilliam**, **James Thomas** (research director), and **Richard Spieler**. Also in attendance were **Carol R. Fretwell** (coordinator of administrative operations), **Kevin E. Kohler** (senior programmer) who designed and maintained the symposium Web site, **Susan L. Thornton** (research associate), and students, **S. Michael Hoke**, **Lance B. Jordan**, **Judy L. Robinson,** and **Kevin Helmle**.

The Ninth International Coral Reef Symposium (ICRS) provided an occasion to advance the dissemination of knowledge on coral reefs, a forum for exchange of experiences and ideas, and a vehicle for evaluating and advancing the International Coral Reef Initiative's (ICRI's) progress in its sixth year. The symposium was sponsored by the State Ministry for the Environment of the Republic of Indonesia, in collaboration with the Indonesian Institute of Sciences and the Indonesian Association for Coral Reef Studies.

(left to right) Bernard Reigl, Kevin Helmle, Susan Thornton, Richard Dodge, Barbara Dodge, David Gilliam, Carol Fretwell, Joshua Feingold, Peggy Stumpski, Lance Jordan, Kevin Kohler, Michael Hoke, and James Thomas. (Not shown: Judy Robinson and Richard Spieler)



Coral Reef Symposium (cont'd)

The following mini-symposiums had NCRI co-conveners or NCRI participants:

Mini-Symposium A16: Environment and General Papers

A16.03 *Thomas J.D.*, Dodge R.E., Gilliam D.S.* "Occurrence of Staghorn Coral (*Acropora cervicornis*) Outcrops at High Latitudes in Nearshore Waters of Fort Lauderdale, Florida, USA"

Mini-Symposium A17: Proxy Records of Climate in Coral Skeletons

*Convenors: Prof. Peter K. Swart, University of Miami, Miami, Florida, USA

Richard E. Dodge, Ph.D., Nova Southeastern University, Dania Beach, Florida, USA

A17.075 *Helmle K.P.*, Dodge R.E.* "Skeletal Architecture and Density Band Analysis in *Diploria strigosa* by X-Ray Computed Tomography"

A17.10 *Swart P.K.*, Dodge R.E., Enfield D.* "Interannual to Century-Scale Climate Records from the Atlantic: Coral-Based Reconstructions"

Mini-Symposium A18: Reproduction, Recruitment, and Effects of Stress on Reproductive Success of Corals and Other Reef Invertebrates

A18.03 *Colley S.B.*, Feingold J.S., Peña J., Glynn P.W.* "Reproductive Ecology of *Diaseris distorta* (Michelin) (Fungiidae) in the Galápagos Islands"

A18.30 *Feingold J.S.*, Reaka-Kudla M.* "Recruitment of *Agaricia* and *Porites* to Aluminum Substrata, Conch Reef, Key Largo, Florida"

Mini-Symposium D2: Central Questions, Experimental Design, and Methods of Long-Term Monitoring Programs. A Synthesis of Ecological Concepts and Data

D2.16 *Robinson J.L.*, Thomas J.D.* "Measure of Mesobenthic Reef Diversity: A Pilot Study Using Three-Dimensional Artificial Substrates as a Surrogate for Natural Substrata"

Mini-Symposium D3: Coral Reef Biodiversity: Assessment and Conservation

D3.06 *Thomas J.D.** "A New Model for Identifying Evolutionary Diversity in Coral Reefs Using Marine Invertebrates: A Synthesis of Geology and Biodiversity"

Mini-Symposium D4: Coral Reef Restoration in the Next Millennium

*Convenors: William F. Precht, Ph.D., PBS&J, Miami, Florida, USA

Richard E. Dodge, Ph.D., Nova Southeastern University, Dania Beach, Florida, USA

D4.17 *Precht W.F.*, Dodge R.E.* "The History and Future of Coral Reef Restoration"

Mini-Symposium E1: Global Climate Change and Coral Reefs, 1: The Science Behind the Prognostications of Gloom

E1.08 *Helmle K.P.*, Wellington G.M., Dodge R.E., Swart P.K.* "Decline in Coral Calcification Rate Over the Last Century: Preliminary Evidence"

