AHEAD of the Class

Sea Grant
Florida

Florida Sea Grant Delivers Marine Education

Florida is sometimes called a state with two oceans back-to-back. And each day, educating Floridians about their coastal environment becomes more essential to protecting these ocean resources for future sustainability.

It is not surprising that numerous academic, governmental, private and nonprofit organizations devoted to marine research and education exist here. Florida Sea Grant collaborates with these groups to provide specialized programs and opportunities to a wide range of users, from highly technical industry groups to scientists and resource professionals to traditional K-12 teachers and students.

All Sea Grant county faculty, regional faculty and statewide specialists contribute to this effort. The investment is equivalent to 2 1/2 people dedicated to marine and aquatic science education, full time, year long. Florida Sea Grant continues to make this investment because it pays off in increased public literacy about coastal issues and more responsible ocean users.

At the same time, investing in coastal and marine education is only part of what the Florida Sea Grant College Program does. Florida Sea Grant also brings a network of university-based researchers to bear on the state's coastal problems. Sea Grant fosters collaboration between the education and scientific communities to ensure that research findings and scientific information are available to Floridians.

Over time, this investment in research, education, and extension has influenced important issues and produced substantial positive results. This publication reviews a selected assortment of collaborative efforts and educational activities that are helping our state's citizens and businesses better manage their fragile coastal resources.

Please also visit the Florida Sea Grant website (www.flseagrant. org), which provides a thorough documentation of our mission and goals, our research and extension programs, and the partnership we build between NOAA and Florida's universities, marine research organizations, businesses, governments and citizens.

Jim Cato
Director
Florida Sea Grant College Program

FRONT COVER: Florida Sea Grant county extension faculty often work with K-12 audiences, providing marine education inside and outside the classroom to thousands of youth annually. LeRoy Creswell of St. Lucie County conducts his 4-H youth "lagoon days" program. He also works closely with the county's marine center and school district providing programs such as "motion in the oceans" and "ecosystem explorers." (Tom Wright, UF/IFAS)

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Ahead of the Class:
Florida Sea Grant Delivers Marine Education

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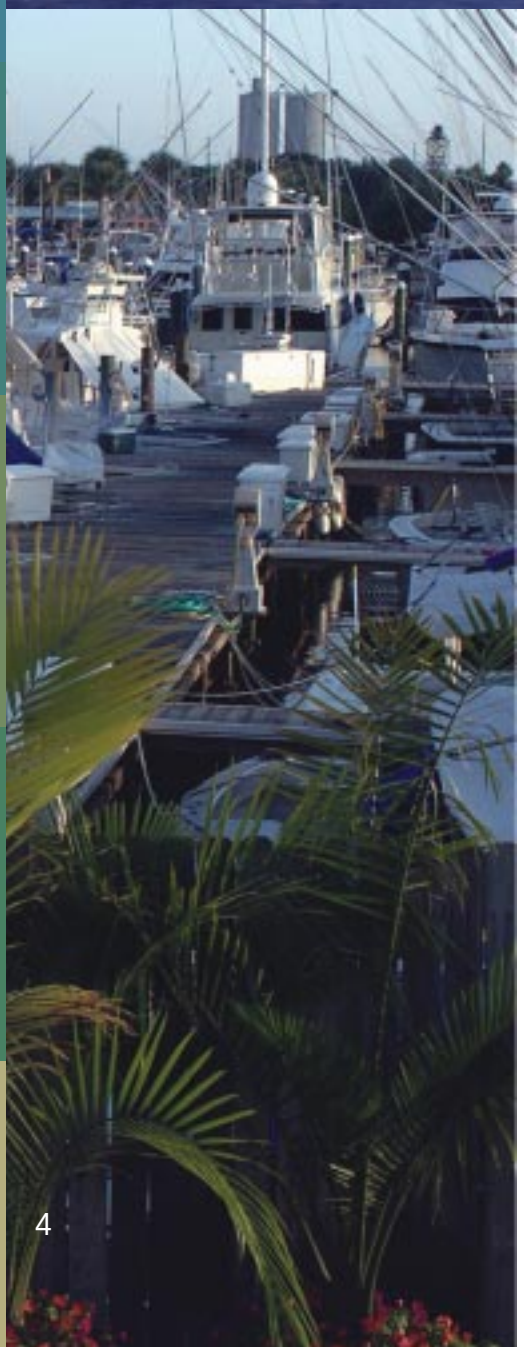


For Florida's 17.1 million residents and about 78 million annual visitors, the coast is a major attraction and an important part of their environment. Nowhere in the United States are so many people so close to such an extensive and economically valuable coastline.

The pressures, wants, and needs users place on coastal resources all combine to make understanding and managing one of the most fragile environments on earth a difficult and often controversial undertaking.

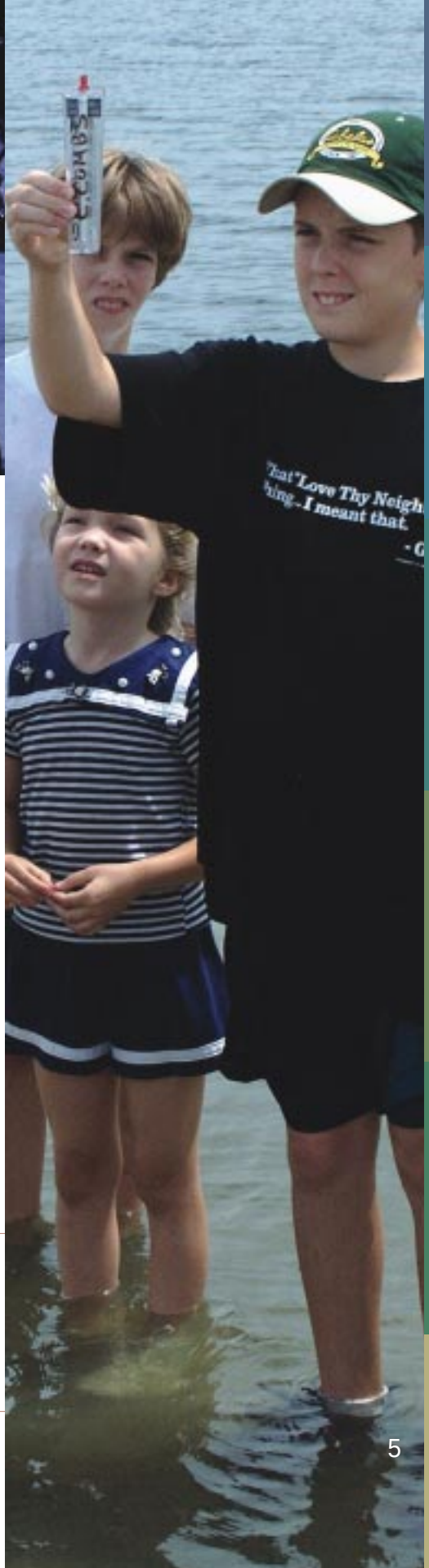
Florida Sea Grant has a vital role to fill in this complex endeavor, and has assumed a leadership role in the creation of a better-informed and more responsible populace — one that recognizes its impact on the quality of the environment. This understanding is essential for Floridians to rationally manage continued growth in the coastal zone, as well as to equitably resolve the ever-increasing competition for coastal resources.

Beyond the Traditional Classroom

While Florida's schools and universities provide structure and visibility for how our citizens and visitors learn about the marine environment, Sea Grant educational programs often move into more informal classroom settings where specialized learning and practical skills can be acquired more effectively.

Using a combination of research, education and technology transfer, Sea Grant extension and communications programs interpret and deliver information to audiences in a format they can use. Efforts are focused among six principal stakeholder groups: citizens of local communities; the state's industry; scientists and academic professionals; governmental and non-governmental managers of coastal resources; K-12 educators; and youths. Some of the programs may be recognized as continuing education, professional development, or executive education; all are delivered with a strategic approach designed to solve specific problems or help its citizens make Florida a better place to live.

(Clockwise, from top) Riviera Beach's scenic, all-weather harbor is a popular stopover for sailboats headed to the Bahamas. School children examine water samples taken from an estuary in Brevard County during a Sea Grant summer marine camp.The Fort Pierce City Marina, located in the heart of the city's historic downtown riverfront, has earned Clean Marina designation. (Tom Wright, UF/IFAS)



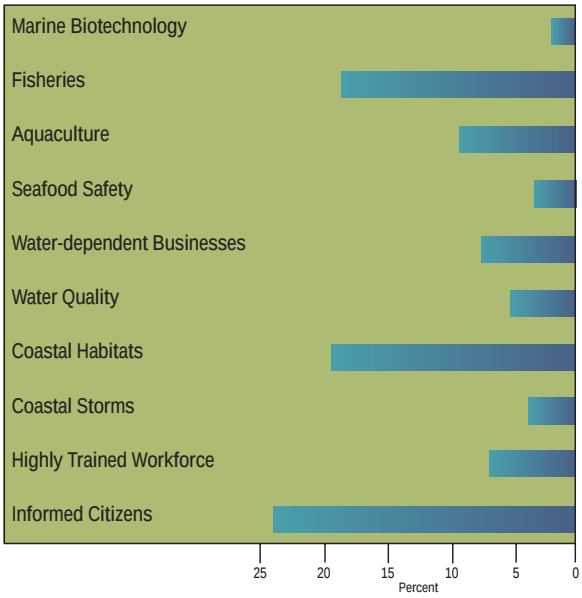
Recent Educational Events

Workshops and conferences are a major outreach activity of Florida Sea Grant's non-formal education initiative. In most cases, these events are held to accomplish specific objectives planned by Sea Grant's research or extension faculty. From 2002 to 2004, they delivered a total of 1,570 educational events, including presentations at scientific conferences, workshops organized by Sea Grant Extension faculty, marine science 4-H camps, K-12 teacher education events and international conferences.

