

# Science Serving Florida's Coast

## **Florida Sea Grant College Program 2004 - 2005 Implementation Plan**

*A partnership program among the  
Florida Sea Grant College Program  
Florida Board of Education*

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*National Sea Grant College Program  
Oceanic and Atmospheric Research  
National Oceanic and Atmospheric Administration*

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*Florida's citizens, industries and governments*

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# IMPLEMENTATION PLAN 2004-2005 FLORIDA SEA GRANT COLLEGE PROGRAM

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## Introduction

The Florida Sea Grant College Program is committed to enhancing the practical use and development of coastal and marine resources while at the same time creating a sustainable economy and environment. Florida Sea Grant's Strategic Plan sets the four-year stage for program priorities. A competitive research proposal process selects two-year projects twice within the period and program areas are enhanced with additional projects funded through national competitions and other sources of funding. Detailed, peer-reviewed proposals are developed every four years for Extension, Communications and Management activities and they are updated at the middle of the four-year period. An Implementation Plan<sup>1</sup> is developed each two years and more detailed work plans and progress reports are written annually.

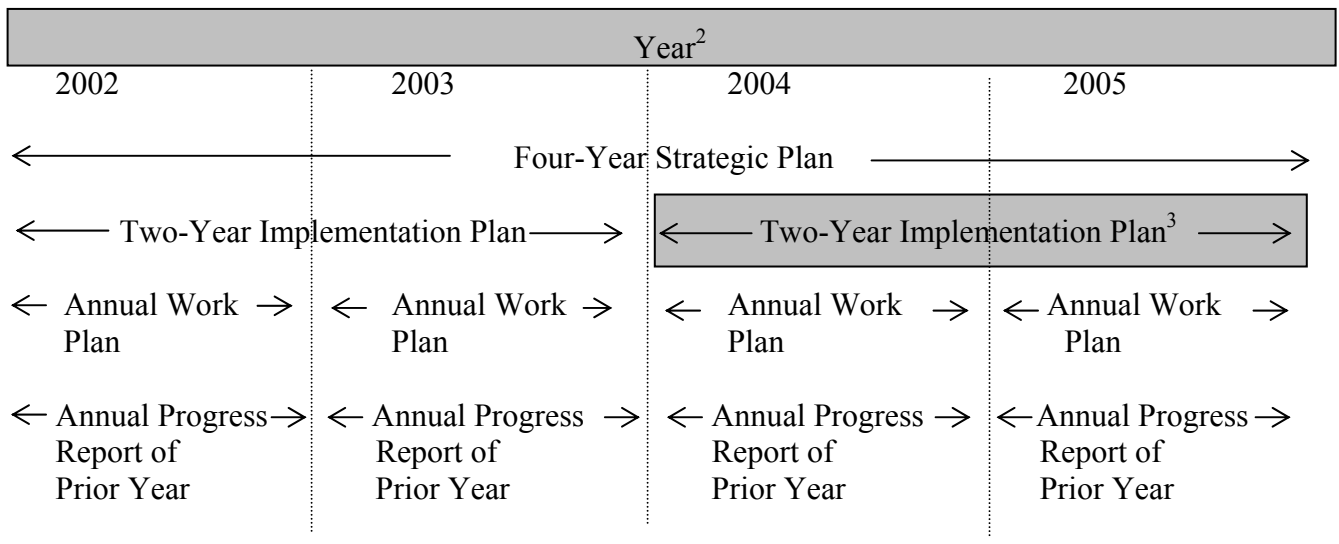
The Florida Sea Grant cycle of strategic planning, implementing of two-year activities, developing a detailed annual work plan and reporting on annual progress is shown in the table on the next page. Florida Sea Grant's Strategic Plan addresses issues that are important both nationally and in Florida, and reflects the input of hundreds of Floridians representing academia, government, industry and citizens. This plan defines Florida Sea Grant's strategic issues within the context of a number of strategic planning activities. First, it builds on seven Florida Sea Grant statewide workshops in 1996, involving hundreds of faculty, agency, industry and citizen participants. The priorities developed through this process were updated for the 2002-2005 strategic plan. They are presented within the context of the National Sea Grant Network Plan: Coastal and Marine Resources for a Sustainable Economy and Environment 1995-2005, which in turn defines overall Sea Grant issues at the national level within the context of NOAA's Strategic Plan: A Vision for 2005. The plan also considers Florida Sea Grant's role in Florida through participation in the development of Florida's Ocean Strategies, a 1999 planning process completed by the Florida Governor's Ocean Committee, and a follow-up Florida ocean research priority agenda developed in 2000-2001. Finally, the plan also considers Florida Sea Grant's role in research, education and extension through participation in the Florida

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<sup>1</sup> The Implementation Plan is the two-year "grants" document containing all project and program activity that is sent to the National Sea Grant Office, NOAA, USDC for processing to provide funds to Florida Sea Grant. The Implementation Plan contained here is the condensed and programmatic version of that document.