The group presented many papers and posters. The abstracts will be published in the proceedings of the conference. For more information on the symposium go the Web site: *www.nova.edu/ocean/9icrs.*

At the Bali Ninth International Coral Reef Symposium, members of the Bahamas government join forces with NCRI and NCORE to plot strategy for consideration of hosting the next International Coral Reef Symposium. Left to right: Front Row: Michael Braynen, minister of fisheries, Bahamas; Richard Dodge, executive director, NCRI; Carol Fretwell, NCRI; Sir Nicholas Nuttall, BREEF, Bahamas. Back Row: Robin Fortuna, NCORE, RSMAS, UM; Earlston McPhee, ministry of tourism, Bahamas; John McManus, director, NCORE, RSMAS, UM

Posters

Dodge R.E., Kohler K.E., and Helmle K.P. "Coral skeletal densitometry analysis program (CORDAP)."

Dodge R.E., Swart P.K., Enfield D., Helmle K.P., Gilliam D.S., White K., Moses C., and Kohler K.E. "Massive corals from the Cape Verde Islands and the Gulf of Guinea: Physical and chemical parameters with potential for reconstruction of proxy climate/environmental records."

Feingold J.S., Hoke S.M. "Sexual reproduction in the elliptical star coral, *Dichocoenia stokesi* Milne-Edwards and Haime, (Anthozoa: Scleractinia) preliminary results."

Jordan L.K.B., Gilliam D.S., Sherman R.L., and Spieler R.E. "Patch reef isolation affects fish assemblage structure: A study using replicate reef modules."

Precht W.F., Macintyre I.G., Dodge R.E., Banks K., Fisher L. "Backstepping of holocene reefs along Florida's east coast."

Posters (cont'd)

Weaver D.C., Gilliam D.S., Anderegg D., Dodge R.E. "Community structure, habitat association, and trophic relationships of reef fishes on a staghorn coral (*Acropora cervicornis*) reef in Broward County, Florida, USA."

Dodge R.E., Spieler R.E., Gilliam D.S., Quinn P., Rogerson A., Glynn E., Banks K., Fisher L., Stout D., Jaap W. "Restoration of a southeast Florida USA coral reef injured by the grounding of a nuclear submarine."

Gilliam D.S., Dodge R.E., Thornton S.L., Jaap W., and Wheaton J. "Scleractinian coral reattachment success and recruitment on a shallow-water ship grounding site in southeast Florida, USA."

Thornton S.L., Gilliam D.S., Dodge R.E., Fergen R.E., and Cooke P. "Success and growth of corals transplanted to cement armor mat tiles in southeast Florida: Implications for reef restoration."

Dodge R.E., Gilliam D.S., and McIntosh G. "Reef delineation at Vieques, Puerto Rico: Coupling air photography with LIDAR bathymetery, sunshading, contouring, and 3-D modeling."

NSU OC "On TV"

Action shots from the Boat Basin; on-camera interviews of Richard E. Dodge (OC dean and National Coral Reef Institute [NCRI] executive director) and Richard E. Spieler (OC professor and Guy Harvey Research Institute [GHRI] executive director); above-water and underwater film clips of OC students, faculty, and staff members working on various projects in the Boat Basin and in offshore waters; a "remote" introduction to a news piece filmed in James D. Thomas' (OC professor and NCRI research director) amphipod lab; and background filmed in Mahmood Shivji's (OC assistant professor) molecular biology lab for a story on a national daytime talk show—all these things have made sightings of television cameras almost an everyday occurrence at the OC this fall.

A local cable television station broadcast an interview with Dodge along with film of staff members, students, and visiting scientists trying out the SeaPC® in the Boat Basin (see story on page 2).

Miami's WTVJ NBC 6 sent a film crew to cover the launch of the Reef Balls for the *USS Memphis* restoration project (see story on page 1). In addition to the Spieler interview and above-water filming, the station also broadcast underwater footage filmed by David S. Gilliam (OC staff member and NCRI research scientist), using the station's own camera equipment.

The same station sent another crew to Bali to attend the Ninth International Coral Reef Symposium (see story on page 3). This crew accompanied the NCRI team on the Bali test of the SeaPC®. Back stateside, the news reporter started the second of his two-part story from a lab in the Schure Building.

