


Winter 1996

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NSU Oceanographic Center

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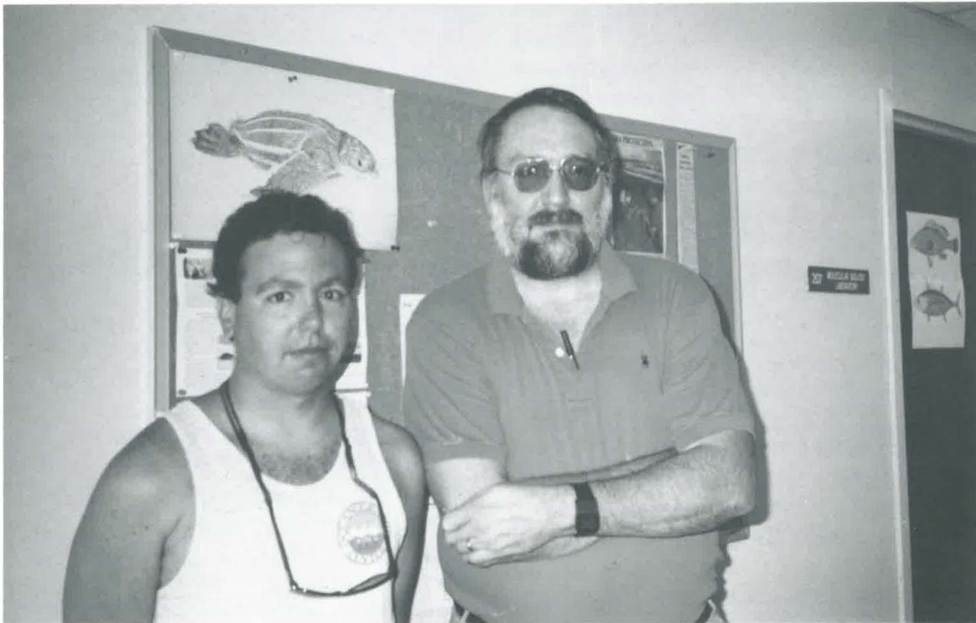
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Currents

Winter 1996 • Volume X, Number 1



Sea Turtle Nesting Is on the Rise Again



Project Manager Bill Margolis and Dr. Curtis Burney.

As we head into another year's contract with Broward County to monitor sea turtle nesting activity along the Broward coast of South Florida, it is time to take a look at nesting and hatchling numbers for 1995. They are, according to principal investigator **Dr. Curtis Burney**, decidedly up.

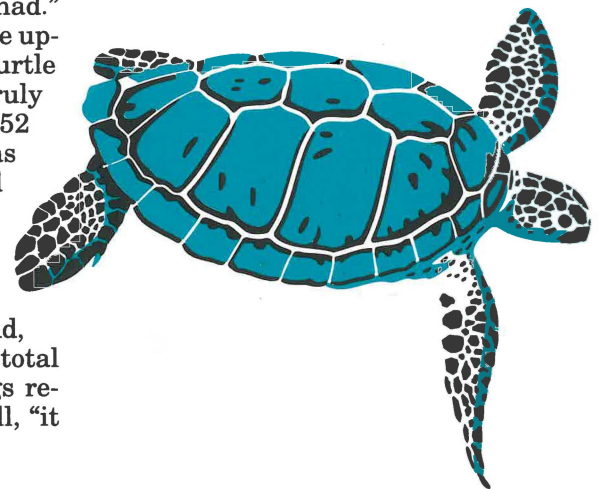
"We had more nests last year than in any other year, going back to 1981," states Dr. Burney. As can be seen from the sea turtle nesting charts on page 2, loggerhead nests were way up in 1989-90, lagged from 1990 to 1994, and now show a positive trend once again: 2,567 nests in 1995. From these nests, a total of 162,294 loggerhead hatchlings were released through our monitoring program.

"Greens are always up and down," Dr. Burney continues. "1995 was a low nesting year for them, but it was the highest nested off-year that we've had." The second chart clearly shows the up-and-down nature of green sea turtle nesting patterns. Last year was truly a "down" year for greens, with just 52 nests, but even this low mark was relatively high when compared with other "down" years. The total number of green sea turtle hatchlings reached 2,339 in 1995. Leatherbacks also seem to be posting a tenuous upward trend, producing 15 nests in 1995. The total number of leatherback hatchlings released in 1995 reached 588. In all, "it

was a smooth year," Dr. Burney concludes.

