The Straits of Florida—the arc-shaped body of water that separates Florida, the Bahamas, and Cuba—lies right outside the door of the Nova Southeastern University Oceanographic Center and represents an oceanic crossroads. Waters from the Gulf of Mexico, North Atlantic, Caribbean Sea, and South Atlantic combine here to form the powerful Florida Current, the headwater of the Gulf Stream. Here, the vast limestone platforms of the Florida Peninsula and Bahama Banks abut the tectonically active Antillean Arc. The combination of hydrodynamics and geology generate a complex environment that represents the biologically richest area of the Western Atlantic Ocean. The straits are a zoogeographical Grand Central Station. In shallow waters, coral reefs find their northernmost reach along the United States east coast. In deeper water, marine species characteristic of New England and Virginia slopes reach their southern terminus. The Pourtalès Terrace, a great triangular limestone shelf that extends out from the Florida Keys halfway to the Bahamas, supports a fauna found nowhere else.

This is the environment that Deepwater Ecology of the Straits of Florida (OCMB-6325/MEVS-5010), a new addition to the NSUOC course listing, set out to explore. Taught by Professors Charles Messing and Richard Spieler, the course began with a weekend of lectures on the history, geology, physical oceanography, and ecology of the straits. But, that was just preparation. On the evening of April 20, Spieler and Messing and half the class boarded the Florida Institute of Oceanography’s RV Bellows, conveniently moored for the purpose next door at the U.S. Navy’s brand-new deepwater seawall dock, thanks to Bill Venezia. They were about to spend a few days dredging and trawling the deep floor and midwaters of the straits to discover directly the reportedly rich fauna of the depths.

Their equipment included a variety of gear suited for sampling different environments: a 30-foot otter trawl for sandy and muddy seafloors; a heavy iron Cape Town dredge for rocky bottoms, and an Isaacs-Kidd Midwater Trawl (IKMT) for collecting, as its name suggests, organisms between the surface and sea floor. While the first two devices are common and widespread pieces of oceanographic equipment, the third is less well known. It consists of a long slender cone of netting that looks like a great green wind sock about 40 feet long, ending in a white finger of plankton net. The mouth, about six feet across, is held open by a steel bar across the top and a steel V-shaped vane across the bottom. Before the advent of electronically controlled nets (which could be deployed closed, opened at a signal from

(Continued on page 2)

Professors Spieler and Messing celebrate new additions to the NSUOC teaching collection: a grenadier (or rattail fish) and a stalked crinoid (or sea lily).

Marissa Magrino shows off two specimens recovered from the otter trawl: a large jonah crab (*Cancer borealis*) and a smaller deepwater swimming crab (*Bathynectes longispina*).
People on the Move

It has been a busy winter for sea turtle workers. At the end of January, the Marine Turtle Permit Holder’s Meeting was held in Orlando. NSU project manager Stefanie Ouellette and eight NSUOC students—Fred Ottman, Nicole Justice, Walt Justice, Mary Wozny, Christian Guerreri, Liz Fahy, Leslye Waugh, and Megan Shoff—attended the meeting. These students have been working on the Broward County Sea Turtle Conservation Program for one or more years, or were applying for the upcoming 2004 season. The group was welcomed on January 30 to an orientation and a reception. The next day was full of lectures and presentations about statewide statistics regarding disorientations, nesting, lighting, strandings, and current research projects that were primarily funded through the sale of the sea turtle license plates and decals. In the evening, there was a social, and on Sunday, they attended a behind-the-scenes tour of Epcot’s The Living Seas. Some members of the group were also fortunate enough to participate in either a snorkeling or diving tour of the exhibit tank.

The 24th Annual Sea Turtle Symposium was held in San Jose, Costa Rica, from February 22–29 and was attended by Ouellette, Arlo Hemphill, Fred Ottman, Christian Guerreri, Leslye Waugh, Mary Wozny, and Nicole Justice. All the students work or have worked on NSU’s Sea Turtle Project for Broward County. Jennifer Hartwig, an NSUOC graduate who now heads up the National Save the Sea Turtle Foundation and still works on the Broward County Project, was also in attendance.