And finally, the BIG TIME! Producers and a camera crew from the *Rosie O'Donnell Show* shot some OC exterior shots and background scenes from another Schure Building lab for possible inclusion in a special segment about a Broward youth. This local high-school student, who has overcome considerable personal adversity as a child, hopes to be able to follow his love of science into college, an interest piqued by a project he worked on in Shivji's lab.

Accolades

NSU alumnus, **James C. Hendee, Ph.D.,** just received NOAA's Researcher of the Year Award in his office (Ocean and Atmospheric Research) for all his coral work, specifically "for the significance and originality of his ongoing contributions to the National Coral Reef Initiative and the coral reef scientific community."

In August 1994, Hendee set up the very first coral-related Web page in the world, Coral Health and Monitoring Program (CHAMP). In fact, it was one of only a few thousand Web pages that existed at the time. It was certainly among the first major Web-based programs in NOAA. It is currently the most widely visited of all coral-related Web pages, with daily visits ("hits") ranging from 3,000 to 10,000. Plans have already been made to move ReefServer (the international coral reef database maintained in the Phillipines) to CHAMP.

The following year Hendee initiated Coral-List listserv, with a list of about 50 names who were planning on attending the Eighth International Coral Reef Symposium. Since that time Coral-List has grown to more than 1,500 names and has become the backbone of electronic communications among the world's coral researchers and management community. It is used to announce symposia, research opportunities, jobs in coral research, scholarships, incidences of coral bleaching, and other coral phenomena. The Web page is *www.coral.noaa.gov*.

Hendee received his B.S. in marine biology in 1971 from Florida State; an M.S. in marine biology from the Institute of Marine Science, University of Alaska (Fairbanks) in 1984 (but did his fieldwork on the coast at the Seward Marine Science Center); and received his Ph.D. in information systems from Nova Southeastern University's School of Computer and Information Sciences this past year.

Jim Hendee

People on the Move

Barry Klinger, Ph.D., attended the CLIVAR workshop on shallow tropical/subtropical overturning cells (STC) and their interaction with the atmosphere, held at the Instituto Veneto di Scienze, Lettere ed Arti in Venice, Italy, October 9–13. He presented a poster titled, "The relationship between oscillating subtropical wind and equatorial temperature," coauthored with J.P. McCreary and R. Kleeman. Klinger was a cochair of the Atlantic Working Group at the meeting, and will be a coauthor on the forthcoming report on recommendations from the meeting.

Center librarian, **Kathy Maxson**, attended the International Association of Aquatic and Marine Science Librarians and Information Centers (IAMSLIC) held in Victoria, Canada, October 5–9, where she presented a talk titled, "Evolution of a security system for a small library."

SAIL (Southeast Affiliate of IAMSLIC Librarians) members at IAMSLIC conference. Back row: Kristin Metzger, Karen Brown, Linda Pikula, Patti Marraro, Jan Boyette, Fred Lohrer, and Kathy Maxson. Front row: Stephanie Haas, Natalie Wiest, and Evelyn-Poole Kober.

Edward O. Keith, Ph.D., attended a conference on the Mathematical Modeling in Nutrition and the Health Sciences held July 29 to August 1 at Pennsylvania State University, where he presented a poster titled, "A matrix model of fasting metabolism in northern elephant seal pups."

Research associate **Susan Thornton**, Captain **Lance Robinson,** and Ph.D. candidate **Judy Robinson** attended the 20th Annual Symposium of the American Academy of Underwater Sciences (AAUS) held October 11–15, 2000, in St. Petersburg, Florida.

Ph.D. candidate, **Peggy VanArman,** who is an assistant professor of biology at Palm Beach Atlantic College, has been busy environmentally. In April she cohosted the Fifth Annual Environmental Awards/Reception for the Treasure Coast chapter of the Florida Association of Environmental Professionals (FAEP) at Palm Beach Atlantic College. At the reception she received the Directors Award for participation in educational and field activities that enhance the environmental community, since she has been the adviser for the Palm Beach Atlantic College Science Club for 12 years. She was also awarded a Community Service (Workshop) Award for participation in a variety of community service projects—mostly environmental.