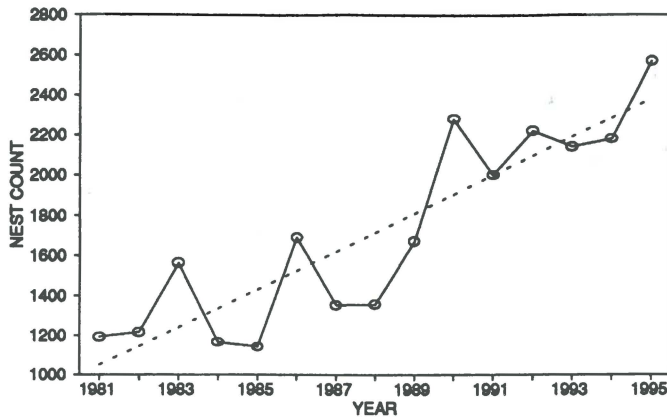
For 1996, Dr. Burney is looking at the feasibility of *not* relocating nests in residential sections of Fort Lauderdale, as has been done in the past. He feels that "if it is dark enough at night, the eggs could remain *in situ*. One disadvantage, though, is inadvertent lighting," which occurs when there are changes in beachfront lighting. Such changes can confuse the hatchlings and perhaps cause them to make a futile dash for a seawall or a brightly lit street, rather than the ocean.

"Where will we be in ten years?" Dr. Burney wonders. "If we continue to try to relocate the nests, there may not be any place to put them all. And the costs associated with relocation will rise. We can hope that beachfront lighting will be reduced by then, and we won't have to relocate the nests. That would be better for the turtles as well."

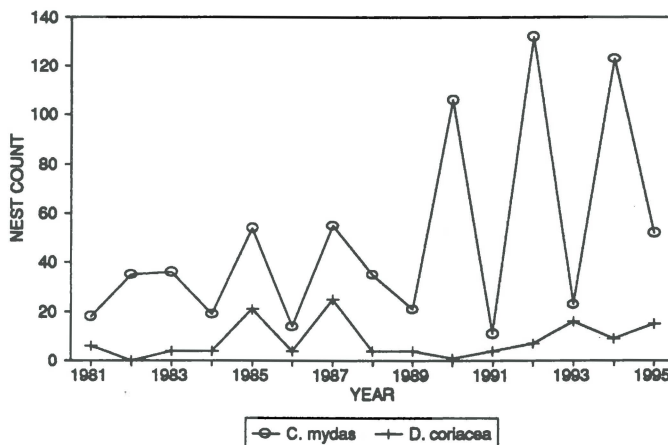


BROWARD LOGGERHEAD NESTS

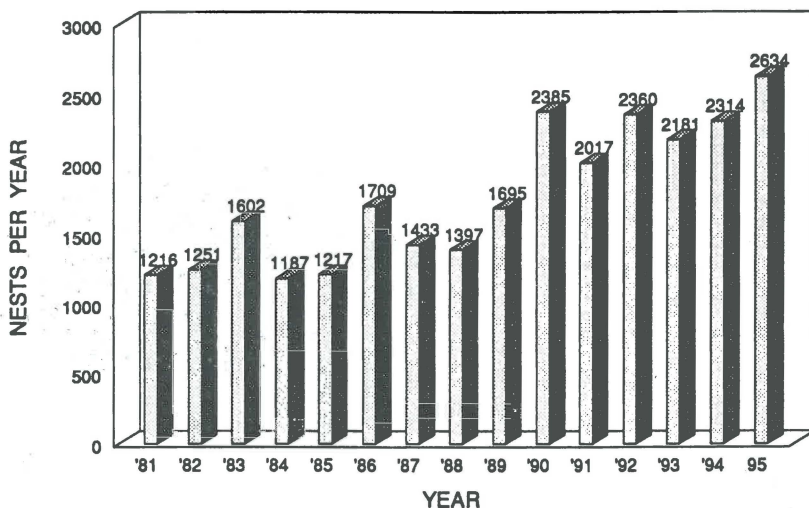
$r = .886$ $P < .0001$



TOTAL BROWARD NESTS GREENS AND LEATHERBACKS



SEA TURTLE NESTING HISTORY ALL SPECIES COMBINED



Dr. McCreary receives gold medal from AMS president David Houghton.
(Photo by Kathy Maxson.)