M.S. candidate Hemphill, who recently left Florida to take a job with Conservation International in Washington, D.C., presented a paper for that same company and staffed a table that he let the group use to display the project’s brochures. Hemphill also presented a paper titled, “From Flagships to Beneficiaries: Defying Ocean’s End Global Agenda for Action and Its Implications for Sea Turtles.” The paper was coauthored by Sylvia Earle, Linda Glover, and Roger McManus.

The 2004 sea turtle season got under way March 1 and will continue through September. This is the third and final year of NSUOC’s three-year contract with Broward County to conduct the conservation program. Personnel include 15 returning workers, 7 new workers, and 5 alternates. Alicia Beltran returned for her second year as the project’s assistant manager, and Curtis Burney, Ph.D., is once again the faculty supervisor for the project. New workers and alternates each undergo a three-day individual training, which began on April 26. As of April 27, they had found three leatherback nests and three loggerhead nests. It seemed like the season had started off unusually slow this year, but with the loggerhead nests all occurring in the last week of April, it seems like it will pick up quickly. Since this is an even year, a very high number of nesting green turtles is expected, as seen by their alternating nesting patterns over time.

Mahmood Shivji, Ph.D., gave invited seminars entitled “Molecular Approaches to Shark Conservation” at the University of South Florida and Mote Marine Laboratory on March 25–26.

Edward O. Keith, Ph.D., and a number of NSU graduate and undergraduate students attended the 12th annual

(Continued from page 2)

organs along their flanks. Bristlemouths are the most abundant vertebrate animals on earth, surpassing in numbers every species of fish, bird, amphibian, reptile, and mammal.

More rough weather, including a few eight-foot swells taken on the beam, forced an early departure for Fort Lauderdale on the morning of April 25, but Captain Tom Worley and First Mate Larry Braun handled the ship with expert care. The following weekend, the class met at NSUOC to go through the collections, and Spieler and Messing introduced them to the arcana of taxonomy. Attempting to identify any organism to the equivalent of a new language. The terminology is complex, the characters often obscure, and the writing sometimes convoluted. Nevertheless, the class pitched in, and by Sunday afternoon, many of the fishes and crustaceans had been identified. The specimens will now be added to the NSUOC collection and will contribute to teaching future students about this extraordinary environment.

The students who participated were Gene Crease, Lindsay Dreger, Kristina Evans, Melody Fischer, Eileen Kelly, Kevin Lasagna, Jeffrey Mackin, Marisa Magrino, Sandra McClung, Stacy Prekel, Rebecca Raffel, Stephanie Rogers, Karen Schanzle, Danica Walcutt, Brad Wimmer, and Laura Wright. 

(Continued on page 4)
Southeast and Mid-Atlantic Marine Mammal Symposium held March 26–28 at the Harbor Branch Oceanographic Institution in Fort Pierce.

NSUOC graduate student Jaime Hilliard presented a poster titled “Seasonal Aggregations of the Florida Manatee (Trichechus manatus latirostris) in Port Everglades, Fort Lauderdale, Florida,” describing her thesis research on the seasonal abundance of Florida manatees in Port Everglades. Manatees congregate in Port Everglades during the winter because of the warm water effluent from a Florida Power and Light electricity generating plant there. The poster was coauthored by Keith and M.S. student Ryan Goldman.

M.S. student Jennifer Scharnitz presented a poster coauthored by Keith titled “Preliminary analysis of the vocalizations of the pygmy sperm whale, Kogia breviceps,” describing her preliminary work on the acoustics of the pygmy sperm whale.

Lindsey Fulcher, an undergraduate student from the Farquhar College of Arts and Sciences, presented a poster coauthored with Keith titled “Inverse correlation between water temperature and the presence of Florida manatees (Trichechus manatus latirostris) at Port Everglades, Florida,” describing the results of her independent study, which correlated the occurrence of manatees in Port Everglades with the temperature of the water in the FPL effluent canal.

Keith also attended the annual meeting of the Federation of American Societies for Experimental Biology, held April 17–21 in Washington, D.C. He presented a poster with several undergraduate students from the Farquhar College of Arts and Sciences as coauthors describing the latest results of his ongoing research project examining the adhesion of tear proteins to contact lenses.