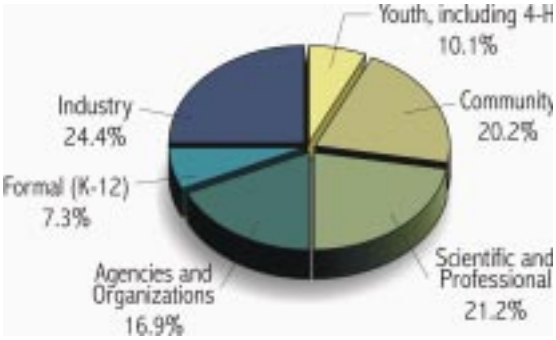
As the figures (right) indicate, the activities are organized along at least one of Florida Sea Grant's ten goal areas, although the number of events in each goal area may vary. The principal areas of emphasis are informed citizens (23.4%), coastal habitat (18.7%), and fisheries (17.3%) education.

When organized among the six principal stakeholders groups, about one quarter (24.4%) of Sea Grant programs is delivered to the state's industrial users, closely followed by scientists and other academic professionals and communities.

Few organizations have the breadth and depth of focus on multi-disciplinary marine and coastal issues statewide that Florida Sea Grant brings to the educational process. The following pages review how Sea Grant invests in the scientific and environmental education of the state's citizenry, a necessary step for the state to remain competitive in the national and world economy while conserving its coastal resources.



Activity by Florida Sea Grant goal areas, 2002–04



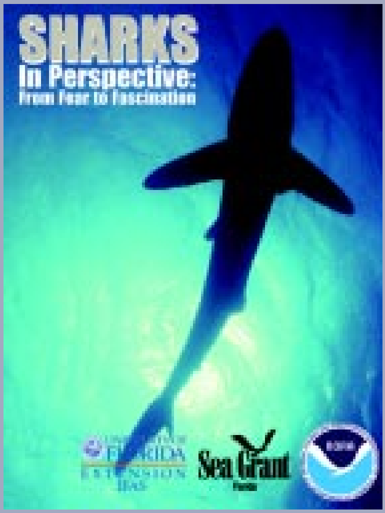
Florida Sea Grant audience type, 2002–04

Educational events by Florida Sea Grant geographic area of delivery, 2002–04

Educating Floridians about the state's marine environment is essential to ensuring the responsible use and sustainability of coastal resources. Here, swimmers enjoy the waters off Gulf Islands National Seashore near Pensacola. (Eric Zamora, UF/IFAS)

Community Education

Community education programs are less technical and thus more general in nature than other Florida Sea Grant (FSG) programs. Some call this "informal education," a lifelong process where individuals acquire awareness, attitudes, values, skills, and knowledge from daily experiences. FSG efforts may focus on the value of estuaries, how to be good citizens and protect the coastal environment, or the biological reasons a new fishery regulation is put in place. Methods may range from a presentation to community leaders at a Rotary or Kiwanis Club meeting, to participating in a television show on coastal conservation that reaches millions, to showing a condominium association the way to protect coastal dunes with sea oats.



Remember Summer of the Shark? As part of a national education effort to replace shark myths with shark science during the summer of 2002, Florida Sea Grant helped organize a conference for educators and resource managers in Tampa, and a media briefing at the National Press Club in Washington, D.C. (Florida Sea Grant)

Putting Sharks in Perspective

Sharks and their relatives, the skates and rays, are in serious worldwide decline from over-fishing and habitat destruction. Yet when a few highly publicized shark attacks on humans in the summer of 2002 created a national groundswell of public fear and speculation, the need to develop and distribute better information about the realities of sharks became apparent.

In direct response to a request from the U.S. Department of Commerce, Florida Sea Grant brought together more than 200 resource managers, educators and media representatives in a national conference, *Sharks in Perspective: From Fear to Fascination.* Conference presenters, some of the nation's leading experts on shark issues, helped defuse many highly charged issues by explaining basic biological attributes of sharks, precautions beach-goers could take to minimize the incidental shark bites that occur, and fishery management strategies in place to protect endangered and threatened shark species.

Understanding Florida Bay

Florida Bay, the estuary where fresh water from the Everglades mixes with the salty waters from the Gulf of Mexico and Atlantic Ocean, has undergone significant degradation from manmade problems in the Everglades and its watershed. From 1998 to 2002, Florida Sea Grant managed an educational effort that reached more than

five million residents of South Florida with information about dozens of ongoing NOAA research projects in the area. More than 65 bilingual project profiles were written and distributed; a resource directory, a quarterly newsletter and a series of *Florida Bay Watch* synthesis and analysis reports were also completed with partners. A low-power radio station and weekly radio programming reached Keys residents and visitors alike. The Florida Bay Project productions are archived at: *www.floridabay.org*.

Enriching Environmental Awareness

The Florida Master Naturalist Program, an award-winning adult education program developed by faculty from the University of Florida's Institute of Food and Agricultural Sciences (IFAS), offers courses in three subject areas: freshwater wetlands, coastal systems, and upland habitats. Florida Sea Grant provided substantial funds and technical assistance to the program's coastal systems module, a program that earned a national award for best video series in the 2003 Association for Communication Excellence competition. Since 2001, Master Naturalist has graduated nearly 2,000 people; many of these 'graduates' received additional instructor training and now provide training at the community level, with course offerings in 45 counties throughout Florida involving more than 85 organizations.

REDstart: Volunteers Restock Redfish

REDstart is a fishery stocking program involving sport fishermen, fishery biologists, local volunteers and others concerned about the sustainability of sport fish stocks in the Charlotte Harbor area, particularly redfish (*Sciaenops ocellatus*). Under the Florida Sea Grant umbrella, REDstart involves a dedicated group of citizen-volunteers, Lee County Cooperative Extension, the J.N. Ding Darling National Wildlife Refuge and the Fisheries Stock Enhancement Program (a partnership program between Mote Marine Laboratory and Florida Fish and Wildlife Conservation Commission). It also involves an impressive line-up of fishing tournaments, the South Florida Water Management District and the City of Sanibel, which have all contributed to a $350,000 grow-out facility that has been built at the Sanibel-Captiva Conservation Foundation Marine Laboratory on Sanibel Island.

Bob Wasno, Florida Sea Grant marine agent in Lee County, displays a young REDstart redfish ready for release. Volunteers from the community have logged more than 6,200 hours building and maintaining the REDstart aquaculture facility on Sanibel Island. (Florida Sea Grant)

Improving Rip Current Understanding

Rip currents are a beachgoer's number one safety hazard. In Florida alone, they accounted for 33 deaths in 2003, and eight more during just one summer month in 2004. Florida Sea Grant county extension faculty have recently partnered with local and state emergency personnel to help educate beachgoers about the threat of rip currents, and what to do if they become caught in a current. Florida Sea Grant,

TOP: Though rip currents can be found on beaches every day, their strength and speed often increase following storm events, as illustrated by this rip current which formed on Florida's Atlantic coast following Hurricane Jeanne. (Dennis Decker, National Weather Service)

BOTTOM: Florida Sea Grant provides rip current materials, signage and other resources to local communities that will help beachgoers identify rip currents and avoid becoming their next victim. (Florida Sea Grant)

in collaboration with eight other state Sea Grant programs in the U.S., produced and distributed thousands of rip current brochures and posters during 2002 and 2003. In 2004, Sea Grant was one of a group of NOAA agencies that, together with the U.S. Lifesaving Association, launched a nationwide rip current safety awareness campaign, supported with informational videos, signage, brochures, and the definitive website, http://www.ripcurrents.noaa.gov, featuring "Break the Grip of the Rip."

Florida Sea Grant-funded researchers are also developing scientific models that may predict rip current formation. Early in 2004, Florida convened a national researcher's workshop in Jacksonville to give scientists the opportunity to explore the use of their predictive methodologies in surf zone forecasting.

Scallops are a popular Florida catch for snorkelers in hot summer months, and thanks to recent restoration efforts, portions of the state's west coast once closed to scalloping have reopened in the past few years. Since the reopening, Florida Sea Grant has produced and distributed more than 20,000 "how-to, where-to" informational brochures for this fun and easy pastime that appeals to anglers of all ages. Florida Sea Grant played a major role in helping restore the fishery, and now community businesses are reaping dividends, too. Economists estimate Citrus County's 2003 scallop season provided 35 new jobs and an additional $1.5 million in business revenues. (Florida Sea Grant)

Florida Sea Grant helps communities protect their local waters. At left, Florida Sea Grant marine extension agent Maia McGuire implemented a monofilament recycling campaign designed to encourage northeast Florida communities to protect wildlife, people and property from hazards posed by discarded strands of fishing line. Volunteers collect the monofilament and send it to a tackle company for recycling. The program has been replicated by Sea Grant extension faculty across the state.

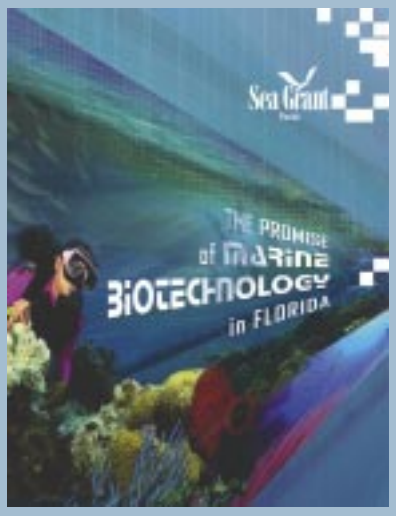
Below, in 2004, over 90 volunteers pulled 7,500 pounds of bottles, cans, monofilament line and other debris from Charlotte Harbor's Boca Grande Pass inlet during an all-volunteer cleanup. Florida Sea Grant has organized this community effort for three consecutive years: an average of 45 divers, 35 support boat captains and 14 government agencies are involved annually. Altogether, more than 21,000 pounds of marine debris have been recovered. (Milt Putnam, UF/IFAS; Florida Sea Grant)

Youth•Community•Industry•Scientific and Professional•Agency and Organization•Formal K-12•Youth

Seafood HACCP training developed by Sea Grant remains the national program for seafood processing and importing in the United States. It has become a world standard for food safety; recently, the protocol was adopted by U.S. processors of juice products. (Tom Wright, UF/IFAS)

Industry Education

"Science Serving Florida's Coast" perhaps describes industry education as well as any of Florida Sea Grant's education programs. Teaching industry requires science-based information that is highly technical in nature and specifically targeted so businesses can better manage operations, develop new product lines, cut costs, increase revenues, or respond to yet another regulation. Examples include an annual shrimp school that draws the world's major shrimp companies; a workshop for oyster processors to learn the latest techniques to increase the safety of their products; or a marina operators' meeting designed to teach how to make their marina "clean" with no detrimental effect on coastal waters.