Dr. Julian McCreary Receives Sverdrup Gold Medal from the AMS

Dr. Julian McCreary, dean of the Oceanographic Center, received the prestigious Sverdrup Gold Medal from the American Meteorological Society (AMS) at its annual Awards Banquet on January 31 in Atlanta. Named for **Harald Ulrik Sverdrup**, a pioneer in the field of oceanography, the award was presented by AMS president **David Houghton**.

The Sverdrup Gold Medal is granted on an occasional basis to researchers who make outstanding contributions to the scientific knowledge of interactions between the oceans and the atmosphere. Dr. McCreary's citation reads that he was honored "for fundamental contributions to the physical understanding of upper-ocean dynamics including El Niño, the Equatorial Undercurrent, the ocean mixed layer, and eastern boundary currents."

The AMS, founded in 1919 as a not-for-profit scientific and professional society, currently has more than 11,000 national and international members. The AMS actively promotes the development and dissemination of information on the atmospheric and related sciences and publishes nine academic journals devoted to these topics.

People on the Move

In early December **Dr. Andrew Moore** traveled to England, where he visited colleagues at both the University of Oxford and the European Centre for Medium-Range Weather Forecasts (ECMWF).

In early January, **Dr. Mahmood Shivji** spent two weeks in Northern Ireland at the Queen's University, Belfast. There he worked on various collaborative projects with **Dr. M. Stanhope** and his students, primarily on the molecular biology of mammals, sharks, groupers, and invertebrates.

Dr. Julian McCreary, dean, presented a talk at the annual meeting of the American Meteorological Society in Atlanta, January 29-31. The title of the talk was "Possible Mechanisms of Ocean-Atmosphere Interaction in the Indian Ocean for the Generation of Interannual Variability, as Inferred from Its Annual Cycle." Dr. McCreary was honored at the AMS Awards Banquet on January 31, where he received the Sverdrup Gold Medal (see story on page 2). Also attending the meeting were two of Dr. McCreary's Ph.D. students, **Weiying Han** and **Shuliang Zhang**, as well as **Kathy Maxson**.



Dr. McCreary (center) with Ph.D. students Shuliang Zhang and Weiying Han in Atlanta. (Photo by Kathy Maxson.)

Weiying Han and **Shuliang Zhang** attended the annual Ocean Sciences Meeting of the American Geophysical Union, which was held in San Diego February 12-16. They participated in a special workshop on Global Change. Ms. Han presented a talk entitled "Dynamics of the East India Coastal Currents," and Mr. Zhang's talk was entitled "On the Coastal Ocean Circulation Driven by River Outflow."

Dr. Gary Kleppel and Ph.D. student **Carol Burkart** also traveled to San Diego for the Ocean Sciences Meeting. Dr. Kleppel presented a paper, co-authored by graduate students **Karen Roberts** and Ms. Burkart, entitled "Diet and Egg Production of the Planktonic Copepod *Calanoides acutus* in the Weddell Sea during the Spring-Summer Ice Edge Bloom." He also presented a poster, co-authored by **Dr. E. Lessard**, of the University of Washington, entitled "Carotenoid Pigments in Microzooplankton: Another Look." Ms. Burkart displayed a poster, co-authored by Dr. Kleppel, entitled "Patterns of Egg Production and Hatching Success of the Calanoid Copepods *Acartia tonsa* and *Acartia clausi*."

On January 23, Dr. Kleppel presented a talk to the Florida Sea Grant Extension Program in Gainesville, entitled "State of Florida's Estuaries and Future Needs in Estuarine Research." Also in January, Dr. Kleppel gave a seminar for the Department of Environmental Health Science at the University of South Carolina in Columbia. His talk was entitled "Nutritional Stress in Estuarine Ecosystems: Lessons from the Lower Trophic Levels."