The 2004 Belize Course took place from March 28–April 4. Twelve NSUOC students and one NSU undergraduate participated in the course, led by Jim Thomas, Ph.D. The group stayed on an island known as South Water Caye, where the International Zoological Expedition (IZE) is located. The students were housed on the island in dorm-style housing for the entire week. Daytime was filled with lectures and all-day snorkeling expeditions where the students work together to create reef characterizations of two different reefs: South Water Caye and Whale Shoals. They were required to create species lists of fish, invertebrates, corals, and algae at each reef and in the various zones of the reefs. Evening time was for classroom work where the day’s work was compiled, maps drawn, reports written, and student presentations were given. Most of the students also participated on one or two dives during their
free time. Some visited Carrie Bow Caye, which is close to South Water Caye and is the location of the Smithsonian Field Research Station. At the end of the week, they took a bus ride through the rainforests of Belize and stopped at Belmopan, and then on to Belize City for the last night before returning to the United States.

Veljko Dragojlovic, Ph.D., gave a talk at the American Chemical Society National Conference and Exposition held March 28–April 2 in Anaheim. Titled “Nature of the Co-oxidant in Catalytic Ruthenium Tetroxide Oxidations,” this work was supported by the President’s Faculty Research and Development Award 2003/2004.

Kathy Maxson, the center’s librarian, attended the annual SAIL (Southeast Affiliate of IAMSLIC) Conference at the University of Texas at Austin’s Marine Laboratory in Port Aransas, May 11–13. The conference was titled, “Getting more with less: How to be ‘lean and mean’ machines in sustainable seas.”

The keynote speaker was Sylvia Earl, Ph.D., a well-know deep-sea researcher who is the Program Coordinator for the Harte Research Institute for Gulf of Mexico Studies and the explorer-in-residence for National Geographic. Earle’s talk was titled “Deep-Sea Dives in the Gulf of Mexico.”

M.S. student Megan Berkle went around the world in six months, visiting 13 countries, 4 continents, and Hawaii. The purpose of her journey was to write a global marine resource guide. This is a comprehensive, but detailed, list of all the nonprofit organizations, aquariums, laboratories, and marine science departments worldwide. Berkle visited facilities throughout South Africa, Thailand, Australia, and Hawaii. In South Africa, she went to Two Oceans Aquarium (Cape Town), Stoney Point Nature Reserve and Boulders Beach (penguin colony), University of Cape Town Marine Biology Department, Port Elizabeth Aquarium, East London Aquarium, and Sea World (Durban). In Thailand she visited the Kho Samui Aquarium and the Kho Phangan research station. In Australia she checked out the Reef HQ Aquarium (Townsville), James Cook University Marine Biology Department (Townsville), the Sydney Aquarium, and Oceanworld Manly, and in Hawaii she stopped at the Waikiki Aquarium.
Other News

NOAA's Coral Programs Meet

For a second year, all of the coral reef programs coordinated under the umbrella of the National Oceanic and Atmospheric Administration's (NOAA) Center for Sponsored Coastal Ocean Science (CSCOR) met together to find out what the other programs are doing, as well as to be updated on NOAA procedural changes. Hawaii Coral Reef Initiative (HCRI) Research Program at the University of Hawaii hosted this year's meeting in April. NCRI Executive Director Richard E. Dodge, Ph.D.; Associate Director Bernhard Riegl, Ph.D.; and Coordinator of Administrative Operations Carol Fretwell represented NCRI at the meeting. The University of Puerto Rico hosted the meeting last year. NCRI is scheduled to host it next year.

“OCEAN” Was Topic of the Day

“Oceans Day 2004” in Tallahassee drew more than the usual constituents of the Florida Institute of Oceanography and the Florida Ocean Alliance this year. Dovetailing with the release of the Ocean Commission Report to state governors, a ceremony took place on the capitol steps, including Governor Jeb Bush; Frank Muller-Karger, member of the Ocean Commission; and Tim Keeney, deputy assistant secretary of commerce for oceans and atmospheres, among the dignitaries. NSUOC and NCRI were represented at Oceans Day by an exhibit staffed by Dean Richard E. Dodge, Ph.D., and Carol Fretwell, NCRI coordinator of administrative operations.

