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Nova Southeastern University
Oceanographic Center

Currents

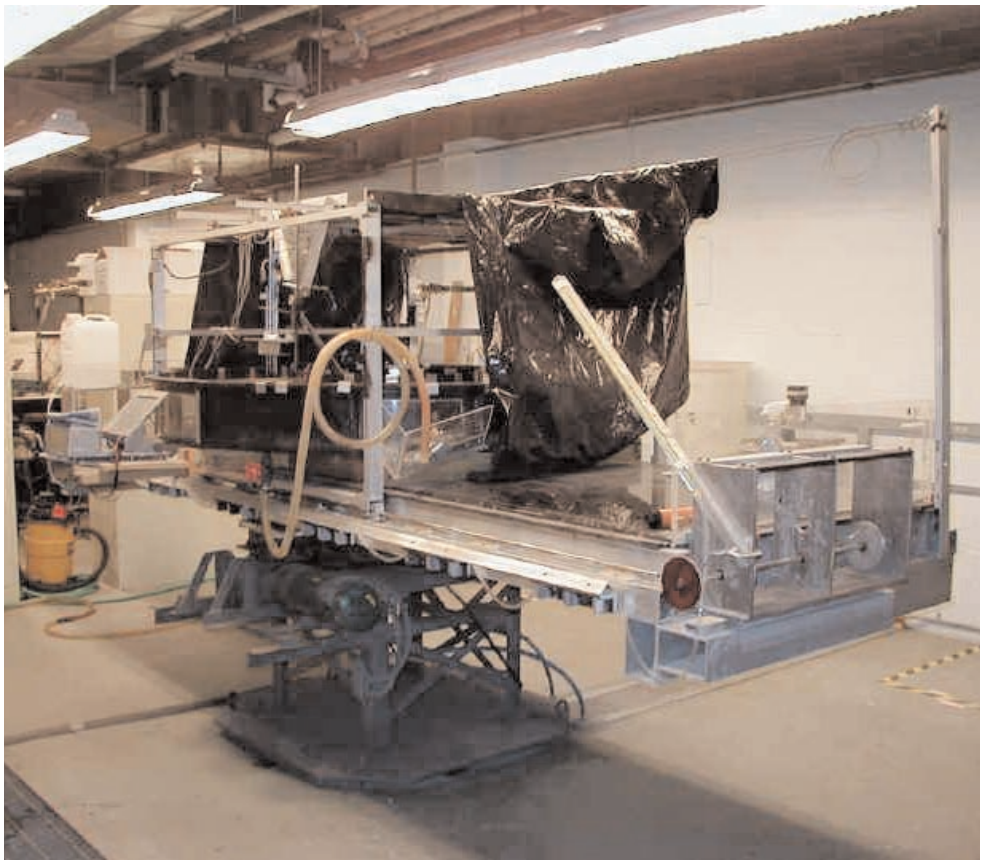
Fall 2004 • Volume XVIII, Number 4

Oceanic Eddies in the Tank by Sasha Yankovsky

NSU Oceanographic Center faculty member, **Sasha Yankovsky**, Ph.D, has been working on a collaborative project with Ph.D.s Don Boyer, Sergey Smirnov (Arizona State University), and Peter Baines (CSIRO Division of Atmospheric Research, Australia). The project's title is "Coupled physical numerical models of the nonlinear interaction between coastal-trapped waves, mean current, and complex topography," and it is funded by a National Science Foundation (NSF) grant.

In one of his earlier studies with David Chapman, Ph.D. (Woods Hole Oceanographic Institute), Yankovsky found that energetic eddies can be formed in the vicinity of the continental shelf topographic features. This mechanism requires an interaction of steady-state and periodic currents; the latter usually propagate in the form of coastally trapped waves along the oceanic margins. Yankovsky and Chapman studied this new mechanism for the formation of eddies by means of numerical modeling.

In the ongoing project with ASU, Yankovsky tests his hypothesis in the laboratory. Boyer and Smirnov are experts in the laboratory experiments, while Baines studied similar phenomena in the atmospheric dynamics. The task of reproducing the elements of oceanic circulation in the laboratory tank is quite challenging. There is immense discrepancy between the physical scales of the real ocean and the laboratory tank. However, scientists often use nondimensional numbers to characterize the oceanic currents (such as the Froude number, Reynolds number, or Rossby number). Henceforth, the similarity between the ocean and the tank can be achieved, if the relevant nondimensional numbers are similar in both cases. In particular, the period of tank rotation (mimicking the Earth's rotation) is reduced proportionally to the reduction in the tank's size versus the real continental shelf width. The period of tank rotation is only 25 seconds.



Turntable used in the laboratory experiments (Arizona State University, Environmental Fluid Dynamics Program). The tank diameter is approximately 2m. The apparatus is covered by plastic during the experiments to avoid the adverse effect of wind stress.

The installation is shown in the above photograph. The water flows in a rotating circular tank. Its density varies with depth (by adding some salt). The stationary ("mean") currents are forced by spin-up/spin-down of the rotating tank, while periodic currents (coastally trapped waves) are produced by an oscillating paddle placed at the shelfbreak. The flow is

(Continued on page 2)

OTHER NEWS

Collaborative Partnership

Strong research collaboration between the Oceanographic Center's National Coral Reef Institute (NCRI) and the United States Geological Survey's Center for Coastal and Watershed Studies in St. Petersburg has developed into a fertile relationship. Under the lead of the USGS's John Brock, Ph.D., and NSUOC's **Bernhard Riegl**, Ph.D., joint work and joint thesis supervision in the field of remote sensing are bringing the two centers closer together. In October, M.S. student **Luz Raquel Hernandez-Cruz** spent a week at USGS St. Petersburg to receive training and to bring her own knowledge in video interpretation. Her thesis uses LIDAR bathymetry and altimetry—provided by the USGS—and other remote-sensing data to build a three-dimensional digital terrain model that will allow assessment of losses in coral habitat in the last three decades. This is combined with other remote-sensing data, such as hyperspectral imagery, to provide habitat maps. Brock's group at the USGS has been a strong supporter and is also working closely with NCRI's **Sam Purkis**, Ph.D., and Riegl on developing water-column correction algorithms for satellite imagery and on the cross correlation of optical and acoustic rugosity measurements.

Left to right, clockwise: Luz Raquel Hernandez-Cruz, John Brock, Nicole Caesar, Melanie Harris, David Nagle, and Lance Mosher in St. Petersburg

Pollution Experts Meet

On November 8 and 9, the National Coral Reef Institute (NCRI) of NSUOC hosted an important meeting on ways to better manage and conserve coral reefs north of the Florida Keys, from Miami-Dade County northward to Hobe Sound in Martin County. The participants were welcomed by **Richard Dodge**, Ph.D., dean of the center.