Florida Sea Grant is fostering an effort by scientists and educators to promote marine biotechnology research to venture capitalists and legislative staff. Sea Grant coordinates a marine biotechnology summit, which has grown into an important opportunity for Florida's academic community to showcase achievements to investors. A collection of publications, including a corporate prospectus titled *The Promise of Marine Biotechnology in Florida*, and pages on the National Sea Grant program's marine biotechnology web site, are written in non-technical language to de-mystify complex topics and support the outreach effort. (Florida Sea Grant)

Marine Biotechnology

A comparatively young sector of Florida's overall biotechnology industry, marine biotechnology seeks to develop products and processes from the ocean's living resources through advanced cellular and molecular investigations. Florida Sea Grant is working to enhance both the immediate quality of and future funding base for research and education in marine biotechnology. By closely targeting leaders in academic research and economic development, Florida Sea Grant encourages decision making that enhances lines of investment and research. Ultimately, this will promote job growth, international economic competitiveness, and environmental benefits for the state.

For the academic community, William Seaman, professor and associate director of Florida Sea Grant, has initiated a series of marine biotechnology summits for scientists and their graduate students to build cohesion among Florida's faculty and students. Summits often feature out-of-state keynote speakers, a

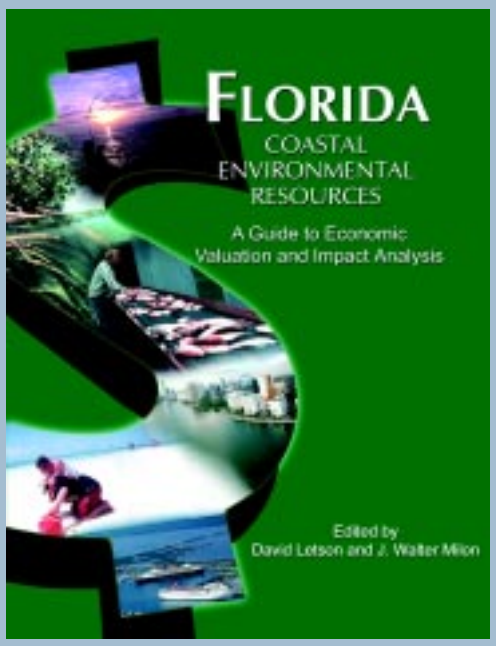
commercialization panel, poster sessions, laboratory site visits, and plenary scientific presentations. Attendees have repeatedly praised the emphasis on science and the opportunity for technical networking that these gatherings afford, and continue to support them with increased turnout. From the group of 15 that convened the initial summit, attendance has risen steadily, from 45 to 74 in subsequent years. In 2004, the prestigious BIOFlorida trade association invited the fourth summit to be held in conjunction with its annual meeting. Attendance was 430, a new high for both meetings.

The relationship with BIOFlorida provides an important link to industry professionals, both for developing cooperation between faculty and industry, and for informing industry leaders about the opportunities for funding, application and commercialization of discoveries. Sea Grant participated in the founding organizational committee for BIOFlorida, and is represented on its current board of directors. In addition to the joint 2004 meetings, Florida Sea Grant has organized sessions on marine biotechnology for two previous BIOFlorida annual meetings.

Educating with Economics

Florida Sea Grant has a long track record of supporting the state's marine industries by providing essential economic information through a one-two combination of research and extension. In fact, Florida hired one of the first extension marine economists in the entire Sea Grant network (1973), and has maintained this as a major program element ever since. Researchers and Sea Grant extension economist Chuck Adams, a professor of food and resource economics at the University of Florida, work hand-in-hand to identify high priority needs for research, and then feed the research results back to industry leaders in a form they can use.

As part of a USAID/NOAA Hurricane Mitch recovery program, Florida Sea Grant collaborated in the demonstration of a commercial-scale shrimp culture system in Nicaragua using zero water-exchange technology. Sea Grant director Jim Cato and marine economist Chuck Adams presented a complete economic analysis of the project to the local shrimp farmers, bankers, and regulators in two workshops. Most of the attendees said they would use the information during the next growing season. (Florida Sea Grant)



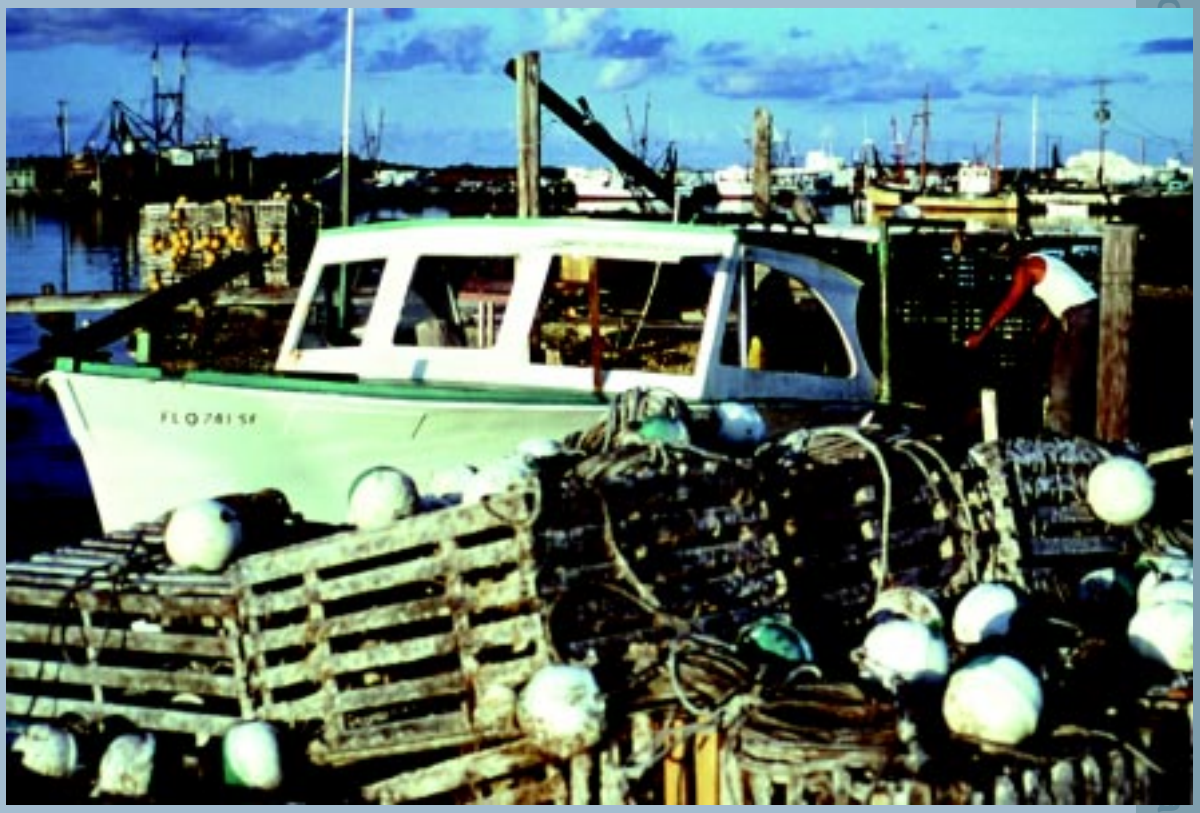
To help coastal community leaders, managers and industry professionals better understand the importance of using environmental economics in their decisions, Florida Sea Grant provided publishing support for *Florida Coastal Environmental Resources: A Guide to Economic Valuation and Impact Analysis.* Collaborators included researchers from the universities of Maryland, Miami, and Central Florida; and economists from NOAA. Copies were distributed to more than 200 environmental consulting firms and virtually every college and university library in the state. (Florida Sea Grant)

In recent years, Sea Grant's economists have analyzed the costs and returns from a zero-water exchange shrimp aquaculture demonstration in Nicaragua; summarized domestic and international market trends for the state's growing marine ornamental species industry; and assisted Florida's commercial shrimpers with their application for financial relief granted by the federal Trade Adjustment Assistance program. The ongoing baseline economics research Sea Grant generates for the hard clam, scallop, and recreational fishing industry sectors, among others, gives trade groups, potential investors, and managers the science-based information they need to make decisions that provide for the sustainable use of Florida's marine resources.

Fact-Finding Capacity

Due to its reputation as an "honest broker" of information, Florida Sea Grant often coordinates fact-finding projects and meetings that bring together the fishing industry, scientists, and resource managers to discuss the current state of a fishery, as well as its future research needs.

In 2002, the Florida Fish and Wildlife Conservation Commission asked Florida Sea Grant to collect opinions and information from stakeholders in the blue crab industry as the commission pondered changes to an existing permit moratorium. Florida Sea Grant used its network of county extension faculty to hold 16 workshops for more than 200 individuals. Extension faculty learned the industry had concerns about what should replace the moratorium, and trap and license limitations, but supported stronger measures to reduce poaching and environmental degradation. The report served as the basis for a subsequent set of public hearings in 2003.



Identifying Research Needs

Spiny lobsters are important to both commercial and recreational fishermen in the Florida Keys, yet the fishery is undergoing major changes from regulation and waterfront development. Florida Sea Grant has supported the lobster fishery in the Keys for the past 30 years through research and extension education. A 2003 workshop organized by Doug Gregory, Monroe County Extension Director and Sea Grant agent, provided the opportunity for collaborations between scientists and fishermen on current research projects and future research needs. More than 100 attended, including about 50 spiny lobster fishermen and a number of scientists who reported results of Florida Sea Grant funded research on the species. About 85 percent of attendees considered the workshop a success and indicated they would like to see similar workshops in the future on other species.