On February 23 Dr. Kleppel presented a seminar at the Department of Oceanography of Florida State University in Tallahassee. The title of the talk was "Relationships between Diet and Egg Production in Calanoid Copepods: A Context for Nutritional Ecology."

Dr. Kleppel and three of his students, Ph.D. candidate **Carol Burkart** and M.S. candidates **Lee Houchin** and **Erin Kirby**, have made monthly treks to a marine laboratory in Marathon, in the Florida Keys. There they have been working with **Dr. Carmelo Tomas**, who is a Center adjunct and a scientist with the Florida Department of Environmen-

tal Protection, along with several of his staff members. The two groups are collaborating on a study of productivity in Florida Bay; Dr. Kleppel's group works with the zooplankton, and Dr. Tomas's group does the phytoplankton assessment. According to Dr. Kleppel, "Results are provocative to date - not consistent with classic dogma on the condition of the Bay." More on this study to follow.



Dr. Joel Picaut presents a seminar on ENSO.

Seminars

Dr. Charles Messing presented a four-part series of seminars on the history and structure of the earth to Nova Southeastern's Institute for Retired Professionals. On January 22, Part I covered "Plate Tectonics and Continental Drift." Part II, presented on January 29, was on "Evolution and the Early History of Life." On February 5 he presented Part III, "The Age of Dinosaurs," and on February 12 the topic was "The Age of Mammals."

The Oceanographic Center hosted several scientific seminars during the past few months. They included:

November 3: "Copepod Egg Production in the Eastern Gulf of Mexico: Relations to Food Availability," by **Lee Houchin** (M.S. student under **Dr. Gary Kleppel**).

November 17: "Temporal Changes in the Phytoplankton Community in Port Everglades," by **Kevin Spingler** (M.S. student under Dr. Kleppel).

(Continued on Page 4)

(Continued from Page 3)

December 27: "Zonal Displacement of the Western Pacific Warm Pool Associated with a Series of ENSO Events," by **Dr. Joel Picaut**, of Group SURTROPAC, ORSTOM, Noumea, New Caledonia.

January 12: "Feature- and Contour-based Data Analysis and Assimilation in Physical Oceanography," by **Dr. Arthur Mariano**, of RSMAS, University of Miami.

January 19: "Examining a Recent Mesoscale Eddy Parameterization," by **Dr. Amit Tandon**, of the University of Victoria.

January 22: "Rossby Waves and Interdecadal Changes in Thermocline Depth of the Northeast Pacific Ocean," by **Dr. Steven Meyers**, of Florida State University.

February 2: "Observations of Stratified Turbulent Mixing in an Estuary," by **Dr. Hartmut Peters**, of SUNY at Stony Brook, New York.

February 5: "Do Transient Eddies Stabilize the Thermohaline Circulation?" by **Dr. Scott Power**, of the Bureau of Meteorology Research Centre (BMRC), Melbourne, Australia.

February 6: "A Theory for the Limitation of ENSO Predictability Due to Stochastic Atmospheric Transients," by **Dr. Richard Kleeman**, of BMRC, Melbourne.

February 9: "Annual Variability of the Subtropical Recirculation in the North Atlantic and North Pacific," by **Dr. Liping Wang**, of NASA/Goddard Space Flight Center, Greenbelt, MD.

February 26: "Small-Scale Structure over the Near-Surface Layer of the Ocean in the Western Pacific Warm Pool," by **Dr. Alexander Soloviev**, of the University of Hawaii.

On February 9, a Job Fair was held for the benefit of graduate students at the Oceanographic Center. The title of the Fair was "Everything You Always Wanted to Know about Dade County DERM But Were Afraid to Ask." It was conducted by **John Farina**, who is Chief of the Compliance Section of the Department of Environmental Resources Management (DERM), located in Miami. Topics of discussion included job opportunities, resume recruitment, interviews, environmental scenarios, and chances for advancement both in and out of DERM. DERM owes its

existence to the Dade County Commission, which, in 1974, created the department in order to regulate and manage activities affecting our local environment. DERM conducts comprehensive monitoring programs to track ambient air and water quality trends. DERM also administers a number of resource enhancement, restoration and remediation programs, among other environmental activities. The department has hired many Coastal Studies graduates in the past, and students here obviously are hoping that this trend will continue.