The Technical Advisory Committee (TAC) for the Southeast Florida Coral Reef Initiative (SFCRI) consists of experts on land-based sources of pollution. Members include representatives from the University of Georgia, Harbor Branch Oceanographic Institution, Smithsonian Institution, McMaster University of Canada, University of Charleston, U.S. Geological Survey, University of South Carolina at Wilmington, Tetra Tech, Florida Department of Environmental Protection, the Environmental Protection Agency (EPA), Broward County Department of Environmental Protection, the NOAA Atlantic and Oceanographic Meteorological Lab, and NSUOC/NCRI. The TAC met for two days. More than 20 scientists and resource managers came together to formulate strategies to study and conserve coral reefs.

Six of the scientists and managers attending the Coral Reef Pollution TAC meeting, left to right: Dale Griffin, Ph.D., USGS; Chantal Collier, Florida DE;, Nancy Craig, Ph.D., Broward County DPEP; Gene Shinn, USGS; Judy Lang, Ph.D.; and Valerie Paul, Ph.D., Smithsonian Institution

(Continued from page 1)

measured by using a particle tracking velocimetry technique, while the density fluctuations are registered by conductivity probes. The project started in summer 2002 and, by now, the PIs have collected a rich data set. Some of the results indeed indicate the formation of eddies near the submarine canyon (topographic feature used in the laboratory experiments). Boyer, Baines, and Yankovsky held a workshop in May 2004, in Breckenridge, Colorado, where they outlined the paper describing their findings.

Sasha Yankovsky on the ASU campus

Sylvia Earle Heads Panel Meeting

Sylvia Earle, Ph.D., is a former chief scientist of the National Oceanic and Atmospheric Administration (NOAA) and a leading American oceanographer. Among her many achievements, she has set the unbelievable record of freely diving to a depth of 1,250 feet. She was at NSUOC to head a meeting of a scientific advisory panel challenged with reviewing core environmental issues facing the cruise industry and providing advice regarding the best course of action to deal with those critical items. The advisory panel is a result of an initiative between the International Council for Cruise Lines (ICCL) and Conservation International (CI). **Andrew Rogerson**, Ph.D., associate dean at the center, is a member of the scientific panel comprising experts in conservation, environmental technologies, and cruise industry environmental practices. **Richard Dodge**, Ph.D., dean of the center, welcomed the panel and gave a brief introduction to the Oceanographic Center.

Richard Dodge, dean of NSUOC, explaining the bathymetric image maps of the offshore reefs of Broward County to the group. Inset: Andrew Rogerson and Sylvia Earle

Seminar on Sediment Stress Index for Corals

Bernardo Vargas-Ángel, Ph.D., and **David S. Gilliam**, Ph.D., both research scientists at the National Coral Reef Institute (NCRI), presented a scientific and management-related seminar October 6 to invited guests representing Broward County's Department of Planning and Environmental Protection; the Florida Department of Environmental Protection; the U.S. Army Corps of Engineers; the Florida Keys National Marine Sanctuary; Miami-Dade County Environmental Resources Management; CECOS Environmental; Milian, Swain & Associates, Inc.; and Coastal Planning and Engineering, Inc.

The talk was held in the DeSantis Building Knight Auditorium. The chief topic of the seminar was Vargas-Ángel's development of a stress index to designate levels of stress demonstrated by specific coral species to various amounts of sediment. This index uses both macroscopic (morphologic) and microscopic (histologic) indicators to gauge stress to the corals. This tool will be used in the upcoming Broward County beach renourishment project to monitor the condition of nearby coral communities. According to permit, if certain thresholds of sediment are met, or other tools such as the sediment stress index indicate potential harm to corals, then dredging operations will be temporarily suspended until conditions improve and dredging can be safely resumed. Gilliam will lead teams of divers to monitor sediment levels and apparent coral health.

Beach renourishment is an important process to maintain and restore beaches. Renourishment activities have the potential to adversely affect nearby coral reefs. NCRI's research on this topic represents advances in ways to better protect the reefs during major dredging projects.

Left to right: Abby Renegar, NCRI research assistant (and NSU alumna); Lauri MacLaughlin, Florida Keys National Marine Sanctuary; Bernardo Vargas-Ángel, NCRI research scientist and main speaker; and Sharon Niemczyk, U.S. Army Corps of Engineers, discuss the challenges of designing an index to designate levels of stress demonstrated both macroscopically on the morphological level and microscopically at the histological level.

After the seminar, senior partners in the biological assessment and monitoring project from the Broward County Department of Planning and Environmental Protection (DPEP) join the NCRI speakers on the stage. Left to right: Bernardo Vargas-Ángel, (NCRI); Eric Meyers, Stephen Higgins, Lou Fisher, and Ken Banks (DPEP); and David S. Gilliam, (NCRI).

NCRI Receives Award

Broward County Mayor Ilene Lieberman, and Greater Fort Lauderdale Convention and Visitors Bureau President Nicki E. Grossman, presented NCRI's **Carol R. Fretwell** (coordinator of administrative operations) and **Richard E. Dodge**, Ph.D., (executive director and dean of the Oceanographic Center) with awards of appreciation at the County Commission meeting on September 28. The awards consisted of proclamations by the Broward County Commission, signed by the mayor, and black marble obelisks, each engraved with the recipient's name. The proclamation iterated reasons for the awards, among them were their successful efforts to promote Broward County as the host site for the International Coral Reef Symposium in July 2008, an event expected to generate an estimated impact of $6.9 million on the local economy. After the ceremony, Grossman said she viewed the awarding of this meeting to Fort Lauderdale "to be a feather in our cap!"

Left to right: Mayor Lieberman, Carol Fretwell, Richard Dodge, and Nicki Grossman at County Commission meeting

Elected

Bernhard Riegl, Ph.D., associate director of the National Coral Reef Institute (NCRI), was elected as a council member for 2005–2008 at the International Society for Reef Studies. The organization is dedicated to furthering the scientific investigations of coral reefs throughout the world. Riegl is also the recording secretary of a related scientific organization, the Society for the Study of Fossil Cnidaria and Porifera, which is dedicated to the study of fossil reef systems.