Spiny lobster is an economically important species to the commercial fishing industry in the Florida Keys. A recent conference sponsored by Sea Grant Extension with assistance from the Florida Fish and Wildlife Conservation Commission and Monroe County Commercial Fishermen examined more critically what is and is not known about the spiny lobster and the dynamics of the fishery.

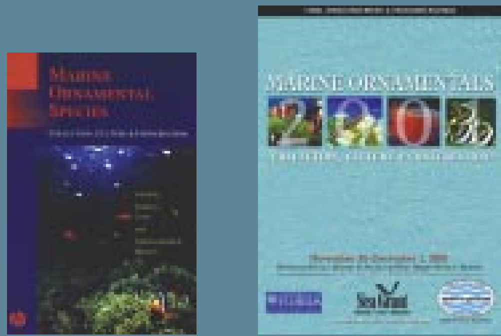
Leslie Sturmer, who leads the Shellfish Aquaculture Extension Program in Florida, examines seed clams that were remotely set in a land-based nursery system. This technology, used in the Pacific Northwest oyster industry, is being evaluated by Florida Sea Grant for the Florida cultured hard clam industry as a way to help clam growers become less dependent upon more costly seed sources. (Eric Zamora, UF/IFAS)

Helping Clam Growers

One notable outcome of Florida's 1994 ban on gill net fishing has been the birth and growth of an economically viable cultured hard clam industry. Florida Sea Grant has partnered with government agencies and industry leaders to provide business management training, nursery technology and seafood safety techniques for growers. Florida's cultured hard clam industry now annually generates nearly $34 million in output, $9 million in labor income and $12 million in value added.

Together with county-based Sea Grant extension faculty, Chuck Adams and Leslie Sturmer have held dozens of educational programs and workshops for shellfish farmers throughout the state. Emphasis has been on growout production technology, seed production, product quality, marketing, water quality and organizational development – integral elements of management strategies that result in profitable, sustainable production of hard clams in Florida.

Sturmer and Adams have been instrumental in obtaining sanctions to allow hard clam growers to qualify for USDA crop insurance — the first eligibility of its kind for marine aquaculture in the United States. They have also developed a user-friendly software program that lets growers track clams from the original seed purchase, through nursery/grow-out, planting, to final harvest, accounting for operating expenses and capital purchases.



As part of its organizational effort, Florida Sea Grant prepared these publications for the international Marine Ornamentals 2001 conference, which attracted 336 participants from 23 countries. (Florida Sea Grant)

Aquaculture and Marine Ornamentals

The commercial aquaculture industry in Florida continues to grow in economic importance and diversity. Florida Sea Grant is providing technical assistance to support the sustainable growth of this industry, internationally as well as statewide. More species are aquacultured in Florida than any other U.S. state, and the rising industry is now valued at about $100 million. Most of that value comes from the culture of freshwater ornamental fish, but a growing marine aquaculture sector is becoming more visible and attractive to potential investors.

Chuck Adams has teamed with researchers Donna Lee and Sherry Larkin, both in the University of Florida's Food and Resource Economics Department, to provide industry groups, potential investors, and fisheries managers with research on the value of the marine ornamental species industry in Florida and an evaluation of international trade in live species. Florida Sea Grant was also one of the sponsors for Marine Ornamentals '04, the third in a series of international conferences for the marine ornamentals industry to meet and discuss issues critical to its future. In 2001, Florida Sea Grant was the lead sponsor and organizer. In between, Florida Sea Grant Director Jim Cato, having served on the organizing committee for all three international conferences to date, co-edited *Marine Ornamental Species: Collection, Culture and Conservation*. This book is the most comprehensive resource available on the growing and economically important marine ornamental industry.

U.S. consumers are eating more shrimp than ever, but increased imports of farmed shrimp have sent earnings of U.S. shrimpers to historic lows. Imports now supply as much as 85 percent of the U.S. market, and many domestic harvesters are facing bankruptcy. Florida Sea Grant coordinated a series of 16 trade assistance workshops to Florida's shrimp fleet through the federal Trade Adjustment Assistance program. To receive the program's cash benefits, producers had to attend one of the workshops for technical assistance and training. Sea Grant extension economist Chuck Adams provided the economic analysis that qualified shrimpers for the benefits; seafood specialists and 13 Sea Grant extension faculty coordinated delivery of the workshops. Adams also provides technical support to the industry through timely presentations. In a recent conference on international agricultural trade disputes attended by policymakers, industry groups, and trade lawyers, Adams examined the use of trade barriers, import quotas, and import tariffs to relieve the plight of U.S. shrimp fishermen. (Tara Piasio, UF/IFAS)

The annual Shrimp School at the University of Florida, part of national seafood HACCP training, helps industry comply with safe seafood regulations. Seminars use lectures and hands-on labs to cover topics on product quality and safety, from production through retail. Over the past eight years, participation in this world-renowned program has included representatives from every major shrimp company in the world. The program incorporates current and relevant material tailored to a commercial audience. (Florida Sea Grant)

Seafood Safety

Food safety training for the nation's seafood industry ranks among the most successful extension education undertakings in Sea Grant history. More than 20,000 people have completed HACCP (pronounced HASS-ip) courses, including all federal FDA seafood inspectors in the nation, most state-based inspectors and over 90 percent of all nationally based seafood processing firms, plus another 5,000 international participants from 30 nations.

HACCP, which stands for Hazard Analysis and Critical Control Point, describes a series of food-preparation procedures that promote the safe and sanitary processing and importing of seafood. Federal regulations require all U.S. seafood importers and processors to implement a HACCP system.

To help the industry comply, the National Sea Grant Program, federal agencies, trade associations, university researchers, and extension services formed the National Seafood HACCP Alliance in 1995 to develop a training and technical assistance curriculum. The program was organized by and continues to be coordinated by Florida Sea Grant seafood safety specialist Steve Otwell, a professor of food science and nutrition at the University of Florida.

The training now includes the traditional 3-day HACCP courses, 1 1/2-day sanitation courses taught biannually in Florida, and a special one-day support course taught for individuals that complete an established Internet course developed by Alliance members at Cornell University. The Alliance publications used for this training are based at and distributed from the University of Florida, coordinated by the Florida Sea Grant program. These training materials are the most successful and demanded of Sea Grant publications.

Seafood HACCP training remains the national program for seafood processing and importing in the U.S. and has become a world standard for food safety. Recently, the protocol was adopted by U.S. processors of juice products.

The HACCP program has also received presidential recognition, including the Al Gore Hammer Award in 2000 for excellence in service to America. Otwell's leadership of the HACCP Alliance — and a consequence of the program's success — is his recognition by the Institute of Food Technologies in 2004 as the first recipient of the Myron Solberg Award for providing leadership and the successful development and continuation of an industry/government/academia cooperative organization.

Since the 1970s, Florida Sea Grant's extension program has advised anglers, divers, government planners and resource managers on responsible practices for artificial reef planning, building and monitoring. Sea Grant research conducted on artificial reefs since the 1980s has provided scientific understanding of reef ecology and engineering, in order to improve the reef deployment, design and evaluation process. (Rob Bronson, Jacksonville Reef Research Team)

Scientific and Professional Education

Scientific and professional education is critical to conveying scientific discoveries to others as soon as possible. This educational process allows the new information to be implemented in academia, in industry and through the regulatory process. It saves time and money and prevents other scientists from "reinventing the wheel." It is also important for scientists and other professionals to continuously retrain themselves to make sure their own talents and programs remain current. Florida Sea Grant efforts in this area range from funded research faculty making scientific presentations at statewide, regional or international conferences, to a workshop for county-based artificial reef program managers where they learn the latest monitoring techniques to evaluate their reefs, to in-service training programs for the Sea Grant Extension faculty to learn about integrated ocean observing systems, a new program area for them over the next decade.

Research Presentations

Researchers and extension faculty routinely contribute to the educational arena as presenters at professional meetings, conferences and workshops. At the same time, researchers funded in whole or in part by Florida Sea Grant publish their findings through research journals, departmental or university productions and through Sea Grant publications. Sea Grant faculty are routinely sought out by the media for their expertise in coastal and marine issues. These efforts combine to help ensure that science-based knowledge becomes public information.

Including journal articles, reports, brochures, posters, and videos and the like, Florida Sea Grant generated more than 475 productions from 2000-04 to provide science-based, educational information resulting from Sea Grant's research and extension program goal areas.

TOP: Florida Sea Grant associate director William Seaman fields questions from a media crew covering an artificial reef workshop. As interest by sport fishermen and divers continues to grow in artificial reefs, Florida Sea Grant supports the transfer of technical information among resource managers, researchers, and others that study and evaluate reef performance. (Florida Sea Grant)

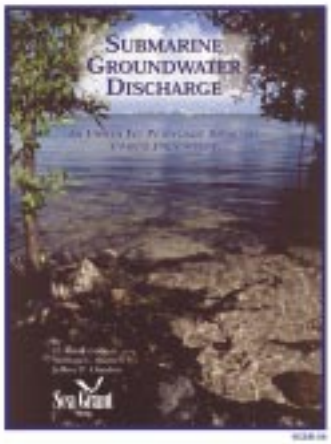
BOTTOM: Sea Grant researchers who make presentations at professional conferences and workshops help ensure that information is transferred in a timely fashion, so that research results can be implemented in academia, industry, and through the regulatory process. Above, William Kem of the University of Florida and Carolina Moller of Florida Atlantic University discuss findings at a BioFlorida conference. (Florida Sea Grant)

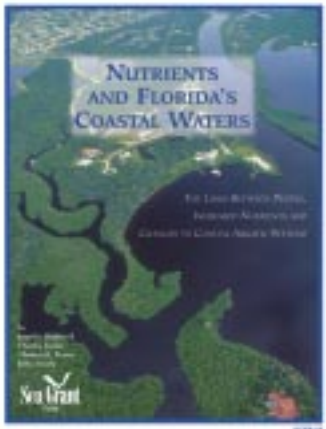
Artificial Reefs

Artificial reefs can enhance recreational fishing, create dive sites, and mitigate damage to ocean habitat. Florida's coastal waters are estimated to contain about half of all artificial reefs deployed in the U.S., and their popularity with a diverse set of stakeholders has made this a priority topic for Florida Sea Grant research and outreach efforts. Technical results from more than a dozen research projects have been transferred to select fishery and habitat resource managers through regional fisheries management councils; synthesis of this research and other information, coupled with a proactive educational effort, has had an impact on artificial reef technology globally.