“5 Percent Day” Nets Dollars and Local Name Recognition

Our National Coral Reef Institute (NCRI) was the cover story for the April issue of the Whole Foods Market Plantation monthly newsletter. Of chief interest (to us!) was that employees of the store had nominated NCRI to receive 5 percent of net sales on Tuesday, April 27, from 8:00 a.m. to 10:00 p.m. An information table was set up in the store, displaying the many activities of NCRI, as well as a supply of informational brochures about South Florida’s coral reefs and NCRI brochures for distribution. More than a hundred brochures were given out during the day. We’ll have to wait to see how much was raised. A BIG thank you to all who stopped by and shopped on NCRI’s “5 Percent Day.”

Fleet Week

Faculty members, staff members, and students got a front row seat when the ships came in and left again for Fleet Week, April 26–30. Among the ships that were in port were the U.S.S Enterprise (CVN-65), U.S.S. Mitscher (DDG-57), U.S.S. Philippine Sea (CG-58), U.S.S. Simpson (FFG-56), U.S.S. Stephen W. Groves (FFG-29), the U.S.S. Trenton (LPD-14), and the submarine U.S.S. Miami (SSN-755). Fleet Week was followed up with the McDonald's Air & Sea Show, May 1–2.
Ship Grounded off Port Everglades

Once again a ship grounded near Port Everglades on March 26. The Eastwind, a Greek-flagged freighter carrying bauxite and oil, ran aground during rough seas, destroying thousands of square feet of reef. The grounding also killed a federally protected loggerhead sea turtle whose crushed remains were found by divers.

This is not the first grounding in the area. In June 2003, the Alam Senang, a 585-foot Malaysian cement carrier, ran up on the second reef from shore near Fort Lauderdale Beach, dislodging hundreds of hard corals, as well as soft corals and sponges. In February 1998 the Pacific Mako, a 428-foot freighter owned by a Cayman Islands company, was caught in the anchorage in a powerful storm, causing it to drag its two anchors over the reefs toward shore also near Fort Lauderdale Beach. This grounding dislodged corals as well as causing the destruction of part of the underlying limestone structure of the reef.

The following month, heavy winds and stormy seas pushed the Hind, a 348-foot Panamanian freighter that was parked in the anchorage outside of the port, toward shore and caused it to drag its anchor. The grounding scraped clean parts of one reef, grinding the coral to rubble.

The reefs are not only valuable biologically, but they provide a vital benefit to the region’s economy, attracting thousands of people for recreational diving, fishing, and snorkeling. NSUOC’s National Coral Reef Institute (NCRI) is actively involved in the science of coral reef restoration and recovery.

Hypothesis-driven projects include examining reef fish and coral recruitment, stony coral and octocoral transplantation, and the use of coral nurseries. NCRI will continue to work with resource managers and resource users to determine the best approach for restoration and recovery following ship groundings and other physical impacts to our coral reefs.

Shining Stars in a Sea of Technology

Members of the Oceanographic Center walked away with two first place entries at NSU’s Seventh Annual Technology Fair, held on main campus April 30. Representing the OC and the National Coral Reef Institute, Bernhard Riegl and Ryan Moyer took first place in the faculty division with their “Acoustic Seafloor Mapping” entry. In the professional division, Kevin Helmlle and Kevin Kohler took first place with their entry, “Coral X-Radiograph Densitometry System: CoralXDS.”

The theme of this year’s Technology Fair was “Adventures on Technology Island,” and the OC staff fit right in, involving the center’s research vessel Surveyor as part of their display. For their efforts, each first place team walked away with a medal and cash prize. The Technology Fair is an annual event sponsored by NSU’s Office of Information Technologies and Media Services Technology Training Services and is a good opportunity for Oceanographic Center faculty and staff members to showcase the application of technology in their given area of research.
M.S. degree specialties are marine biology, coastal zone management, physical oceanography, and marine environmental sciences. 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 summer term runs from July 6–Sept. 16, 2004 (unless otherwise specified). Registration ($25 nonrefundable fee) is June 14–July 9. For further information, call Andrew Rogerson, Ph.D., or Melissa Dore at (954) 262-3610 or 800-396-2326, or email mcs@nsu.nova.edu. More information can be found at the Web site www.nova.edu/oceanl.
Distance Education courses

Coastline Environmental Security: New perspectives on threats to the natural environment
CZMT-0677

In the post-September 11, 2001, global theater, there is a widely held perception of new threats facing democratic societies. Traditional terrorist targets include human assets such as political leaders and foreign diplomatic staff; physical assets such as aircraft, buildings, factories, and power stations; and institutional assets such as legislatures and courts of law. We seek here to expand the notion of threat beyond these traditional determinants to include the coastal environment, domestically and internationally.