Riegl doing field work in Songsong Lagoon, Rota, Mariana Islands

Grants Received

Andrew Rogerson, Ph.D., has been awarded $203,000 from the National Oceanic and Atmospheric Administration for a project titled "Electro-Ionization of Ballast Water: Full-Scale and Land-Based Study." This work is in collaboration with a local technology company developing ballast water treatment systems (Marine Environmental Partners, Inc., of West Palm Beach) and Carnival Cruise Lines, who have installed a system for testing on board one of their cruise ships. The research is designed to determine the effectiveness of the new technology in killing or inactivating organisms (potentially invasive exotic biota) being transported in ballast tanks.

Rogerson was also awarded $60,000 from the National Science Foundation (NSF) for a collaborative project with Auburn University and Woods Hole Oceanographic Institute to study the symbiotic relationship between ctenophores (comb jellies) and an amoeba. The title of the study is "Analysis of Protist Assemblage of the Coastal Ctenophore *Mnemiopsis leidyi*"

Andrew Rogerson in his lab

Award Given for Research

Among the winners of the Fifth Annual President's Faculty Research and Development Grant Award for 2004–2005 were **Bernhard Riegl**, Ph.D., and **Bernardo Vargas-Ángel**, Ph.D., along with Douglas Garber (University School Upper School) for their research titled "Analysis of Nutrient Induced Sublethal Stress in Corals Utilizing a Novel Cellular Diagnostic System with Presentation of a Coral Lecture Series at the University School of Nova Southeastern University." The president of NSU presents annual grants of a maximum of $10,000 each to selected faculty members to support faculty research and development.

People on the Move

In October, **Charles Messing**, Ph.D., presented two invited seminars at the University of Cincinnati Department of Geology: "Biology of Deep-Water Carbonate Hardgrounds in the Bahamas" and "Ecology, Growth, and Taphonomy of Living Stalked Crinoids." While there, he continued a research project on the unusual Cretaceous fossil crinoid *Uintacrinus* with David Meyer, Ph.D., and arranged for the shipment of several fossil-containing landscape boulders from the Ordovician Period that will grace the Mesozoic Garden on NSU's main campus.

NCRI researchers **Kevin Kohler** (senior programmer) and **Shaun Gill** (M.S. student), traveled to St. Petersburg October 20–22 to visit the Fish and Wildlife Research Institute (FWRI), where they presented a demonstration of coral point count software developed to assist coral researchers assess coral coverage and diversity. CPCe (Coral Point Count with Excel extensions) was first publicly introduced at the 10th International Coral Reef Symposium held in June 2004 in Okinawa and is now in use by various researchers and institutions worldwide. Kohler and Gill instructed researchers at FWRI on the efficient use of CPCe, and plan to collaborate with their group to further enhance the automated database backend of the software.

More information about CPCe can be found at *www.nova.edu/ocean/cpce/*.

Ship Grounding

A ship has once again caused widespread damage to the fragile coral reef off Fort Lauderdale. A 564-foot freighter, the *Federal Pescadores*, ran ground on October 6, after leaving Port Everglades with a load of cement. After the ship was refloated on October 9, divers from Broward County's DPEP and NCRI were dismayed to find extensive damage to the reef. **Brian Ettinger**, a research associate with NCRI, found coral smashed to rubble, barrel sponges sheared off at the base, and sea fans snapped in two and buried in sand. A huge area was flattened as smooth as a parking lot.

This has been the fifth major grounding since 1998. Just seven months ago, the *Eastwind*, a Greek-flagged ship carrying bauxite and oil, ran aground on the second reef off Fort Lauderdale and destroyed thousands of square feet of coral, sponges, and other marine life. The U.S. Coast Guard is investigating this latest incident.

Mahmood Shivji, Ph.D., director of the Oceanographic Center's Guy Harvey Research Institute, presented invited seminars on his laboratory's shark research at the University of South Florida in Tampa and Mote Marine Laboratory in Sarasota in February 2004, and the Institute for Far Seas Fisheries Research in Japan in July 2004.

Shivji was also an invited speaker at the BioFlorida/Florida Sea Grant Marine Biotechnology conference held in Boca Raton in October 2004, where he presented his lab's research on the development of novel genetic approaches for forensic applications in fisheries management and conservation.

From June 10 to August 20, **Edward O. Keith**, Ph.D., participated in the NOAA Summer Faculty Research Program, and was involved with marine mammal research projects at the NOAA Fisheries Southeast Fisheries Science Center (SEFSC) in Miami. Working in collaboration with Lance Garrison, Ph.D., Keith began examining several data sets collected by SEFSC scientists regarding the abundance and distribution of bottlenose dolphins in the northwest Atlantic Ocean off the coast of the southeastern United States. Using a number of statistical software programs, Keith was attempting to develop a time-series of dolphin abundance over a 20-year period. Another goal of his program was to submit for publication two articles, written by his graduate students and collaborators from the SEFSC, one about the correlations between abiotic factors and cetacean mass strandings in Florida, and the other about bottlenose dolphin habitat use in Biscayne Bay.

Keith also finished a final report to the Florida Institute of Oceanography (FIO) describing a research trip to the Bahamas aboard the *R/V Bellows* from FIO in November 2003. Participants in this voyage included Garrison and other staff from the SEFSC, as well as a number of NSUOC graduate students. Keith also wrote two grant proposals to the John H. Prescott Marine Mammal Rescue Assistance Grant Program seeking funding to support two of his graduate students, one conducting corrosion casting studies of the vascular anatomy of cetacean kidneys in collaboration with Ruth Ewing, Ph.D., from the SEFSC, and the other conducting an analysis of pygmy and dwarf sperm whale strandings with Blair Mase Guthrie at the SEFSC.

Finally, Keith participated in a bottlenose dolphin health and risk assessment (HERA) project in Charleston, South Carolina, from August 8–15. In this project, free-living dolphins were captured for veterinary health assessment, biological sample collection, and tagging.

Christina Gwaltney, Ph.D. candidate under the supervision of **Andrew Rogerson**, Ph.D., presented a poster entitled "The role of naked amoebae in the degradation of mangrove leaf litter" at the Restoring America's Estuaries Conference in Seattle from September 12–16. Her research is funded by a NOAA/National Estuarine Research Reserve Fellowship and is being conducted in the Rookery Bay Reserve in Naples, Florida.