After inaugurating a periodic statewide summit of reef users, managers and scientists in 1987, Sea Grant turned over lead responsibility for subsequent meetings to the (agency now known as the) Florida Fish and Wildlife Conservation Commission. These summits provide up-to-date technical training on how to more effectively plan, construct and monitor artificial reefs. In 2001 and 2004, Sea Grant coordinated these summits and contributed presentations. In addition, Sea Grant published the results of its survey of artificial reef monitoring efforts in Florida counties to help educate county staff in methods of documenting reef performance. As a follow-up to the latest meeting, Sea Grant made plans to organize a short course on Geographic Information Systems applications to Florida county artificial reef programs.

In the national and international setting, Florida Sea Grant associate director William Seaman has delivered reef evaluation research to an American Fisheries Society continuing education workshop; reef planning conferences in Korea and Canada, and the 2004 World Fisheries Congress. Seaman has also edited a comprehensive guide to artificial reef evaluation topics written by an international team of experts; the book is recognized as the first volume to combine such essential disciplines as engineering, economics, biology, and statistics for proper evaluation of reef performance.





Through a Florida Sea Grant coastal environmental and water quality design team that involved faculty from four universities, two publications were produced to support educational efforts in subjects identified by field personnel as needed. The first, ***Nutrients and Florida's Coastal Waters***, examines the links between people, increased nutrients and changes to coastal aquatic systems. The companion piece, ***Submarine Groundwater Discharge***, addresses groundwater basics, provides Florida examples of the influence of groundwater discharge on water quality, and the complexity of water management. (Florida Sea Grant)

The 14th International Pectinid Workshop was coordinated by Florida Sea Grant extension faculty. The workshop was held in 2003 in St. Petersburg, the first time the conference has been held in the U.S. in a number of years. (UF/IFAS)

International Fisheries Information Exchange

Sea Grant extension faculty provide coordination for the exchange of information among scientists and fisheries managers at the international level. LeRoy Creswell, Sea Grant extension agent in St. Lucie County, has recently served as the chair of the steering and program committee for the Gulf and Caribbean Fisheries Institute (GCFI), founded in 1947 to promote the exchange of current information on the use and management of marine resources in the Gulf and Caribbean region.

GCFI provides scientific, governmental, and commercial sectors — groups which often operate in relative isolation from one another — with the opportunity to exchange perspectives on current fisheries issues. The GCFI has provided a dialogue that has enabled NOAA fisheries scientists, for instance, to discuss management of tropical and subtropical species common to this region. The 2002 GCFI, held in Xel-ha, Mexico, attracted more than 140 oral and poster presentations. Creswell edited and distributed the proceedings of that meeting to 200 members, 82 libraries and three international scientific databases.

Don Sweat, marine extension agent for five southwest coastal counties, and Norman Blake, Florida Sea Grant campus coordinator at the University of North Florida, co-chaired the 14th International Pectinid Workshop, a conference dedicated to the sharing of research on the scallop species of the world, particularly those of commercial importance. It gave more than 120 researchers, resource managers, aquaculturists, conservationists, fishermen, and economists from 26 countries the opportunity to network and discuss a species whose demand is rapidly expanding while natural stocks dwindle.

Newell Seminar Series

One of the most effective means available to Sea Grant for advancing professional education across Florida has been through sponsorship of visits and seminars by renowned marine scholars. The Elise B. Newell Seminar Series annually enables five or six experts in coastal and ocean disciplines to visit one or more campuses over about a three-day period, mentor students, and develop collaborations with Florida faculty. The series, named for Florida Sea Grant's long-time fiscal officer, who herself was a valued mentor, has funded visits from faculty at institutions such as the Institute of Marine and Coastal

Florida Sea Grant graduates of the Florida Natural Resources Leadership Institute include (above, left) Broward County marine agent Dianne Behringer, shown attending a Clean Marina designation ceremony with Clean Marina representative Paul Thompson, and Miami-Dade County marine agent Marella Crane (right), whose practicum focused on a calendar poster featuring art from the Biscayne Bay area. (Florida Sea Grant)

Sciences of Rutgers, Oregon State University, Tufts University, and Virginia Institute of Marine Sciences. Topics ranged from genomics to ecolabeling, endocrine disruptors, aquaculture, fisheries policy and harmful algal blooms.

Natural Resources Leadership

Florida Sea Grant has capitalized on the University of Florida's Natural Resources Leadership Institute, a program that helps rising leaders develop skills that build consensus around contentious environmental issues and move beyond conflict to find resolution. Five extension faculty have graduated. Over the course of a year, they participated in seven three-day sessions and completed a course practicum.

Participants of the Institute become familiar with natural resource policy and prepare to play a role in shaping it. Program sessions include: skill building in natural resources leadership, communication and conflict resolution; understanding natural resources issues and how decisions concerning them are made; exploring real-life examples through field trips to natural resource areas in Florida; and, applying knowledge to current natural resource issues or problems.

The 2005 Florida Natural Resources Leadership Institute has an emphasis on the impact of coastal development on the state's salt and freshwater resources.

The annual Florida Sea Grant extension faculty meeting provides staff with the updates on topics in coastal issues they need to effectively plan programming for the coming year. Scientists and agency personnel also attend. Recently, representatives from NOAA Fisheries and the Florida Museum of Natural History provided presentations on fishery management and shark issues. Program leaders from Sea Grant programs in the Gulf of Mexico region provided a discussion on mercury in fish and its potential impacts. Researchers from the University of South Florida discussed ocean observation systems and potential educational activities. This annual meeting is designed to allow Florida Sea Grant extension state and county faculty time to discuss and develop annual plans of work at both the state and county level. (Florida Sea Grant)

Professional Development

In order to effectively transfer technology and the latest scientific information to marine and coastal users, Florida Sea Grant extension faculty receive annual, ongoing training in delivery skills and technical content. Sea Grant actively supports professional training and development — each county faculty member receives, on average, at least 15 days of professional development training. Delivery techniques may cover dealing with conflict, project design, program evaluation, management and development, and leadership and communication. Typical in-service training may cover current topics in fisheries conservation, marine education, ocean observation systems, invasive species, coastal water quality, Florida Everglades restoration, marine aquaculture, seafood safety, rip currents, or waterway and boating management. Sea Grant faculty often take the leadership in developing these in-service training sessions. Examples include:

- Sea Grant economist Chuck Adams has developed an annual workshop on sustainable marine fisheries that addresses a variety of national and state management and conservation issues for county extension faculty. The workshops lead to the development of county plans of work that emphasize fishery issues.
- Sea Grant estuarine ecologist Chuck Jacoby has coordinated a series of workshops focusing on contemporary watershed issues during 2002-2004. University of Florida/IFAS Extension state and county faculty, including Sea Grant faculty, attended these interdisciplinary workshops.
- Many of Sea Grant's county faculty have completed Florida Master Naturalist Program Workshops, and become certified in both the wetlands and coastal modules. Some of these faculty have gone on to develop Master Naturalist Programs in their respective counties.

Florida Sea Grant provides the agencies that have jurisdiction over coastal resources with up-to-date information through a variety of channels, including direct input to scientists at these organizations based on the latest findings (even before they are published); service on committees of the federal fishery management councils; testimony to legislative subcommittees; or presentations to county commissions. (Florida Sea Grant)

Agency and Organization

Education

Florida has a large number of local, state and federal agencies that focus on the coast. In fact, with half of the counties in Florida on the coast, even county commissions get heavily involved in debating issues relating to the coast. Federal agencies such as NOAA Fisheries and two federal fishery management councils that cover the state, the state's Fish and Wildlife Conservation Commission and regional (within Florida) organizations such as the West Coast Inland Navigation District are regular partners with Florida Sea Grant to conduct educational programs or receive the latest scientific information.

Marine economist Chuck Adams (above) and Monroe County marine extension agent Doug Gregory are Sea Grant extension faculty that serve on the scientific and statistical committees of both the Gulf and South Atlantic fisheries management councils. Adams chairs a technical task force for the Gulf States Marine Fisheries Commission, which is currently developing a fishery profile and draft management plan to guide the recreational and commercial harvest of sheepshead in the Gulf of Mexico. Gregory also serves on a joint council coastal pelagics stock assessment panel, and is often asked to serve on teams to review stock assessments in other fisheries the councils manage. (Florida Sea Grant)

Providing Science to Management

Florida Sea Grant researchers and extension faculty provide yeoman's service to fisheries management agencies, often delivering research results before they appear in scientific journals. During 2000-02, 10 members of Sea Grant's funded research or extension faculty were serving on a scientific advisory committee of either the Gulf of Mexico or South Atlantic fishery management councils. Sea Grant input was directly responsible for establishing the parameters that led to a conclusion that the yellowtail snapper fishery was healthy and not overfished, which had been the contention of outside reviewers. Sea Grant researchers serving on council committees at that time included Deb Murie, Bill Lindberg and George Burgess from the University of Florida; Wally Milon of the University of Central Florida; Felicia Coleman and Chris Koenig of Florida State University; Nelson Ehrhardt of the University of Miami; and Mark Butler of Old Dominion University.