Holiday Party Scores!

The annual Center holiday party, which was held in the Richardson Library in late December, scored big points with all who attended - as usual. We were pleased to play host to a number of people from NSU's main campus, especially those who seldom have an excuse to visit our rather out-of-the-way facility.

The festivities were planned by **Kathy Maxson**, who was ably assisted by student employee **Melissa Dore**. We were treated to the usual five-foot sandwiches, this time with a choice of delectable fillings. The tables overflowed with salads, wings, dips, assorted munchies, and a multitude of desserts to top off the display. And a good time was had...



Kathy Maxson with library tree.



Dr. Gary Kleppel with Elise and Dr. Barry Klinger.



Dr. Charles Messing, Peggy Strumski, and Kevin Kohler.



Ruth Lazarus and Carole Ann Peskin, NSU Controller.



Karyn Skemp with Dr. Andrew Moore.

Recent Center Publications

Below is an update of scientific publications authored by Oceanographic Center faculty, staff, and students since the Winter 1995 issue of *Currents* went to press.

Baumiller, T.K., G. Llewellyn, C.G. Messing, and W.I. Ausich, 1995: "Taphonomy of isocrinid stalks: Influence of decay and autonomy." *Palaaios*, 10(1), 87-95.

Gilliam, D., K. Banks, and R.E. Spieler, 1995: "Evaluation of a tire-concrete aggregate for artificial reef construction." *ECOSSET Proc.* (in press).

Kleeman, R., A.M. Moore, and N.R. Smith, 1995: "Assimilation of subsurface thermal data into an intermediate tropical coupled ocean-atmosphere model." *Monthly Weather Review*, 123, 3103-3113.

Kleppel, G.S., C.A. Burkart, K. Carter, and C. Tomas, 1996: "Diets of calanoid copepods on the west Florida continental shelf: Relationships between food concentration, food composition and feeding activity." *Marine Biology* (in press).

Kleppel, G.S., C.S. Davis, and K. Carter, 1996: "Temperature and copepod growth in the sea: A comment on the temperature dependent model of Huntley and Lopez." *American Naturalist* (in press).

Klinger, B.A., 1996: "A kinematic model of wind-driven meridional heat transport." *J. Physical Oceanography*, 26, 131-135.

Leder, J.J., P.K. Swart, A. Szmant, and R.E. Dodge, 1996: "The origin of variations in the isotopic record of Scleractinian corals: I. Oxygen." *Geochim. Cosmochim. Acta* (in press).

Lu, P., and J.P. McCreary, 1995: "Influence of the ITCZ on the flow of thermocline water from the subtropical to the equatorial Pacific Ocean." *J. Physical Oceanography*, 25, 3076-3088.

McCreary, J.P., K.E. Kohler, R.R. Hood, and D.B. Olson, 1966: "A four-component ecosystem model of biological activity in the Ara-

bian Sea." *Progress in Oceanography* (in press).

McCreary, J.P., and P. Lu, 1994: "On the interaction between the subtropical and the equatorial oceans." *J. Physical Oceanography*, 24, 466-497.

Messing, C.G., 1994: "Crinoid meadows of the West Indies: Distribution, responses to flow, disarticulation, sediment production and taphonomy." IN *Echinoderms through Time*, B. David, A. Guille, J.-P. Feral, and M. Roux, Eds., Balkema, Rotterdam.

Messing, C.G., 1995: "*Alloecommatella*, a new genus of reef-dwelling feather star from the tropical Indo-West Pacific (Chinodermata: Crinoidea: Comasteridae)." *Proc. Biol. Soc. Washington*, 108, 436-450.

Messing, C.G., 1996: "Redescription of a unique feather star (Echinodermata: Crinoidea: Comasteridae) with the diagnosis of a new genus." *Proc. Biol. Soc. Washington*, 108(4), 656-661.

Moore, A.M., and R. Kleeman, 1995: "The dynamics of error growth and predictability in a coupled model of ENSO." *Quart. J. Royal Meteorological Soc.* (in press).