Tina Gwaltney

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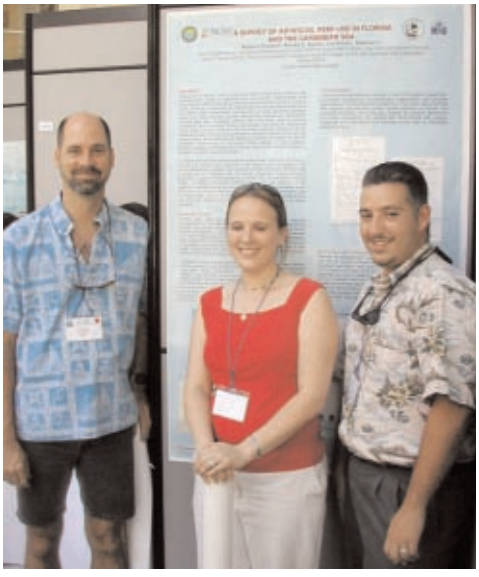
The 39th European Marine Biology Symposium, held from July 21–24, 2004, in Genoa, Italy, was attended by 275 scientists from more than 25 countries and addressed main themes of biodiversity and artificial habitats. **Richard Spieler**, Ph.D., attended the conference with graduate students **Paul Arena** and **Pat Quinn**. **Robin Sherman**, Ph.D. (NSU Farquhar College of Arts and Sciences and NSUOC alumna), and M.S. student **Becky Freeland** also attended the conference. Ph.D. candidate Arena delivered an oral presentation of a portion of his dissertation research entitled "Fish assemblages on sunken vessels and natural reefs off Southeast Florida". Arena also presented research entitled "Tires: Unstable material for artificial reef construction" for Sherman, who was unable to attend the scheduled session. Quinn, also a Ph.D. candidate at NSUOC, presented a poster titled "Multivariate hypotheses-based coral reef restoration study using artificial reefs with varying coral transplants and fish refuges."

Sherman and Freeland presented a poster titled, "A survey of artificial reef use in Florida and the Caribbean Sea." Oral presentations were held in the University of Genoa's Aula Magna Auditorium, which is decorated with sculptures and frescoes, reminiscent of some the most beautiful basilicas in Italy. Presenters often gave their talks to the accompaniment of music coming in through the open windows from street vendors.

Pat Quinn, Richard Spieler, Brian Walker, and David Gilliam with Buck Island in the background

NSU folk also were able to enjoy some of the vistas and culture of a city that dates back hundreds of years. Morning walks to the symposium were memorable parts of the trip because the University of Genoa is located on Via Garibaldi, one of the most monumental streets in Italy. This cobble-stoned street is lined with impressive 16th and 17th century palaces with porticos, courtyards, and frescoed chambers. Genoa also was the birthplace of Christopher Columbus, whose presumed home is now a popular sightseeing destination. Additionally, the surrounding Ligurian region is known for its delicious pesto sauce, which was consumed with relish by the attendees. *Manga, Manga!*



Pat Quinn, Becky Freeland, and Paul Arena in front of their poster

Quinn, Freeland, and Arena in front of Christopher Columbus' house

Richard Spieler, Ph.D., was recently awarded a contract by the National Park Service to conduct an inventory of cryptic reef fish at the Buck Island Reef National Monument (BURNM), St. Croix, U.S. Virgin Islands. The goal of this inventory is to identify the cryptic reef fish and document their abundance and distribution at the National Monument. Buck Island (BUIS), located 1.5 miles off the northeast side of St. Croix, is over one mile long, a half mile wide, and rises 328 feet above sea level. The BURNM currently consists of the island and 18,839 acres of marine environment. Initially protected in 1948, BUIS and 700 acres of surrounding water were designated a national monument in 1961 by President John F. Kennedy. Its marine boundaries were enlarged 30 acres by President Gerald R. Ford in 1975, and later expanded to its current size by President Bill Clinton in 2001.

More than 5,000 acres of coral reef consisting of barrier reef, spur and groove areas, patch reefs, wall, and unusual 'haystacks' made of elkhorn coral are included in the protected area. In addition to coral reefs, BURNM has sea grass beds, sand communities, and algal plains and is a habitat used by several endangered and

Left to right: Pat Quinn, David Gilliam, Brian Walker, and Richard Spieler

threatened species including humpback whales; pilot whales; four species of dolphins; brown pelicans; least terns; and hawkbill, leatherback, and green turtles. Of historical interest, the monument also contains remnants of two slave shipwrecks dating from 1797 and 1803. Slave shipwrecks are rare in U.S. waters and others may also exist in the area.

In mid-October, Spieler, along with **Dave Gilliam**, Ph.D., (NCRI research associate), and **Pat Quinn** and **Brian Walker** (NSUOC Ph.D. candidates), enjoyed the hospitality of Park Superintendent Joel Tutein and Chief of Resources Zandy Hillis-Starr for two days of snorkeling and diving within the monument boundaries. The purpose of the trip was to assess the habitat to be sampled and aid in site selection. The first day, using a park service boat, Hillis-Starr and BURNM biologist Kimberly Woodey were guides for NSUOC personnel to snorkel the amazing haystack coral formations (patch reefs of elkhorn coral 50 feet wide at the base and rising 30 feet to the surface) in glassy calm conditions with 80 feet visibility. They were also able to extensively snorkel inside the barrier reef, which surrounds three-quarters of BUIS on the north, east, and half the southern side. The second day, BURNM biologist Philippe Mayor took the NSUOC personnel to the north side of the island for an amazing wall dive, then to the south side to dive on the patch reefs, sea grass beds, and outside of the barrier reef. Spieler and his group came away suitably impressed by the complexity and diversity of the habitat.

The fish inventory will consist of sampling 50 sites in the new park area in as many benthic habitats as possible. The sampling will take place in 2005 and Spieler is planning on two separate two-week trips to complete the work.

The NSUOC group found time to visit Point Udall, the easternmost point of the United States; drive through the rain forest; sample a local beverage called momma-wanna; and even see the famous beer-drinking pigs—nonalcoholic beer, but very impressive porkers nonetheless.

M.S student **Matthew Potenski** recently led a small research expedition to Cocos Island, Costa Rica. He has been working with the Shark Research Institute (SRI), based in Princeton, New Jersey, for the past four years. SRI's main research interests include Operation Whale Shark, a program of tagging, spot pattern identification, and satellite telemetry on whale sharks (*Rhincodon typus*) in several locations in both the Atlantic and Pacific oceans. SRI has worked to expand their research to other species and is now looking at focusing on scalloped hammerheads (*Sphyrna lewini*) in the eastern Pacific.