In July, VanArman participated in collecting teams in the Everglades with the South Florida Water Management District in WCA2 (periphyton and crayfish) and with Frank Jordan, Ph.D., of the Ecological Studies Department of Loyola University, New Orleans, in WCA1 (fish and crayfish).

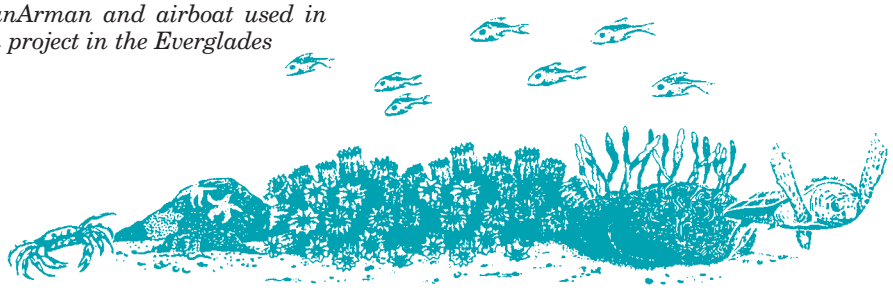
Peggy VanArman and airboat used in collection project in the Everglades

On October 6, VanArman took nine students to the Arthur R. Marshall Loxahatchee National Wildlife Refuge (ARM-LNWR) in Boynton Beach. Alligators were captured in WCA1 and brought in for measuring and weighing under the direction of Ph.D.s Laura Brandt and Frank Mazotti.

Alligator being weighed and measured

Later in the month she participated in the first cypress tree replanting in the Everglades, in the ARM-LNWR, sponsored by Arthur R. Marshall Environmental Foundation.

VanArman would also like to announce that the PBA Science Club will be the lead volunteers on Everglades Day, February 10, at the refuge, where they will be training all of the expected 250–300 tree planters. Anyone can volunteer, but must preregister.



MASTERCURRENTS
INSTITUTE OF MARINE AND COASTAL STUDIES

M.S. degree specialties are marine biology, coastal zone management, and marine environmental science. Each course carries three credit hours or may be audited. Tuition is $449 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 (unless otherwise specified.) The winter term runs from January 2–March 23 (unless otherwise specified). Registration ($25 nonrefundable fee) begins two weeks prior to the start of classes. For further information, call Andrew Rogerson, Ph.D., or Melissa Dore at (954) 262-3600 or 800-396-2326, or email *imcs@nova.edu*. More information can be found at the Web site: *www.nova.edu/ocean*.

WINTER 2001 Term Schedule

Concepts in Physical Oceanography (CORE) (OCOR-5601) Introduction to how wind, radiation, gravity, friction, and the Earth's rotation determine the ocean's temperature and salinity patterns and currents. Conceptual models (geostrophy, Ekman transport, Rossby waves, etc.) explain physical features of the ocean ranging from microscopic turbulence to global circulation. Prerequisite: algebra. The course is a CORE course for both specialties. Meets Wednesdays, 6:30–9:30 p.m. Begins January 3. Instructor: William Venezia, Ph.D. (center faculty).

Biostatistics (OCOR-5606) This is a basic course on the practical applications of descriptive and inferential statistics with emphasis on principles and methods of summarizing biological data. Measures of central tendency, dispersion, and variability testing will be discussed along with basic concepts of probability distributions, hypothesis testing, and decision making. Topics will also include simple statistical tests, analysis of variance (ANOVA—single classification, nested, and two-way), linear regression, and correlation. Meets Tuesdays, 6:30–9:30 p.m. Begins January 2. Instructor: Mark Farber, Ph.D. (center adjunct).

GIS and Remote Sensing (CZMT-0639/MEVS-5023/OCMB-6100) This course provides hands-on training with the latest techniques in geographic information systems and remote sensing. Course work includes lecture and hands-on computer training. Areas covered (utilizing both ERDAS Imagine 8.3 and ESRI Arcview 3.0) include GIS/remote sensing theory, image georeferencing and mosaicing, image enhancement and classification procedures, accuracy assessment procedures, importing GPS polygons, establishing database and multimedia hot links, importing tables, joining, building queries, charting, and map creation. Class instruction will be centered on application of these techniques to actual environmental case studies. Meets Mondays, 7:00–10:45 p.m. Begins January 8. Instructor: Stacy Myers (center adjunct).
Note: To be held on the main campus (exact location TBA) and limited to 25 students, this course is strongly recommended to all students. GIS/Remote Sensing is required in the majority of science positions. There is a lab fee of $100.