Specifically, but not exclusively, we will consider:

1. What is environmental terrorism?
2. What are coastal environmental assets?
3. Possible security countermeasures that could be used to reduce or eliminate threats to environmental assets.
4. The costs and benefits of employing countermeasures and their feasibility considering the desire for an open and free society.

Instructor: Scott White

Marine Geology
OCOR-5604

The objectives of the course are (1) to enable students to examine the structure, evolution, and stratigraphy of the ocean basins and continental margins and (2) to provide an understanding of the dynamic processes that shape the surface of the earth under the ocean surface. Instructor: Bernhard Riegl (Please note: For CZM students only)

Internship in Coastal Policy
CZMT-0664

Students enrolled in this course are expected to invest the equivalent of three hours per week for 14 weeks (i.e., at least 42 hours) in their internship. This can be done at a research organization; private company or consulting firm; local, county, state, or federal agency; or other approved venue that is related to coastal zone activities. In addition to hands-on work, each intern will also keep an academic journal of internship activities. The journal will be submitted for review for the final grade. The student’s supervisor at the internship venue will also evaluate the student. Permission and approval of supervising professor is required before you enroll in this class. Instructor: Steffen Schmidt

Marine Mammal Management
CZMT-0667

An interdisciplinary approach to people and the environment—as this has evolved over time and as it stands today—this course examines the present state of the relationship with marine mammals along with what it is likely to be for the future, whether by default or design. The marine mammal and environment relationship is extremely complex and fluid. It changes depending upon place and time, and the rate of this change is accelerating along with related developments such as population and economic growth, technological capacity, and our expanding use of the world’s oceans and waterways. We will look at the position and influence of marine mammals within the environment, as well as the development of physical conditions, values and economic activities that have led to their present situation. Instructor: Keith Ronald (minimum of 10 students needed)

Notice to all Oceanographic Center Students: A Change in the Core Requirements.

To cope with the diverse background of our students, we have initiated a new section of Biostatistics.

Biostatistics I is intended for students with little or no background in statistics. Biostatistics II is intended for students with previous statistical experience. To satisfy core requirements, only one of these courses need be completed. However, students who feel that they would benefit, can take both Biostatistics I and II, with the second course counting as an elective. (Note: If you have previous statistical experience, you cannot take Biostatistics I.)

Biostatistics I will be offered in the fall term, and Biostatistics II will be offered in the spring term. Students who are unsure of their capabilities are encouraged to contact the instructor, Mark Farber, at mfarber@nsu.nova.edu.

Fall Term September 27–December 17

Marine Ecosystems, OCOR-5602
Instructor: Curt Burney

Biostatistics I, OCOR-5603
Instructor: Mark Farber

Scientific Diving and Coral Reef Assessment, OCMB-9700
Instructors: David Gilliam/Lance Robinson

Physical Oceanography, OCOR-5607
Instructor: Sean Kennan

Marine Mammals, MEVS-5016/OCMB-6340
Instructor: Edward Keith

Fluid Mechanics, MSPO-TBA.
Instructor: Alexander Soloviev

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 $3,868 per quarter.

The Oceanographic Center offers a degree in marine biology. The program requires at least 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 $3,868 per quarter.

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Marine Mammal Management
CZMT-0667

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Biostatistics I will be offered in the fall term, and Biostatistics II will be offered in the spring term. Students who are unsure of their capabilities are encouraged to contact the instructor, Mark Farber, at mfarber@nsu.nova.edu.
New Master's Degree in Physical Oceanography Being Offered

The Oceanographic Center has received approval to offer a new master's degree in physical oceanography (MSPO). The first MSPO class begins in October 2004. NSU has a rich tradition in physical oceanography; the Oceanographic Center was first directed by a renowned physical oceanographer, William Richardson, Ph.D., and has long been one of the leading research centers for physical oceanography. Current faculty members conduct research in many areas of physical oceanography, including: global, tropical, and coastal circulation; air-sea interactions; dynamic modeling; and relations to climate and marine ecosystems.