In early July, Potenski participated in a trip to the Galapagos Islands, Ecuador. The expedition spent most of the time at the small northernmost islands, Darwin and Wolf. Two Microwave Telemetry™ satellite tags were deployed on two female whale sharks with an average size of 15 meters. In addition, substrate was evaluated for the placement of Vemco VR2 bottom monitor hydrophone receivers. Hammerheads will be tagged with Vemco acoustic transmitters *in-situ*, via modified spear gun dart head anchor tags by divers on rebreathers. Potenski has had experience with Vemco equipment by participation in M.S. student **Mark Corcoran**'s Stingray tracking

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A school of hammerhead sharks

(Continued from page 7)

project as part of the Guy Harvey Research Institute (GHRI) Conservation Biology Lab's Cayman Islands Stingray Ecology and Conservation Project, overseen by **Mahmood Shivji**, Ph.D.

With Galapagos mapped out and equipment ordered, the next goal was to explore Cocos Island, off Costa Rica's Pacific coast. Potenski was asked by SRI to lead a small expedition there and make observations of both the hammerheads and substrate types at various dive sites. On September 18, the small SRI crew, including Costa Rican conservationist Randall Aruaz, boarded the *Undersea Hunter* dive support vessel in Puntarenas. A 36-hour excursion landed them at the lush, tropical Isla del Coco. It is a pinnacle rising thousands of feet from the sea floor and allowing for upwelling of nutrients and an explosion of marine life. Cocos Island is a UNESCO World Heritage site and is protected from fishing by Costa Rica. Huge schools of hammerheads hang around the various pinnacles off the island and come in to the reef areas to be cleaned by barberfish (*Johnrandallia nigrirostris*). Ten dive sites were evaluated for abundance of hammerheads and composition of substrate. Based upon their parameters and actual location around the island, four sites were chosen as sites for future bottom monitor deployment. Portable CTD data was taken on every dive and more than 100 species of fish were observed over the course of the week.

To cap everything off, a whale shark was observed on the last two dives and pictures of its spot pattern were taken to be added to SRI's database. Potenski is scheduled to help SRI deploy automated telemetry equipment in Galapagos in January 2005 and Cocos in June 2005. SRI is also looking at exploring the Malpelo Islands off Colombia because the three island groups and their surrounding waters form a large triangle within which the hammerheads might move. The entire area between the three island groups is being proposed as a multinational conservation corridor and SRI is lobbying for its inception as a means to protect the sharks of the Eastern Pacific. Shark populations worldwide are greatly diminished. Galapagos, Cocos, and Malpelo are some of the last strongholds of healthy shark populations in the world and require vigilance to maintain their protection. For more information on the Shark Research Institute see *www.sharks.org*.

Reef-mapping team: Greg Foster, Joanna Walczak, Kristi Foster, Adrienne Carter, Robert Ginsberg, and Rodrigo Garza (front) aboard the Researcher

In September, NCRI research assistants **Kristi Foster** and **Greg Foster** were invited to participate in an Atlantic and Gulf Rapid Reef Assessment (AGRRA) survey of Biscayne Bay with Robert Ginsburg, Ph.D., of the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS). Ginsburg is the primary developer of AGRRA, a comprehensive surveying program used to establish baseline data on Western Atlantic and Gulf of Mexico coral reefs.

Ginsburg and Rodrigo Garza, Ph.D., next teamed with Ph.D. **Bernhard Riegl**'s reef-mapping team, adding to the AGRRA database a number of sites along the ridge complex and inner reef of Broward County. NCRI research assistants **Adrienne Carter** and **Joanna Walczak** joined the team as reef fish counters with **Brian Buskirk** at the helm of NSU's *Researcher*.

After a few hurricane delays, Ginsburg invited the NCRI team to be a part of his AGRRA research trip to the Dry Tortugas in early October. The Dry Tortugas team included a rotating cast of researchers from RSMAS, NCRI, and NOAA. The live-aboard *R/V Tiburon* served as homebase for the week of reef and fish surveys.

The goals of the AGRRA Project include completing a regional assessment of the health of coral reefs throughout the Western Atlantic, including the development of a database to establish a practical scale of comparative reef condition, and to promote the transfer of this information to a wider audience including the general public, resource managers, government officials, policy makers, tourist operators, and students.

The team had many memorable experiences while on the trip, including visits to Fort Jefferson and the Carnegie Institute on Loggerhead Key (credited with the beginnings of marine science research), a research dive on Sherwood Forest, meeting shark researchers Wes and Theo Pratt, and of course, interfacing with Ginsburg. The information that the team gathered will be added to the ever-growing database that is maintained by RSMAS and will be used to help monitor the reef conditions.

Publications

Winkler R., A. Antonius, and **D.A. Renegar** (2004). The Skeleton Eroding Band Disease on Coral Reefs of Aqaba, Red Sea. *Marine Ecology*, 25 (2): 129–144.

Katsaros, K.B., **A.V. Soloviev**, R.H. Weisberg, and M.E. Luther. (2004). "Reduced Horizontal Sea Surface Temperature Gradients under Conditions of Clear Sky and Weak Winds," *Boundary-Layer Meteorology* (in press).

MASTERCURRENTS
INSTITUTE OF MARINE AND COASTAL STUDIES

Winter 2005 Schedule

CORE COURSES (for all degrees)

Concepts in Physical Oceanography
(OCOR-5601)
This course covers basic ocean physics. Topics include: the physical properties of seawater, temperature and salinity structure of the oceans, major current patterns, waves and tides, influences of the wind, El Niño, and tropical oceanography. **Lab Fee: $15.** Instructor: Alexander Yankovsky. Thursdays. Classroom #1

Ocean Circulation
(For Physical Oceanography MSPO-5050)
This course follows on Concepts in Fluid Mechanics by introducing the student to the applications of geophysical fluid dynamics to the problem of ocean circulation. Topics include: the equations of motion in the Earth (rotating) reference frame, geostrophy, thermal wind balance, quasigeostrophy, Ekman boundary layer, wind-driven circulation theories, abyssal circulation, ventilated thermocline, planetary waves, and equatorial dynamics. Equations will be derived and discussed with a focus on understanding the ability to reproduce observations using theories. Prerequisites: Concepts in Physical Oceanography, Concepts in Fluid Mechanics. **Lab Fee: $15.** Instructor: Sean Kennan. Tuesdays, Classroom #2

CZMT = Coastal Zone Management
MEVS = Marine Environmental Sciences
MSPO = Physical Oceanography
OCMB = Marine Biology

TWO-WEEK DAY COURSE

Coral Reef Geology and Evolution
(OCMB-7015)
Throughout earth history, bioconstructions—reefs being the most noticeable—have been focal points of organismal evolution, which is recorded in the fossil record as well as the growth fabrics and lithologies of the reef rocks. Organism-environment and environment-sedimentology feedbacks create distinct signatures that allow us to gain detailed insight into the ecological functioning of reef communities long gone and the environment they lived in—if only we can make the rocks talk. **March 7–18. Lab Fee: $30.** Instructor: Bernhard Riegl. Meets: Monday–Friday, 1:00–5:00 p.m. Classroom #1

M.S. degree specialties are marine biology, coastal zone management, marine environmental science, and physical oceanography. Each course carries three credit hours or may be audited. Tuition is $567 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 3–March 24 (unless otherwise specified). Registration ($25 nonrefundable fee) begins two weeks prior to the start of classes. For further information, call Andrew Rogerson or Melissa Dore at (954) 262-3610 or 800-396-2326, or email *imcs@nsu.nova.edu*. More information can be found at the Web site *www.nova.edu/ocean*.