Aspects of Marine Pollution (CZMT-0790) (MEVS-5100) This course deals with various forms of environmental pollution as they affect both the land and maritime environment. Focus on the role of microorganisms as causes and indicators of toxicity. Sources, measurement, and control of pollution in marine and coastal environments are discussed. Meets Thursdays, 6:30–9:30 p.m. Begins January 4. Instructor: Don McCorquodale, Ph.D. (center adjunct).

Field Courses

Ecology of the Belize Barrier Reef (OCMB-8100) A field course to be held at South Water Caye, Belize. This course will be an intensive hands-on learning experience at the magnificent barrier reef system of Belize. Limited to 14 students. Registration will be open to undergraduate science majors if space becomes available. (One week: February 26–March 5) Prerequisites: Invertebrate Zoology, Marine Ecology, or equivalent.

Students will need a valid passport or certified copy of a birth certificate and will be required to pass a swim test prior to departure. Students will undertake individual projects related to their thesis/dissertation topic. All students intending to participate in this class will be required to sign a performance contract with the instructor before final registration. Housing and accommodations on the island are rustic but adequate. Food is local and adequate. Special diets cannot be accommodated. We will work primarily on reef environments adjacent to the island, with boat trips to adjacent areas. Preparation: The class will meet three times before departing for Belize to provide written material and background on the course. Attendance is mandatory.
Costs: $690 plus airfare (approximately $300). Price includes all taxes, transfers, and lodging and is limited to 14 students by permission of instructor. Instructor: James Thomas, Ph.D. (center faculty).

Winter 2001 Term (cont'd)

Distance Education

Marine Mammal Management (OCMB-6330) This CD-ROM course is designed to serve as a source of information and ideas providing an introductory awareness of a diversity of issues including the morphology, physiology, adaptation, and behavior of these species and their interaction with humans and other predatory mammals. A secondary objective is how marine mammal species are interconnected to the rest of the natural environment. A third objective is to help the student to begin to consider the linkages between the ways in which we regard marine mammals, and our actions toward them. Two papers are required. Instructor: Keith Ronald, Ph.D. (center adjunct).

Spring 2001 Term Schedule

Marine Geology (OCOR-5604) This is a core course. $40 lab fee. Instructor: Patricia Blackwelder, Ph.D. (center faculty).

Biostatistics II (CZMT-0765/MEVS-5100/OCMB-6091.) Instructor: Mark Farber, Ph.D. (center adjunct).

Biology of Sharks (OCMB-TBA) Instructor: Mahmood Shivji, Ph.D. (center faculty).

Oil Pollution Effects (CZMT-0634/MEVS-5016) Instructor: Bart Baca, Ph.D. (center faculty).

Marine Mycology (OCMB-TBA) Instructor: Scott Schatz, Ph.D. (center adjunct).

Introduction to Marine Environmental Science (CZMT-TBA/MEVS-5110) Instructor: Andrew Rogerson, Ph.D. (center faculty).

Welcome to our new fall students!

Irene Arpayoglou, Licco Dept. de Colonia, Uruguay
Jeremy Barnes, University of Puget Sound
Robert Baron, Rider University
Alicia Beltran, University of North Dakota
Mega Berkle, Denison University
Matthew Brosious, University of Tampa
Amanda Burgos, College of Charleston
Kara Carolina, University of New Haven
Jessica Craft, University of West Florida
Brian Fleuch, University of Tennessee
Ian Gibson, University of Rhode Island
Heather Halter, University of Miami
Aaron Hartz, Oregon State University
Andrea Jenkins, University of Miami
Heath Laetari, Southwestern College
Kevin Lasagna, Huron University
Briana Lenox, University of Minnesota
Jennifer Magnussen, University of North Carolina–Wilmington
Sara Matthews, Barry University
Ali Miller, Cornell University
Ryan Moyer, Kutztown University
Andrea Pula, University of Rhode Island
Kevin Rowe, Tri-State University
Brian Shepard, University of Kansas
Jaimi Stout, Nova Southeastern University
Jaime Vernacchio, Salisbury State University
Rebekah Walker, St. Mary's College
Greg Ward, Texas A&M University