Shankar, D., J.P. McCreary, W. Han, and S.R. Shetye, 1996: "Dynamics of the East India Coastal Current, Part I: Analytic solutions forced by interior Ekman pumping and local alongshore winds." *J. Geophysical Research* (in press).

Smith, M.R., M.S. Shivji, V.G. Waddell, and M.J. Stanhope, 1966: "Phylogenetic evidence from the IRBP gene for a baleen/sperm whale clade, with mixed support for cetacea as a suborder of Artiodactyla." *Molecular Biological Evolution* (accepted).

Stanhope, M.J., M.R. Smith, V.G. Waddell, C.A. Porter, M.S. Shivji, and M. Goodman, 1996: "Mammalian evolution and the IRBP gene: Convincing evidence for second superordinal clades." *J. Molecular Evolution* (in press).

Swart, P.K., R.E. Dodge, and H.D. Hudson, 1996: "A 240 year stable oxygen and carbon isotopic record

in a coral from South Florida: Implications for prediction of precipitation in South Florida." *Palaaios* (in press).

Swart, P.K., G. Healy, R.E. Dodge, P. Kramer, H. Hudson, R. Halley, and M. Roblee, 1996: "The stable oxygen and carbon isotopic record from a coral growing in Florida Bay: A 160 year record of climatic and anthropogenic influence." *Paleo., Paleo., Paleo.* (in press).

Swart, P.K., J.J. Leder, A. Szmant, and R.E. Dodge, 1995: "The origins of variations in the isotopic record of Scleractinian corals: II. Carbon." *Geochim. Cosmochim. Acta* (in press).

Weber, D.N., and R.E. Spieler, 1994: "Behavioral mechanisms of metal toxicity in fishes." IN *Molecular Biological Approaches to Aquatic Toxicology*, D.C. Malins and G.M. Ostrander, Editors, Lewis Pub. Inc., Boca Raton, FL, 421-467.

Alumni News

While surfing the Net, M.S. graduate **Joseph Vigil** (1985-1990) found our webpage and was reminded of his student days here at the Oceanographic Center. So he sent **Dr. Curtis Burney** an informative e-mail message to tell us of recent exploits.

"Currently I am a staff member at the Los Alamos National Laboratory in New Mexico. I work with a group called Science Education and Outreach. We run educational programs.... I have used my water chemistry experiences from Dr. Burney's class here at LANL. The lab experience really paid off.... I am using a program called TOPS to work with teachers on weather tracking, specifically hurricane tracking.... I use supercomputers for ocean/atmosphere modeling and will use the Internet to dispense information to teachers and students.... This year has been a lot traveling since I am on the New Mexico Council of Technology in Education."

UNDERCURRENTS

INSTITUTE OF MARINE AND COASTAL STUDIES

SPRING TERM SCHEDULE

M.S. degree specialties are **Marine Biology** and **Coastal Zone Management**. Each course carries three credit hours or may be audited. Tuition is \$333 per credit hour (50% less for audit). Classes meet once a week from 6:30 to 9:30 PM at the Oceanographic Center. The spring term extends from April 1 to June 21, 1996. For further information, call **Helene Taylor** at (954) 920-1909.

Marine Geology (OCOR-5604): This is a required CORE course and is offered for both degree programs. Describes the origin, form, and resources of the ocean basins and continental margins. Covers sea-floor spreading, trenches and island arcs, mountain building, coral reefs and atolls, sedimentation, ocean mining, coastal morphology, and the impact of wave action and human activity on beaches and coasts, continental shelves, and submarine canyons. Instructor: **Dr. Pat Blackwelder** (Center faculty). Begins Monday, April 1.

Marine Microbiology (OCMB-6055): Covers the nature, activities, interactions, and ecological roles of marine bacteria and their consumers in coastal and offshore environments. Includes discussion of sampling and quantitation methods, growth rate and production determination, bacterial substrates, food chains, the nitrogen and sulfur cycles, marine snow, and deep-sea microbiology. Instructor: **Dr. Curtis Burney** (Center faculty). Begins Tuesday, April 2.