EVENING ELECTIVES

Aspects of Marine Pollution
(CZMT-0790/MEVS-5100)
Deals with various forms of environmental pollution as they affect both the land and maritime environment. Focus on the role of micro-organisms as causes and indicators of toxicity. Sources, measurement, and control of pollution in marine and coastal environments are discussed. **Lab Fee: $15.** Instructor: Don McCorquodale. Mondays, Classroom #1

Coastal Dynamics
(MSPO-5210)
The course will describe major elements of the circulation on the continental shelf and slope. The topics will include: wind-driven currents, upwelling, and coastal-trapped waves; tides and tidal mixing; long waves in the boundary regions and in the semi-enclosed seas; buoyancy-driven currents, coastal buoyant plumes, and shelf break fronts; impact of the open-ocean forcing on the shelf dynamics; physical-oceanographic description of the U.S. continental shelves. Prerequisite: Concepts in Physical Oceanography. **Lab Fee: $15.** Instructor: Alexander Yankovsky. Mondays, Classroom #2

Plankton Ecology
(OCMB-5606)
Traditionally, plankton have been dealt with under two broad headings: phytoplankton and zooplankton. While this categorization is useful, it does not reflect current research emphasis of the smaller members of the plankton community; bacteria (picoplankton) and the grazing protozoa (nanoplankton). This course will deal with these smaller members of the plankton community. Plankton Ecology will begin with a summarization of the plankton environment in lakes, oceans, and estuaries. It will continue with the essential aspects of the biology and physiology of bacteria and protozoa. It will finish with the exploration of the functional role of these organisms within aquatic ecosystems. **Lab Fee: $15.** Instructor: Andrew Rogerson. Tuesdays, Classroom #1

Law and the Sea
(CZMT-0603/MEVS-5150)
Many aspects of the coastal zone are managed by legal strategies. The scope of these is outlined and then described and discussed with the class by faculty members from the Shepard Broad Law Center. Topics include comprehensive planning and zoning, regulatory controls of permit systems, the history of the special controls of the Florida Keys, international treaties affecting fisheries and marine mammals, legal aspects of water management in the Everglades system, coastal construction controls and post-disaster redevelopment,

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erosion and sea level rise, pollution from land, and laws concerning oil spills. Grades are based on a short paper, a short answer exam, and participation in the discussions. Lab **Fee: $15.** Instructor: Brion Blackwelder. Wednesdays, Classroom #1

Coastal Ornithology
(CZMT-0640/MEVS-5050/OCMB-6400)
Examines the evolution, taxonomy, structure and function, behavior, natural history, and ecology of the members of the class Aves, with special focus on coastal and marine species. The course will include lecture and laboratory sessions, as well as a number of field trips. **Lab Fee: $45.** Minimum of eight students. Instructor: Edward Keith. Wednesdays, Classroom #2

Distance Education Courses

Marine Chemistry*
(OCOR-5605-DE1)
Instructor: Curt Burney

Environmental Sustainability
(CZMT-0665-DE1)
Instructors: Jane Dougan, Keith Ronald
Email: *douganj@nsu.nova.edu*

International Integrated Coastal Zone Management
(CZMT-0614-DE1)
Instructor: Steffen Schmidt
Email: *sschmidt@nsu.nova.edu*

Coastal Zone Interpretation
(CZMT-0667-DE1)
Instructor: Alan Watson
Email: *de-czinterp@mail.ocean.nova.edu*

Marine Mammal Management
(CZMT-0677-DE1)
Instructor: Keith Ronald
Email: *kronald@nsu.nova.edu*

*Marine Chemistry is offered for online students only. In-house students must take the in-house version in summer term.

Largest Student Registration in Institute's History

For the fall semester, 163 students enrolled in the Institute of Marine and Coastal Studies (34 of them new students). This was the largest group of students ever to register since the institute began in 1981. An orientation and barbeque was scheduled for September 27, but was cancelled because of the arrival of Hurricane Jeanne. The event was rescheduled for October 9, when the students were treated to mini-presentations of the majority of the faculty members describing their respective research interests. The students were then given a tour of the facility, which was followed by the rescheduled barbeque under clear skies.

Librarian Kathy Maxson (far right) gives a group of the new students a brief overview of the library.

New students enjoying the barbeque

Andrew Rogerson (center), director of the IMCS, checks out the party. To the left of him are students Jennifer Magnussen and Fred Ottman, with Vince Richards to the right.

Seminars and Defenses

SEMINAR

Alasdair Edwards, Ph.D., School of Biology, Ridley Building, University of Newcastle, United Kingdom. "Patterns of coral recruitment, growth and survival on artificial reefs in Maldives." October 25

Michael Heithaus, Ph.D., Florida International University, "Predator-prey interactions in a subtropical sea grass ecosystem: Antipredator behavior of dolphins and sea turtles in response to tiger shark predation risk." November 5

Joseph Prospero, Ph.D., RSMAS/University of Miami. "Transport of African dust to Florida and the eastern U.S.: Impact on the environment and air quality." November 19

THESIS

Kara Nowosielski, "Distribution and Significance of Fecal Indicator Bacteria in Beach Sand and Seawater in a Sub-Tropical Environment." Committee members: Andrew Rogerson; Donald S. McCorquodale, Jr.; and Nwadiuto Esiobu, Ph.D. (Florida Atlantic University). September 24

Tonya D. Bonilla, "Fecal Indicator Organisms and Pathogenic Protozoa in South Florida Beach Sand: Implications for Public Heath." Committee members: Andrew Rogerson; Donald S. McCorquodale, Jr.; and Harold Laubach (NSU Health Professions Division). October 22