Ph.D. candidates

Alfredo Bonilla, University of Hawaii at Manoa
Kevin Helmle, University of Houston

Seminars and Defenses

Thesis:

Brian T. Maybruck, "An initial study of the colonization, annual temporal variation, and ecological interactions of the microbial epibiont community on the prop roots of red mangroves, *Rhizophor mangle*." October 13. Committee: Andrew Rogerson, Curtis Burney, and Richard Spieler.

Fraser Mickle, "The seasonal distribution of marine and non-marine fungi along a salinity gradient in a subtropical estuary." September 7. Committee: Scott Schatz, Harold Laubach, and Andrew Rogerson.

Brian Voelker, "Faunal abundance and diversity between littoral shelf mitigation areas of varying design parameters." September 1. Committee: Bart Baca, Stacy Myers, and Hilburn Hillestad (Indian Trace Development District).

Capstone Review:

Kevin M. Kittredge, "Nutritional considerations for tilapia in aquaculture." September 15. Committee: Bart Baca and Richard Dodge.

German R. Mendez, "A diver-operated protocol for mapping the distribution of the scleractinian coral, *A. cervicornis,* off Fort Lauderdale, Florida." October 6. Committee: James Thomas and Curtis Burney.

Richard R. Wingrove, "Guidelines for protecting and cleaning cultural properties affected by oil spills." October 13. Committee: Richard Dodge, Robert Baer, and R. Duncan Matthewson.

UNDERGRADUATE

Here is a success story for our marine biology students. **Jason M. Gavril** was a hardworking student that benefited greatly from the individual attention he was able to receive at NSU. Gavril was selected by the U.S. Navy for the directed tract in oceanography. As one of only eight students selected from more than several hundred applicants that applied, Gavril's field experience and boat time were major factors in the decision by the Navy. He graduated in May 1999 with a B.S. in ocean studies with a 3.2 GPA. Thanks to this degree he will be entering as an officer, and after two years he will begin his studies for a master's degree paid for by the Navy.

Other Publications

Gadh, R., M. Boltz, D. Mangatt, L. Janoff, and **E.O. Keith** (2000). Adhesion of tear proteins to contact lenses. FASEB J. 14(8): A1472.

Kennan, S.C. and P.J. Flament (2000). "Observations of a tropical instability vortex," *Journal of Physical Oceanography*, v.30, pp.2277–2301.

Klinger, B. (2000). "Acceleration of general circulation model convergence by exponential extrapolation." *Journal of Ocean Modeling* (accepted).

Cassen, I., *et al* [including **H. Balchowsky**] (2000). "Independent adaptation to riverine habitats allowed survival of ancient cetacean lineages." *PNAS*, V. 97(21), pp. 11343–11347.

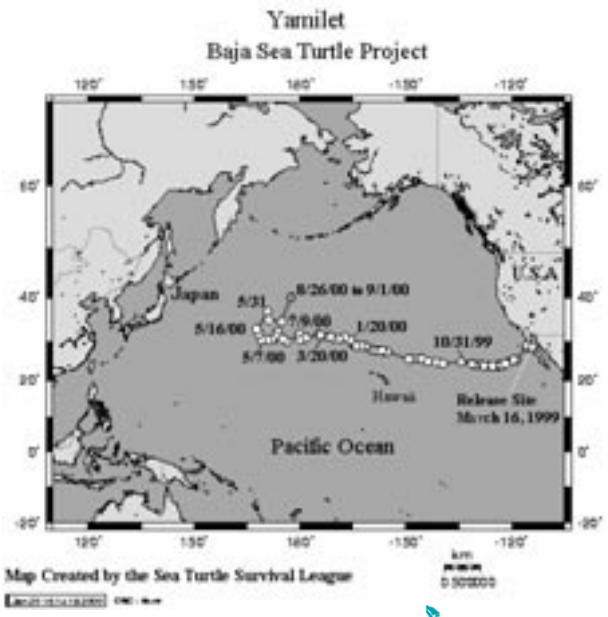
The center bids adieu to **Barry Klinger, Ph.D.,** who on a leave of absence from NSU, moved north with his family in November. His wife, Elise, has taken a position at the Agency for Health Care Quality Research in the federal government in the Washington, D.C., area, an opportunity they couldn't pass up. Klinger will be a professor at George Mason University and will be working with the Center for Ocean-Land-Atmosphere Studies, a climate research lab affiliated with the university. Their gain—our loss. Good luck Barry and Elise!