Dynamic Biological Oceanography (OCMB-6195): Explores relationships between the physical environment and biological productivity in the ocean. Emphasis is on understanding how water movements influence marine life by building conceptual bridges be-

tween fundamental concepts in physical oceanography and marine ecology. Incorporates guest lectures and roundtable discussions to provide a broad range of topics. Instructor: **Dr. Gary Kleppel** (Center faculty). Begins Wednesday, April 3.

Dry Coastal Ecosystems (CZMT-0610): Focuses on the ecology of coastal (non-wetland) habitats above mean high water, such as dunes, maritime forests, and hammocks. Provides Saturday field trips to several South Florida parks, including Everglades National Park, Loxahatchee National Wildlife Refuge, Jonathan Dickinson Park, and Pennecamp State Park, plus a planned three-day trip to the Bahamas to study Caribbean ecosystems. Instructor: **Dr. Bart Baca** (Center adjunct). Begins Thursday, April 4.

Biostatistics (OCMB-6091): Covers 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 are discussed, along with basic concepts of probability distributions, hypothesis testing, and decision-making. Includes simple statistical tests, analysis of variance through factorial analysis, simple and multiple regression, and correlation. Examples are taken from ecology and aquatic toxicology. Instructor: **Dr. Gary Rand** (Center adjunct). Begins Friday, April 5.

Summer Term Schedule

The summer term extends from July 1 to September 13, 1996. Course descriptions will be published in the next issue of *Currents*.

Marine Chemistry (OCOR-5605). Instructor: **Dr. Curtis Burney** (Center faculty).

Marine Zooplankton (OCMB-6065). Instructor: **Dr. Gary Kleppel** (Center faculty).
Wetlands Ecology (CZMT-0791). Instructor: **Dr. Bart Baca** (Center adjunct).
Biological Effects and Risks of Chemicals in Aquatic Environments (OCMB-6196). Instructor: **Dr. Gary Rand** (Center adjunct).

Thesis Defenses

The following candidates presented their thesis defenses during December:

December 13: "Serological Changes in Three Species of Sharks (Bonnethead, *Sphyrna tiburo*; Blacktip, *Carcharhinus limbatus* and Bull, *C. leucas*) Associated with Capture and Restraint," by M.S. student **Eric V. Hull**. Committee: **Drs. Richard Spieler** (Chairman) and **Richard Dodge** of the Oceanographic Center, and **Drs. Robert Heuter** and **Charles Manire** of the Mote Marine Laboratory, Sarasota, Florida.

December 14: "An Aquatic and Terrestrial Faunal Census of Manmade Canals and Lakes in the Everglades Region," by M.S. student **Joseph Lindstrom**. Committee: **Drs. Richard Spieler** (Chairman), **Mahmood Shivji**, and **Bart Baca** (Center adjunct).

December 20: "Diet and Feeding Habits of the Yellow Stingray, *Urolophus harrisi*," by M.S. student **Pat Quinn**. Committee: **Drs. Richard Spieler** (Chairman), **Curtis Burney**, and **Charles Messing**.

December 20: "Regulation of Beta-Glucosidase in Marine Bacteria," by Ph.D. candidate **Dennis Stetter**. Committee: **Drs. Curtis Burney** (Chairman), **Richard Dodge**, **Richard Spieler**, and **Donald McCorquodale** (Center adjunct).

(Continued on Page 7)

(Continued from Page 6)



Joseph Lindstrom defends his M.S. thesis.



Bahamas Field Course is a Success!

During the week of October 15-20, students taking the Marine Botany course experienced a new type of field study, taught on Grand Bahama Island. The semester-long course began and ended with lectures and exams at the Oceanographic Center, but the field session in the Bahamas consisted of intensive lectures and field observations.

The course was led by Center adjunct **Dr. Bart Baca**, with the able assistance of M.S. student **Austin Ives**. Twelve students took the class and enjoyed discounted cruise ship and hotel costs. The course was designed because of the need for intensive, tropical field work, which, according to Dr. Baca, "has been problematic over the last years when taught in the Florida Keys." In the past, the Port Authority of Freeport had requested that the Center provide courses there, having in mind the idea of establishing a branch campus in Freeport.