Assisting NOAA and the Nation

Although resource managers and scientists have become increasingly alarmed by the overfishing of shark populations in the northwest Atlantic, NOAA's Office of Law Enforcement has lacked effective tools to enforce protective measures. A team of researchers led by Mahmood Shivji, associate professor at Nova Southeastern University and director of the Guy Harvey Research Institute, has developed a method of DNA analysis of shark parts that puts teeth in NOAA's efforts to identify and prosecute U.S. fishing vessels suspected of catching and selling protected shark species.

In one recent period, Shivji's group helped federal prosecutors confirm the presence of

A rapid and reliable DNA test developed by team of scientists led by Mahmood Shivji of Nova Southeastern University (left) can identify shark species from fins and other body parts, which in turn helps fisheries managers enforce protective measures for overfished shark populations. Shivji's work has fostered close cooperation between Sea Grant funded research and NOAA Fisheries. (NOAA Fisheries)

prohibited species in four of five investigations, resulting in fines of more than $100,000. In one case, a fish dealer suspected of selling white shark filets was exonerated when the analysis showed the products were obtained from legal species. The team's research has received extensive international media coverage in *Science; Nature; the New York Times; National Geographic Today*; New Zealand radio; NBC TV's "EcoWatch" program and AAAS radio, among others. Thus, Florida Sea Grant-supported science has led not only to direct application, but has gone a long way in educating the public about the seriousness and need for fisheries management.

Clean Marinas and Clean Boatyards

There are nearly 2,000 marinas operating in Florida today and hundreds of thousands of boaters using Florida's waters every day, all contributing to constant and growing pressure on the state's fragile aquatic and marine ecosystems. Clean water is essential to the multi-billion dollar boating industry.

Florida Sea Grant has responded by partnering with the Florida Department of Environmental Protection, Marine Industries Association of Florida, U.S. Coast Guard, and International Marina Institute to form the Clean Boating Partnership, the original clean marina program in the nation. The partnership's goal is preventing pollution in Florida's waterways by providing incentives to marinas, boatyards and related facilities that adopt environmental best management practices.

The partnership approach motivates public and private entities to work together and removes bureaucratic roadblocks to wise resource stewardship. Florida Sea Grant has contributed to the partnership by writing curriculum for workshops on clean marinas and boatyards, giving presentations in workshops, and

The Clean Boating Partnership estimates that the Clean Marina program has, in its few short years of existence, prevented over 600,000 pounds of glass, 1.5 million pounds of paper, 3.7 million pounds of aluminum, 5.6 million gallons of oil, and more than 1 million gallons of antifreeze from entering Florida's waters. Florida Sea Grant, a founding member of the partnership, produced a series of six PSAs on clean boating practices that were widely distributed to Florida television stations and cable networks. (Eric Zamora, UF/IFAS)

training trainers. In addition, Sea Grant county extension faculty serve as members of check-up teams that verify a facility's progress on its plan for Clean Marina designation. Since the start of the program, more than 150 of Florida's marinas and boatyards have earned certification. Ten other states are now involved in clean marina programs and six more are contemplating startup. Most of these programs have used elements of the Florida Clean Marina model.

Waterways and Boating Management

Coastal communities face a daunting yet critical challenge: how to balance the phenomenal growth of the recreational boating population while maintaining and restoring fragile natural environments. To help manage the challenge, Florida Sea Grant has been providing local decision makers with innovative research that forms the basis of new management policies and programs.

A team of Sea Grant extension specialists led by Robert Swett and coastal planners Charles Sidman and David Fann has introduced government planners and resource managers in southwest Florida to waterway planning based on analysis of boaters' activities coupled with data generated from sophisticated Geographic Information System technology.

The Sea Grant team has worked with the West Coast Inland Navigation district, the Town of Bonita Bay, Collier County, the City of Naples, the City of Marco Island, the Charlotte County Marine Advisory Committee, and environmental, boating, and citizen associations of Manatee and Sarasota counties.

One resource manager praised the results of a Sea Grant inventory of his county's local boating infrastructure because it enabled his office to objectively measure boating pressures on local waterways, prioritize projects for dredging and signage, and more efficiently obtain state and federal permits.

One of the program's most significant results to date has been legislation enacted to improve the onerous dredging process. In 2002, the Florida legislature authorized a pilot program in two Florida counties that allowed general waterway and canal dredging permits if the counties followed scientific guidelines established in earlier Sea Grant research. The end result is environmentally friendly permitting at lower cost in less time.

With the West Coast Inland Navigation District, Sea Grant published the popular two-volume *Historical Geography of*

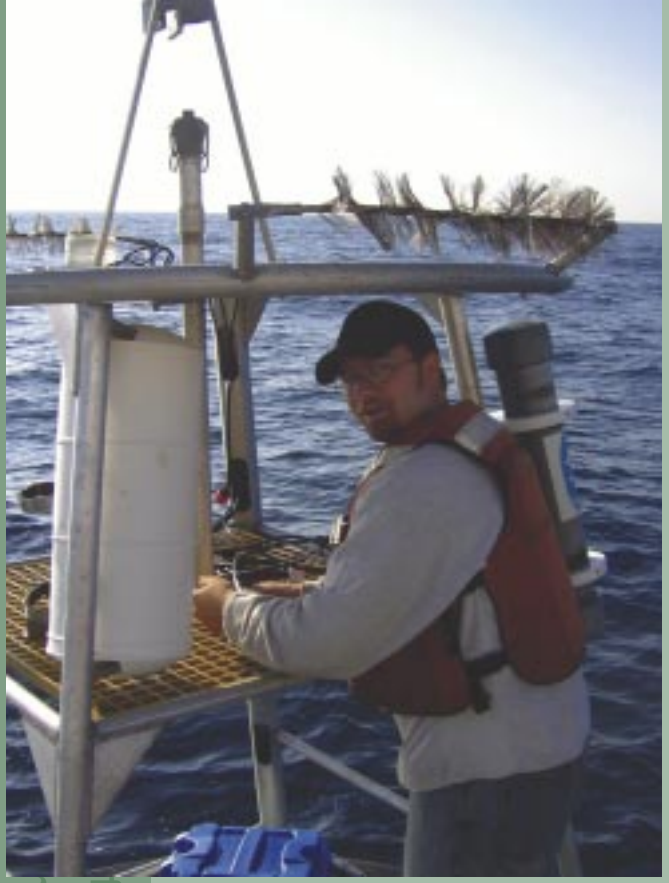
Southwest Florida Waterways to provide a historical perspective on the development of Florida's coastal communities. In 2003, both volumes were converted to CD format and placed online with the University of South Florida's Water Atlas Program.

Coastal Storms Initiative

Florida Sea Grant conducted the outreach and extension component of the NOAA Coastal Storms Initiative (CSI) Florida pilot project, located along the northeast coast of Florida within the St. Johns River watershed. CSI initiatives unite the efforts of local, state, and federal organizations to help coastal communities plan for, respond to, and recover from coastal storms. Florida Sea Grant's role was to support the nine research projects in the Florida pilot by developing an outreach and extension network and identifying needed training and technical assistance so project partners could take full advantage of CSI information. Pilot coordinator Don Jackson of Sea Grant organized a series of network constituent meetings that helped fully engage communities and provide project leaders with community feedback.

Florida Sea Grant continues to develop its waterways and boating management program into a nationally recognized effort. In 2003, it was recognized as the top Sea Grant extension program in the country, receiving the Outstanding Program Award from the Assembly of Sea Grant Extension Program Leaders. Accepting the award from National Sea Grant director Ron Baird (right) are, from left, Florida Sea Grant's extension program leader Mike Spranger, director Jim Cato, and boating specialist Bob Swett. (Florida Sea Grant)

Loss of waterway access is a critical concern to the boating public and boating industry in Florida, a state that has almost one million registered boats and a large number of out-of-state boats that cruise Florida annually. Currently, water-dependent uses—boat repair and fueling facilities, marinas and boating access ramps—are being replaced by non-water-dependent businesses such as restaurants, and residential condominiums. Florida Sea Grant jointly sponsored and coordinated a two-day "Public Access" workshop with the Southwest Florida Marine Industries Association to familiarize resource managers, marina operators, coastal property owners, boaters and developers with the issue of loss of public access ramps and facilities. The workshop convened experts from across Florida and the United States; more than 100 individuals participated. A follow-on workshop is planned for 2005. (Florida Sea Grant)



Florida Sea Grant is a founding partner in the Southeast Atlantic Coastal Ocean Observing System, known as SEACOOS, a network which provides reliable information on the coastal oceans for people who live and work in the Southeast. Jay Law, a technician in the University of South Florida's College of Marine Science, performs maintenance on an ocean monitoring buoy deployed in the Gulf of Mexico by the Coastal Ocean Monitoring and Prediction System at USF, also a SEACOOS partner. (Chris Simoniello, Florida Sea Grant)

SEACOOS

Why observe the oceans? A significant proportion of our world's population and economic activity depend on the sea, yet we have a limited understanding of the complexity and interconnectivity of the ocean and marine ecosystems. Learning more about the forces at work could lead to improved marine transportation and coastal storm preparedness; reduced public health problems associated with contaminated seafood, rip currents and harmful algal blooms; and, enhanced efforts to protect ocean habitats and endangered species.

SEACOOS, the Southeast Atlantic Coastal Ocean Observing System, is a collaborative university partnership funded through the Office of Naval Research that has initiated an integrated coastal ocean observing system for a four-state region of the southeast U.S. Data from buoys, remote sensors, and other field instruments that measure wind, tides and currents will be compiled and transformed into a variety of products useful to coastal communities and marine user groups.

Careful crafting of these products is an essential part of SEACOOS. Florida Sea Grant and cooperating extension programs from Georgia, South Carolina and North Carolina have taken the lead in creating an outreach and education work group to coordinate this activity. Their goal is to provide information products according to the needs of key users. County extension faculty conduct needs assessments with their clientele to determine how the application of real-time observational systems can benefit their daily activities. In 2004, Florida Sea Grant co-sponsored a national ocean observation system workshop in South Carolina attended by over 60 educators to develop a plan for incorporating ocean observation data into national and state educational standards.