The MSPO is flexible, with two tracks—a research track and a non-research track—so students can choose to study to become a professional researcher or to apply their expertise in the corporate, government, or private sectors. Classes are held at the Oceanographic Center in the evenings. The curriculum covers the wide range of topics needed for a physical oceanography degree. Students will learn about the dynamics of the ocean currents; coastal regions; instrumental methods; satellite oceanography; and the biology, geology, and chemistry of the oceans.

The distinguishing factor between the M.S. in physical oceanography and the other M.S. degrees at the Oceanographic Center is the emphasis on ocean physics. Thus, in addition to fulfilling the normal requirements for acceptance to the M.S. programs, students should have a basic mathematics background including a year of calculus. Physical oceanography is the uniting discipline in oceanography—all oceanographers need to appeal to the ocean dynamics and currents to understand oceanic processes.

For more information, see our Web site at www.nova.edu/ocean/mspo/ or contact the M.S. in physical oceanography program coordinator, Sean Kennan, at skennan@nsu.nova.edu.

Defenses

THESIS

Irene Arpayoglou, “Cultivation of Wrack Collected Seagrasses.” Committee members: Stacy Myers, South Florida Water Management District; Curt Burney, NSUOC; Carman N. Vare, environmental program supervisor, Department of Environmental Resource Management (DERM). March 12

Courtney Campbell Arena, “Electro-ionization technology as a treatment for ballast water with a review of potential methods used to verify treatment.” Committee members: Andrew Rogerson, Don McCorquodale, and Curtis Burney. April 8

Neil Hammerschlag, “Factors Affecting Predatory Success of White Sharks (Carcharodon carcharias) at Seal Island in False Bay, South Africa.” Committee members: R. Aidan Martin, ReefQuest Centre for Shark Research; Edward O. Keith, NSUOC; and Mark I. Farber, Adjunct NSUOC. May 24

Publications

Cash, D., A. Combs, and V. Dragojlovic (2004). Cobalt-catalyzed photolytic ethoxycarbonylation of bromoalkanes in the presence of a Lewis acid, Tetrahedron Lett. 45 (6), 1143-1145. (Daniel Cash and Angela Combs were NSU undergraduate students. Both of them are currently enrolled in NSU’s osteopathic medicine (D.O.) program. The work was supported by a President’s Faculty Scholarship Award 2000/2001.)

A 196-cm mature male Caribbean reef shark, named Gale after our boat captain, is drawn close to the boat for surgery. After his release, a receiver positioned a quarter of a mile east on the reef slope records Gale milling around for about two hours, starting at midnight. The next night he visited the same spot from 4:00–7:00 a.m. Continued monitoring will tell us a great deal about Gale’s residency to Glover’s reef, reveal his habitat preferences, and will hopefully help conservationists design effective marine parks for his species.

Into its body cavity. Before the shark wakes up, medical sutures are used to close the wound and other vital biological information, such as body length, sex, and clasper length (for males) is taken. This year, the team successfully implanted pingers into 7 Caribbean reef sharks and 22 nurse sharks, and checked the data stored in the receivers for information about last year’s sharks. So far, the nurse sharks seem to be showing fidelity to specific sites around the atoll, but make long nocturnal excursions, making their home-ranges very large and heterogeneous with regard to habitat. The one adolescent male Caribbean reef shark pingered last year swam past one receiver on the reef slope almost every day in the early evening, from November 1 to February 14. Since the 14th, he has apparently left Glover’s, prompting the researchers to speculate that maybe he found a girlfriend and took off for Valentine’s Day! The results of the study will help resource managers in the Caribbean design Marine Protected Areas (MPAs) that are large enough, and encompass enough critical habitat to maintain vulnerable shark populations.
Kathy Maxson, Peggy Oellrich, and Chris Barry show their support as the U.S.S. Enterprise prepares to depart.

The U.S.S. Philippine Sea.