A new display was set up in the Forman Building by **Ed Keith, Ph.D.,** with help from his high-school intern, Jessica Davis. The display, which features a dolphin skull, also has illustrations showing components of dolphin anatomy and its skeleton.

Jessica Davis standing proudly next to new display with her adviser, Ed Keith.

Turtle Travels Monitored

The Oceanographic Center has made a small donation of supplies and equipment to the International Turtle Research Center, which is affiliated with Sea Turtle Survival League and the Baja California Sea Turtle Conservation Network. This group is involved with the rehabilitation and recovery of marine turtles in the Gulf of California and the west coast of Baja California, Mexico. In July 1994 they released Adelita, a loggerhead turtle (*Caretta caretta*), on the central Pacific coast of the Baja California peninsula. Adelita was followed by satellite, and 478 days later she was found by a fisherman off the coast of Kyushu, Japan. This represents a one-way transpacific migration of more than 10,000 km. This report was published in *Pacific Science*, vol. 52, no. 2, pp. 151–153, April 1998. On March 16, 1999, a second loggerhead turtle, Yamilet, was released from the same place, and is currently in the North Pacific Ocean, about halfway between Hawaii and Japan.



Roger Anderson, Ph.D., a professor at Columbia University in New York, visited the center from August 14–25. A world expert on forminiferans and radiolarians (check out his books in our library), he recently became involved in studies of other amoebae and so came to the center to work with **Andrew Rogerson, Ph.D.**

While Rogerson watches, Professor Anderson delves into the mysteries of floc-associated protists.

NSU NOVA SOUTHEASTERN UNIVERSITY

Currents, Fall 2000

Oceanographic Center
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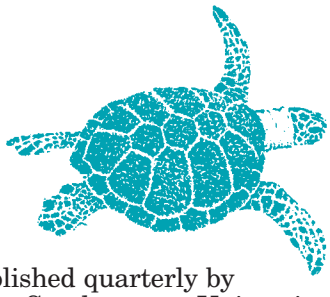
Dania Beach, Florida 33004-3078

Amy Hall working on a Reef Ball

Going native! (left to right) Susan Thornton, David Gilliam, Kevin Helmle, and Lance Jordan in Bali



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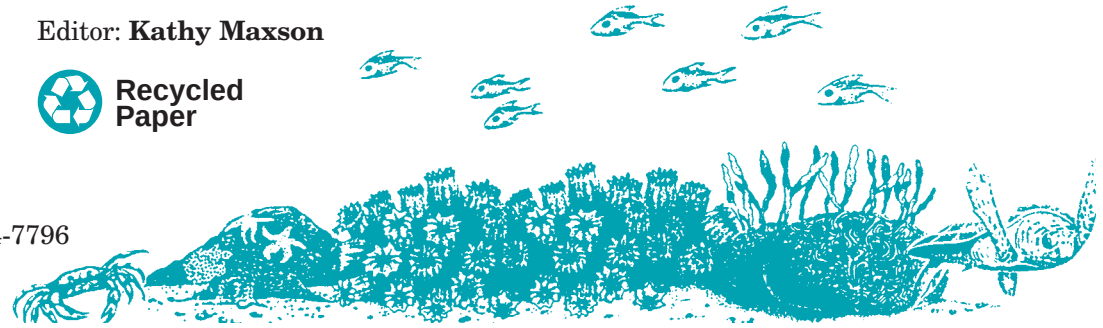

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