Florida Sea Grant also employs a SEACOOS outreach coordinator, Chris Simoniello, to deliver educational programs that increase the awareness and potential use of SEACOOS products and services, and to develop educational materials and products. Simoniello contributes to the outreach and education portion of the SEACOOS web site (right).

Providing K-12 educators with a greater capacity to understand and deliver high-quality teaching on the ocean sciences is the goal of Florida Sea Grant's participation in a National Science Foundation initiative linking scientists and educators. At this workshop in Cedar Key, teachers participated in a variety of training activities on proper marine collecting techniques and identification of common coastal marine life. (Tom Wright, UF/IFAS).

Formal K-12 Education

This area is one of two that target youth either directly or indirectly. Formal K-12 Education includes those programs that reach youth through a structured, graded, education system as the students move through the formal educational process from kindergarten to the completion of high school. Florida Sea Grant faculty get involved through lectures in the classroom, but more importantly, by working with teachers to upgrade their curricula to include math or science components that also incorporate coastal or marine issues. Examples of "teaching the teachers" include directing a coastal field trip as part of a classroom activity, providing in-service training (for which the teachers receive credit) and making presentations at educator conferences, including the Florida Marine Science Educator's Association.

The Centers for Ocean Science Education Excellence, or COSEE, initiative provides middle school science teachers with professional development opportunities during summer months. Florida Sea Grant participates in the COSEE group focused on the Gulf of Mexico, one of a network of seven centers across the U.S. (Tom Wright, UF/IFAS)

Center for Ocean Science Education Excellence (COSEE)

Florida Sea Grant is collaborating with four other states (Texas, Louisiana, Mississippi, Alabama) to strengthen ocean sciences education with a focus on the Gulf of Mexico. The Centers for Ocean Science Education Excellence, known by its acronym COSEE, is a National Science Foundation initiative that bridges the gap between research and education. Florida Sea Grant leads implementation of Gulf of Mexico COSEE programs in Florida, which in turn is one of seven COSEE centers nationwide.

In 2003, both formal and nonformal COSEE programs were conducted. Over a three-month period (June-August) a one-week, field-based COSEE Teachers Institute was held in Cedar Key and Gainesville, supplemented by a two-month online program for the entire Gulf of Mexico region. Content of the institute focused on marine habitats, processes and technologies. Topics covered by the online program included harmful algal blooms, sharks, hypoxia, coral reefs, environmental stewardship and ocean technology.

Also in 2003, a two-day COSEE Nonformal Educator's Workshop was held for Sea Grant and 4-H Extension agents, aquarium educators, nature center educators and youth volunteers. Nearly 90 participants engaged in discussions that allowed researchers to gain a better understanding of educational organizations, and provided educators with programs and material to enhance their classroom content and delivery.

At the Cedar Key summer institutes held in 2003 and 2004, teachers partnered with a research scientist and spent five days in the field, learning about global positioning systems (GPS), harmful algal blooms, coral reefs, marine technology, and coastal habitats. Participants supplemented their field work with online internet training. (Tom Wright, UF/IFAS)

Supporting Marine Education Professionals

Florida Sea Grant works closely with state and national marine education professional associations, and is a supporting organization for the Florida Marine Science Educators Association (FMSEA). FMSEA membership includes both K-12 teachers and nonformal educators. In addition to providing fiscal support for the annual conferences, Florida Sea Grant faculty provide seminars and workshops at the annual FMSEA conference, which draws more than 100 educators annually, and support smaller FMSEA workshops throughout the state.

Between 2002-2004, Florida Sea Grant was a major sponsor and contributor to the 2004 National Marine Educators Association (NMEA) annual conference. In addition to fiscal support, Sea Grant's assistant director for extension Mike Spranger served as a consultant to the conference's program committee. The conference was held in St. Petersburg, with more than 400 K-12 and nonformal educators attending from North America, the Caribbean, Hong Kong and Australia. Spranger also regularly attends the National Science Teacher's Association's annual conference, and participates in the marine education seminar track that is attended by over 300 annually.

In recognition of its contribution to the organization of the 2004 National Marine Educators Association conference in St. Petersburg, Florida Sea Grant earned the right to display "Mr. Pike," the NMEA traveling trophy, for the year preceding the conference. Florida Sea Grant extension faculty are pictured accepting the trophy during an in-service training workshop. (Florida Sea Grant)

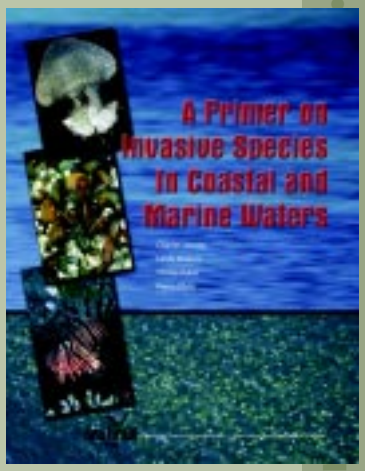
In addition, he served as a member of the National Sea Grant theme team on marine and aquatic literacy which developed the nationally distributed 2004 report, "Marine and Aquatic Science Literacy: Educating the 21st Century Workforce." The report called for making marine and education literacy a national priority, both in terms of outreach and research activities.

In another national effort, Florida Sea Grant provided funding support in 2003 for a NMEA report requested by the Research, Education, and Marine Operations working group of the United States Commission on Ocean Policy. The report, titled "The NMEA Membership Profile Data Analyses and Interpretation," provided baseline information and analysis on formal and nonformal marine education activities for the commission, and was included as an appendix to the commission's final report, delivered to the President in October, 2004.

Promoting Knowledge of Invasive Species

Aquatic invasive species, which have affected all of the U.S. coast, may constitute the largest single threat to our coastal ecosystem, our coastal economy, and human health in the coastal region. Working with groups such as the Florida Aquarium and the Tampa Bay Estuary Program, Florida Sea Grant is part of SERANSE, the Southeast Regional Aquatic Nuisance Species Education and Outreach Network. The network involves educators from three states — Mississippi, Alabama and Florida — and develops programs and materials for both formal and nonformal educational audiences. For the school systems, programs are offered as in-service training for elementary, middle and high school teachers. Similarly, programs are tailored for agency managers, university researchers, extension specialists and agents, and an array of nonformal marine science educators.

Within the state, Florida Sea Grant has offered more than 20 programs and workshops in the last three years. Participants included coastal community leaders, agency managers, university researchers, extension faculty, youth educators, program assistants and camp staff. These one- and two-day sessions considered the status of Florida marine invasive species, familiarized participants with available resources to use in their educational efforts, and provided participants with educational programming and source materials on invasive species. In a succession of specialized in-service opportunities for elementary, middle and high school teachers, participants received training to qualify for Florida's marine educator's marine collection permit.



Florida Sea Grant is well suited to address the problem of invasive species because it provides the necessary breadth of scope in research, education and outreach. In recent years, Sea Grant has produced a "Primer on Invasive Species in Coastal and Marine Waters," fact sheets, "diver alert" cards and other materials designed to support training programs for K-12 and nonformal educators. (Florida Sea Grant)

Florida Sea Grant extension and research faculty accepted the Sustainable Florida Award during a statewide awards ceremony in Boca Raton. Pictured left to right are: Mary Lou Rajchel, president, Council for Sustainable Florida; Jim Cato, director, Florida Sea Grant; Dianne Behringer, marine extension faculty, Broward County; Russ Kerr, Sea Grant researcher and campus coordinator at Florida Atlantic University; and Sharon Cooper, executive director, Council for Sustainable Florida. (Florida Sea Grant)

Recognition for Educational Excellence

Florida Sea Grant's ongoing commitment to enhancing ocean sciences education has earned recognition from the Council for Sustainable Florida, a governor's level collaboration of business and citizen leaders committed to conserving Florida's natural and economic resources. In 2003, Florida Sea Grant received the top award for best practices in the university category in the Sustainable Florida competition, an annual awards program that recognizes organizations, businesses and universities which have demonstrated a commitment to Florida's long-term prosperity and overall environmental health.

The Florida Sea Grant Program was selected for its ability to solve critical coastal and marine problems as well as produce new scientists, ocean policy experts and industry leaders who will be responsible for continuing the preservation of Florida's coastal resources. It is the second Sustainable Florida award for Florida Sea Grant. In 2000, Florida Sea Grant won a Leadership Award for its program of recreational boating research and education, an effort to improve boaters' access to Florida's waters while reducing the detrimental impacts of boating on the marine environment.

Dozens of Florida's youngsters spend summer months learning about their coast in enrichment programs organized through one of Florida Sea Grant's extension faculty. Above, a group examines the marine organisms caught in a seine net during a field trip led by St. Lucie County agent LeRoy Creswell along the shores of the Indian River. (Tom Wright, UF/IFAS)

YouthEducation

Florida Sea Grant's youth education programs might be defined by some as "informal" education; that is, education that it is not diploma oriented, nor does it lead to a degree. In most cases, Sea Grant youth education is operating within some sort of educational system, and is both an important part of some broader activity and intended to serve identifiable learning objectives. More often than not, these efforts include a pre- and post-test to measure the amount of learning that was achieved. Some examples of the way that Sea Grant teaches youth are through organized 4-H programs such as marine science camps and a statewide marine ecology contest, participation in the Florida Science and Engineering Fair as judges and through organized field trips to plant sea oats to restore and stabilize coastal dunes.

Extension faculty teach marine education by involving thousands of Florida's youth in hands-on beach stewardship activities. Above, Maia McGuire demonstrates proper sea oat planting techniques at a restoration area along one of northeast Florida's coastal stretches. Scott Jackson involved dozens of high schoolers at a sea oat planting event along Fort Walton Beach in the Panhandle. (Florida Sea Grant)

Coastal Counties Involve Thousands of Youth

At any given moment, Florida Sea Grant's county extension faculty may be running beach and coastal cleanups, marine youth camps, or interactive exhibits at schools, fairs and special events. These programs involve thousands of youngsters in hands-on activities that help foster an appreciation for the coastal environment. Often Sea Grant faculty work through organizations such as 4-H, Boy Scouts and Girl Scouts, or serve as the local liaison for a nationwide or statewide effort, or organize their own long-standing event that has become a community tradition.