Daniel P. Fahy, "Diel Activity, Patterns, Space Utilization, Seasonal Distribution and Population Structure of the Yellow Stingray, *Urobatis jamaicensis* (Cuvier, 1817) in South Florida with Comments on Reproduction." Committee members: Richard Spieler, Mahmood Shivji, and David S. Gilliam. October 29

S. Michael Hoke, "Gametogenesis and Spawning of the Elliptical Star Coral, *Dichocoenia stokesi* (Cnidaria: Scleractinia) in Southeast Florida." Committee members: Joshua Feingold, Susan Colley, (University of Miami, Rosenstiel School of Marine and Atmospheric Science), Charles Messing, and Bernardo Vargas-Ángel. November 15

Jessica A. Craft, "Reef Macrobenthos Adjacent to a Major Navigational Inlet: Port Everglades, Florida." Committee members: Bernhard Riegl, Charles Messing, and Ken Banks, (Broward County Department of Planning and Environmental Engineering.) December 10

CAPSTONE

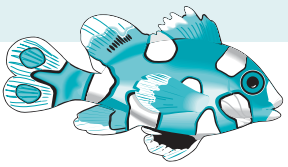
Randy Lee Sears, Jr. "Marine Biopiracy: Legal, Economic, and Social Aspects of Prospecting for and Profiting from Biodiversity." Committee members: James Thomas and Brion Blackwelder (NSU Law Center). October 21

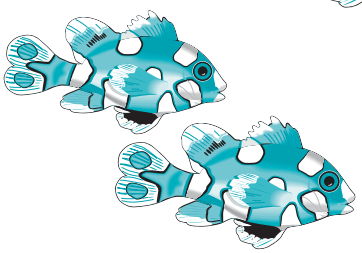
End of the Year for Students

A special thank you goes out to our outgoing student president and vice president, Lauren Shuman and Shaun Gill. They did a super job throughout the year in representing the NSUOC students and arranging various functions. One of which was the first end-of-year party where the students presented the first of their "WAVE" awards. The award was given to one student and one faculty member voted on by students and faculty and staff members as those who have somehow been "making WAVES" at the center. Tina Gwaltney received the student award and Bernard Riegl the faculty award. The two were presented with certificates at the party. The students hope to make this an annual tradition. The students have also voted in their new president, Abe Smith, and vice president, Melody Rhodes.

Ph.D. Degree Offered

The Oceanographic Center offers a doctoral degree in oceanography/marine biology. The program requires a minimum of 90 credits beyond the baccalaureate. At least 48 credits must consist of dissertation research, and at least 42 credits must consist of upper-level coursework. Required courses include the four M.S. core courses. Other upper-level coursework is usually in the tutorial mode with the major professor. Tuition is $3,875 per quarter.



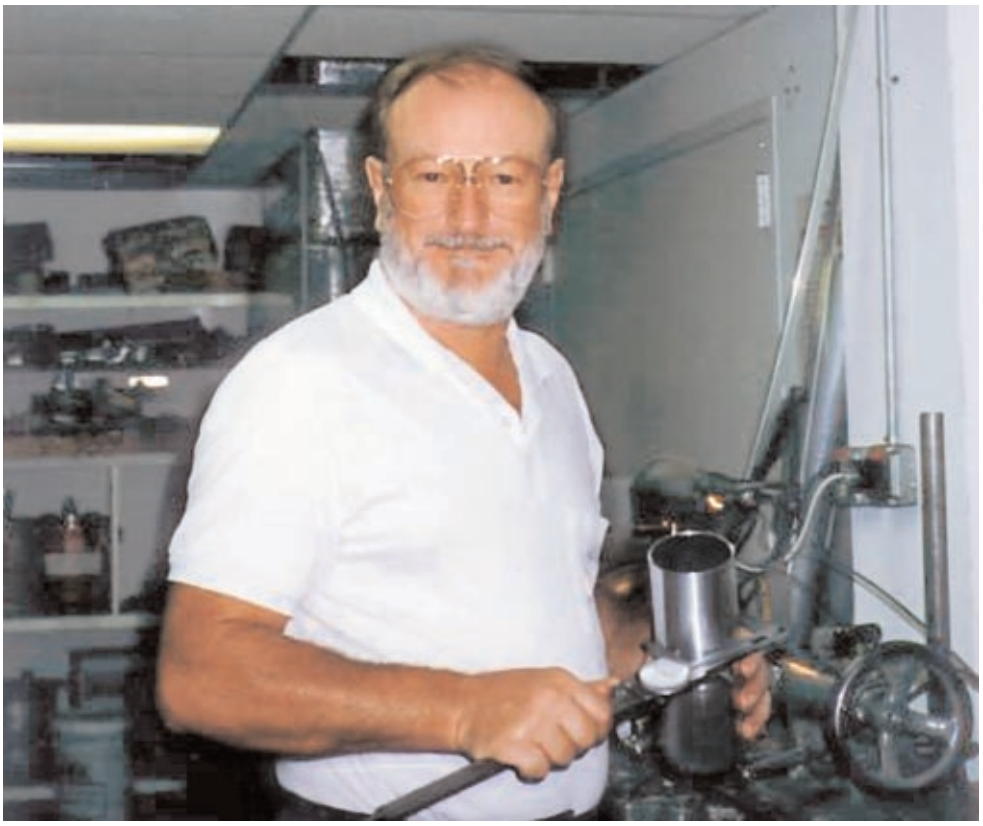


In Memory of Laszlo Nemeth, 1934–2004 By Kathy Maxson

Laszlo Nemeth had already been with the newly formed Nova University of Advanced Technology for about a year when he was approached in 1966 to join a small group from Miami who wished to start an oceanographic center that would be part of the fledgling university. Nova itself was so new it was still just a few storefront buildings on Las Olas Boulevard in Fort Lauderdale, while awaiting the construction of the Parker Building on the old Forman Airfield. Nemeth agreed, and became an integral part of the research facility. As a research associate, machinist, and photographer, Nemeth was in charge of the machine shop and was responsible for building instruments, including their electronics.

As an avid photographer, he recorded the scientists' endeavors and any other lab-related activity that was worthy of a photograph. Nemeth was an excellent photographer and developed many of his own prints.

The group, under the direction of William Richardson, had two houseboats commissioned by Surf Side 6, which were docked on 15th Street until the Port Everglades site was ready. Some time after the disappearance of the *Gulf Stream* and the loss of Richardson and his crew in 1975, Nemeth and a few others went back to the University of Miami Rosenstiel School of Atmospheric Science (RSMAS) to work on a large project. Nova always drew him back however, and he eventually came back to work part time in the machine shop, which had been neglected. He continued to split his time between RSMAS and NSUOC, but always considered NSU his home base.