Board of Governors Meets in January

The Oceanographic Center's Board of Governors met on January 18, 1996, at the Center. Board members in attendance were **John Peet**, Chairman, **Gary Arenson**, **Betty Berry**, **Will Connelly**, **Richard Donato**, **Chris Jacoby**, **Kenneth Kent**, **Robert King**, **James LaBate**, **Denise Liebmann**, **John Penn**, and **Tom Plachter**. NSU attendees included **Leslie Brown**, Vice President for Development, **Drs. Richard Dodge**, **Julian McCreary**, and **Charles Messing**, and **Helene Taylor**.

Mr. Penn introduced two new Board members: **Robert King**, from the U.S. Navy South Florida Testing Facility, and **Gary Arenson**, a CPA from Arenson and Sandhouse.

Dr. Dodge and Dr. Messing brought up some development projects in which the Center plans to participate this year. Among them

are the annual barbeque with the Marine Industries Association of South Florida (MIASF) on April 25, and the second annual at-sea project, which is scheduled for this June and is dubbed "Oceanographers for a Day." Also discussed was the Center's possible participation in "Oceans '96," a major international conference scheduled to take place at the Fort Lauderdale Convention Center in September.

A major topic of discussion centered on a development effort to enlarge the role of "Friends of Oceanography." Various plans were put forth to merge other development groups with this organization. Also discussed were suggestions to liven up the laboratory, using photographic exhibits and other art projects. Dr. McCreary announced that Fort Lauderdale developer **Hamilton Forman** has loaned the Center a multitude of archaeological finds, and that the artifacts will be on exhibit at the Center sometime in April.



Showing off in the Bahamas: **Michael Hopkins**, **Peter Cappola**, **Dana Rankin**, **Pamela Bachman**, **Kevin Kittredge**, **Austin Ives**, **Marianus Datubara**, **Wende Evans**, **Yasser Kattan**, **Alex Brylske**, and **Susan Teel**.
(Photo courtesy of Dr. Bart Baca.)

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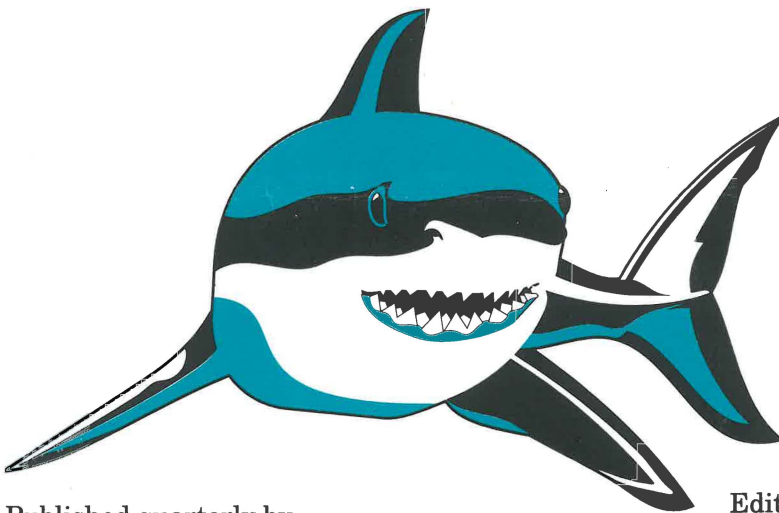
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Her job finished, a green sea turtle returns to the sea.



For these hatchlings, the job has just begun.

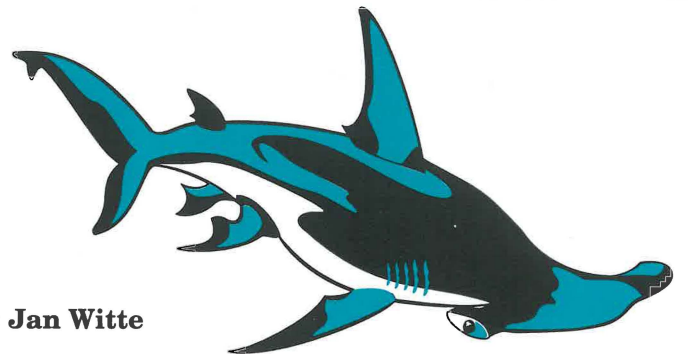


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