Monofilament recycling and beach clean-ups — Many of Florida Sea Grant's marine agents serve as local coordinators for beach stewardship programs in their areas. The state's monofilament recycling effort has proven to be especially popular with youth. In Brevard County, 80 students from one local high school constructed approximately 100 monofilament collection bins, then distributed them to Clean Marinas around the state.

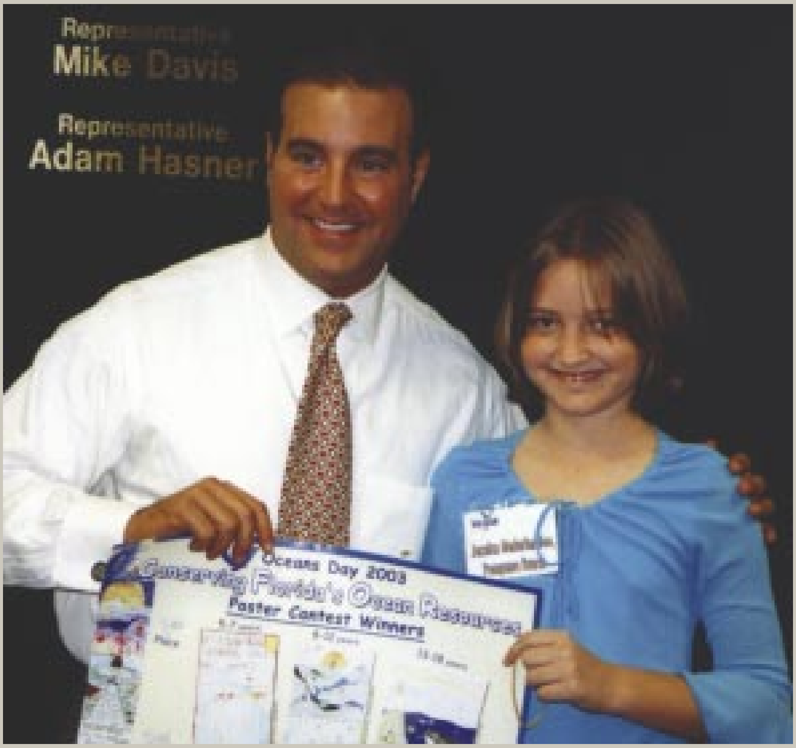
Scott Jackson, Sea Grant agent for Okaloosa and Walton counties helped his local 4-H teen council initiate a monofilament recycling program for the surrounding communities. The group raised funds and then set up information displays and recycling bins throughout the county. They also built and set up bins at the local 4-H coastal youth camp, and conducted a beach cleanup.

To the south, more than 40 Boy Scouts and their parents in Miami-Dade county volunteered with the Sea Grant agent, Marella Crane, to build, install and maintain monofilament recycling bins. Two in the group received Eagle Scout badges for their role; in all, more than 20 bins were installed at county and state parks, marinas, and fishing piers.

Maia McGuire, the northeast Florida Sea Grant agent, held a poster contest to raise awareness of monofilament recycling. Winning posters were displayed at the Greater Jacksonville Agricultural Fair, and featured in a 2004 recycling calendar.

Teaching recreational fishing — Don Sweat, the southwest central marine extension agent, has organized the annual St. Petersburg Pier Aquarium Kid's Fishing Tournament for more than 16 years. The tournament attracts some 500 to 600 youth under 12. Trophies, lunch and drinks are provided through sponsorships of more than $9,000. In one tournament, the kids caught 23 species of fish from the pier.

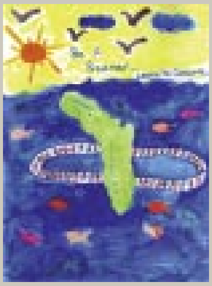
The Lee County Sea Grant extension agent, Bob Wasno, has constructed an educational two-panel kiosk depicting fundamental fishing techniques at the Yankee Beach Fishing Pier to teach children about species of fish that may be caught in that area, typical baits and lures that are successful for their targeted species, and fundamental knots and landing techniques that minimize fish injury. He also holds a sport fishing camp for 4-H youth to teach casting, tackle crafting, local pond biology, fish cleaning and equipment maintenance.

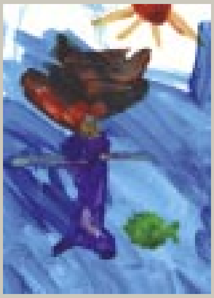


Ocean Day poster contest winner Jessica Nederlanden's enthusiasm was shared by her Representative, Adam Hasner (Broward County) following the awards ceremony at the Capitol. (Florida Sea Grant)

Oceans Day in the Capitol

Kids stole the show when winners of a Florida Sea Grant-sponsored poster contest converged on Tallahassee as part of the 2003 observance of Oceans Day in the state capitol. Florida 4-H members shared their artistic impressions of why it's important to protect coastal habitat by submitting colorful drawings of ocean-related subjects. Winners selected from among more than 80 contestants earned a trip to Tallahassee to meet their state legislator. One legislator escorted the group on a tour of the Capitol House Chambers. The winning entries were published and distributed by Florida Sea Grant as an Oceans Day 2003 commemorative poster.





Seine nets and touch tanks provide a never-ending source of fascination as youth discover what lives beneath the surface of coastal waters. Sea Grant extension faculty provide essential programming and curriculum support for state marine camps, 4-H field trips, and the state's marine ecology competitions. (Florida Sea Grant; Tom Wright, UF/IFAS)

Resource Rangers

Sea Grant agents Andrew Diller and Chris Verlinde assist in writing, providing technical advice, and appearing in the award-winning *Resource Rangers* television show that airs on WUWF-TV Cox Channel 4 in Escambia County and on MediaCom Channel 27 in Santa Rosa County. Episode topics include watersheds, storm water pollution, seagrasses, and the water cycle. *Resource Rangers* is a curriculum-based program that includes classroom activities, field trips and a series of videos focusing on environmental education for grades 5-8 and their families. Diller and Verlinde have also teamed to conduct 4-H and youth educational events under the *Resource Rangers* program for five elementary schools in their region. Approximately 300 children learned about sea turtles, marine debris, and coastal dune and aquatic ecosystems.

Marine Science Camps, Competitions

Sea Grant's Florida Panhandle marine agents – Diller, Verlinde, Jackson, and Bill Mahan — routinely provide youth education in marine concepts and issues at Camp Timpoochee, a 4-H center where an annual state marine camp, and county marine camp programs are offered. The program gives campers first-hand experience with Florida's marine environment, learning identification of marine vertebrates and invertebrates, plants and habitat. About 20 kids a week choose the marine science camp adventure as part of their summer experience.

The northeast marine extension agent, Maia McGuire, has helped revise and provide materials for the 4-H Marine Ecology Judging Event, an annual statewide competition that gives 4-H members an opportunity to learn about the marine and aquatic world. Kids can demonstrate their skills in identification of marine vertebrates and invertebrates, plants, and coastal habitats. McGuire and Brevard County marine agent Chris Combs have also provided specimens for and helped run the competition, held each fall at Camp Ocala.

Florida Sea Grant Online: www.flseagrant.org

Through its website, Florida Sea Grant gives those who manage, use and enjoy the coast immediate access to current research and timely publications on coastal issues considered most critical to the state's future. Most of the site's publications are readily available in full-text format and free to download. A popular item is the online directory of the state's marine education and research organizations.

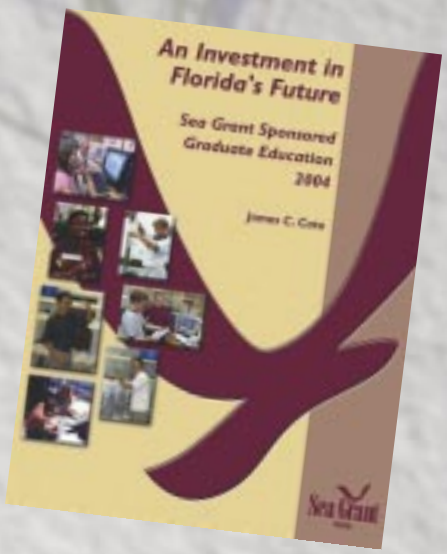
You can also link to the National Sea Grant library, which give visitors access to the entire Florida Sea Grant collection, plus thousands of publications from the 31 other Sea Grant programs. In fact, the National Sea Grant Library reported for 2003 and 2004 — the first two years that a comprehensive report was compiled — that Florida Sea Grant ranked first among the top 10 (in funding) Sea Grant programs in both total documents submitted, and in electronic downloads by users.

What's more, Florida Sea Grant was tops by a notable margin. Of the 422,577 downloads, 183,659, or 43 percent, were for Florida Sea Grant documents.

Graduate Education

Keeping track of college students is not easy; trying to track them down after graduation is harder still. *An Investment in Florida's Future: Sea Grant Sponsored Graduate Education* does just that. First published by Florida Sea Grant in 2002 (TP-117) and revised in 2004 (TP-140), this report traces the program's investment in scholarships and fellowships, and, more importantly, showcases the investment and contributions of the recipients in their commitment to research and their chosen careers.

It features degree information for students supported by Florida Sea Grant, the Aylesworth Foundation for the Advancement of Marine Sciences and the Old Salt Fishing Club, 1986-2004. Included is a summary of students' last known occupations and locations, and degree completed. It also tracks the Florida Sea Grant Knauss Fellows of the last 22 years by university, placement, current occupation, employer, and current location.



For additional information on Florida Sea Grant support for graduate education, and to locate an online version of this report, go to Florida Sea Grant's website at www.flseagrant.org.

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