Laszlo Nemeth in the center's machine shop in 1989

This picture was taken by, developed, and printed by Laszlo Nemeth. It depicts the center in about 1970, at the time when the boat basin and Forman Building had recently been completed. You can see that the houseboat had not yet been moved from Las Olas Boulevard to the site. In addition, in the background you can see the Point of America's condos being constructed.

Nemeth is fondly remembered for many things, paramount among them his good sense of humor and warmth. He also is remembered for his vehicles. He owned a DeLorean, a Gullwing Mercedes (both of which had doors that lifted up rather than out), and an array of BMW motorcycles.

Among Nemeth's other passions were skiing and traveling. He didn't much like the sea though, for despite working at an oceanographic center, he was known for getting seasick.

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Retiring After 30 Years

Ruth Lazarus began her career at Nova University on September 25, 1974, where she worked for the Institute of Human Resources. In 1980, President Abe Fischler recruited her to join the Oceanographic Center to help with financial operations. Since many of the faculty members receive grants from various government and private agencies, one of her jobs was to keep all their receipts and expenditures straight, as well as the general center accounts.

Lazarus' first office at the center was on the houseboat, which she occupied until the approach of Hurricane Andrew in 1992, when all the offices were transferred to the newly acquired Schure Building for safety. She ended up with a land-based office with a window overlooking the entrance to Port Everglades. Lazarus loves the beach and could be found walking it on her lunch hour every day.

Interviewed for *Currents* some years ago, she was quoted as saying "Every day at the Oceanographic Center is exciting and there are always new challenges. There is a sense of family here, a feeling of belonging. I am part of everyone's grants, and I can identify with the achievements of the scientists. New funding is celebrated, losses are shared. I take part in everyone's life."

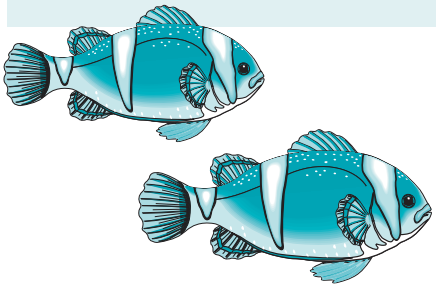
As Richard Dodge, dean of the center, described her at the annual Employee Luncheon in 1999 when Ruth got her 25th year award, "Neither rain, nor hurricanes, nor snook runs, nor rolling waves, nor thirsty manatees, nor panicky faculty could stop Ruth from the completion of her appointed rounds." Ruth Lazarus officially retired on October 31. Everyone at the center thanks her for her contributions and wishes her well in her retirement.

Ruth Lazarus in her office on the houseboat in 1990

(Continued from page 12)

One humorous story involving Nemeth was about a time he was driving to work and saw a wild monkey that had been hit by a car. He stopped to check on the creature and was immediately set upon by the primate's friends. Nemeth had to make a hasty retreat to his car.

Nemeth was the patriarch of his family back in his native Hungary, even supporting a dear cousin who had cancer. He fought valiantly against the same disease that invaded his body near the end of 2001, but lost the battle on August 16, 2004. He is survived by his wife, Jean; his son, Laszlo, Jr.; his daughter-in-law, Mikii; and his granddaughter, Zokni. He will be sorely missed by all who knew him.



National Coral Reef Task Force Held in Miami

The U.S. Coral Reef Task Force met December 2, 3, and 4 at the Intercontinental Hotel in Miami to conduct business related to the conservation of the nation's precious coral reef resources. On December 2, the task force received a report from **Richard Dodge**, Ph.D., of the National Coral Reef Institute (NCRI) of NSU on the successful U.S. bid to host the International Coral Reef Symposium (ICRS) in 2008. Others in attendance from NSUOC were Bernhard Riegl, Bernardo Vargas-Ángel, David Gilliam, Carol Fretwell (coordinator of NCRI), and students Erin Hodel and Adrienne Carter.

Richard Dodge with (L-R): Jacqueline Schafer, deputy assistant administrator, U.S. Agency for International Development; Tim Keeney, deputy assistant secretary of commerce for the NOAA; Colleen Castille, secretary, DEP, state of Florida; and James Connaughton, chair of the White House Council on Environmental Quality.

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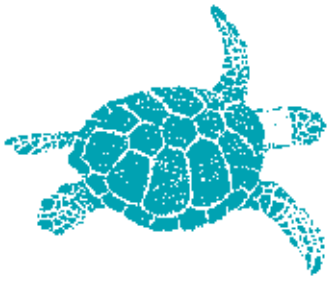
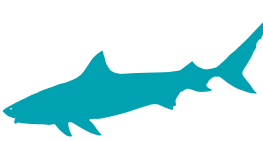
Currents, Fall 2004

Left to right: Barbara Dodge, Judy Robinson, Richard Hubbard, and Cathy Mattison, enjoy the beautiful post-hurricane weather at the fall student party.

Winners of Halloween costume party (left to right): Students Erin Hodel, Ewing-Chow, and David Portnoy





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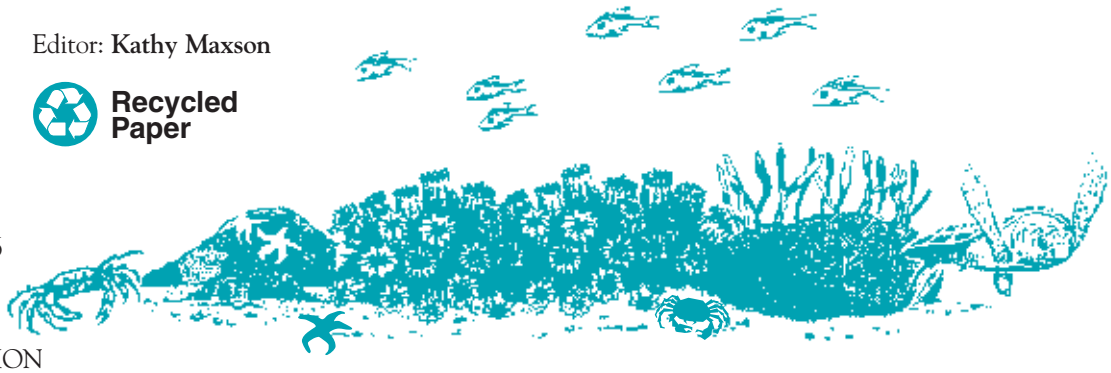

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