FIRST strategic planning process of the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida in 2000 and beyond. This latter involvement allows Florida Sea Grant priorities to consider land-based actions that affect the coast, activities along the shoreline, bays and estuaries, and ocean priorities in planning its research, education and extension goals.

Every Florida Sea Grant activity outlined in this implementation plan satisfies three simple but tough criteria: 1) it is based on a strong rationale; 2) it demonstrates scientific or educational merit; and 3) it will produce results that are clearly useful and applicable in industry, management or science. A number of core values allow Florida Sea Grant to deliver results based on these criteria: 1) **Excellence**; Research is funded on a competitive basis, with scientific merit as the most important criterion. Extension programs are based on reviewed faculty plans of work. Communications efforts use the latest technology to achieve maximum output, visibility and citizen receipt of our science-based information; 2) **Participation**; High value is placed on the involvement of a large number of participating institutions in research, education and extension programs. Graduate student involvement is high and a diverse male and female faculty are involved, from assistant to full professors; 3) **Accountability**; Both external and internal processes are used to measure a wide range of achievements. These include tracking the scientific publication output of faculty and students, understanding the contribution to society of scientific discovery, measuring the way citizens receiving educational programs change their behavior, and determining the economic impact or level of new business activity resulting from a research project; 4) **Connection with Users**; A strong advisory process is used to define research priorities, to plan extension programs, and to measure the impact of programs. It is also used to build public and private support for Florida Sea Grant; 5) **Partnerships**; Faculty, students, and citizens all benefit when functioning in a partnership mode. Scientific results and education projects reach greater success levels and are implemented when partners, from agencies to businesses, provide financial support to an activity. Greater emphasis will be placed on developing partnerships.



<sup>2</sup> The current strategic plan, implementation plan, annual work plan and annual progress report are available at the Florida Sea Grant website [www.flseagrant.org](http://www.flseagrant.org).

<sup>3</sup> Representation of this document on the timeline.

Florida Sea Grant conducts its work through functional research, extension/outreach and communications activities. However, Florida Sea Grant strategically plans along goal areas focused on key issues. One goal may require mostly research to achieve the objective, and another mostly extension and communications activity. Yet another may require a mixture of both. Thus, each of Florida Sea Grant's 10 goal areas and the work implemented within each contains research, extension and communications activity. Florida Sea Grant management provides oversight and makes available the resources to achieve each of the stated goals through the work outlined in this plan.

**Rich Novak  
"In Memoria"**

Rich Novak, Charlotte County's Florida Sea Grant marine extension agent, died unexpectedly on January 21, 2004, while working on a research vessel out of Morehead City, North Carolina.

Novak, 56, joined Florida Sea Grant in 1997, after working as a Sea Grant agent in North Carolina. His outreach programs in Charlotte County focused on the development of artificial reef habitat, and increasing survival of catch-and-release marine fish. He was an avid sport fisherman, hunter, and diver, and organized frequent underwater clean-up dives in the Charlotte County area. Rich was an integral part of the team of Florida Sea Grant faculty and made major contributions to Florida Sea Grant's and Charlotte County's fisheries and fisheries habitat programs. He died just as this implementation plan was being completed. To share his involvement, and as a professional tribute, we have left his planned activities listed in this document. While others will come behind Rich, and assist in completing the work he had planned, his influence and impact on the work of all of us and those who benefit from the work, will not be forgotten.

Novak held a bachelor's degree in parks and recreational administration from Western Illinois University, and a master's in forest and range management from Washington State University. He had completed doctoral work in continuing and adult vocational education at the University of Wisconsin. He was a native of Illinois.

Rich Novak will be missed by the entire Florida Sea Grant College Program family. He was a loved and appreciated colleague, and he was a friend.

Mike Spranger, FSG Asst. Director of Extension  
Jim Cato, FSG Director  
on  
behalf of all Florida Sea Grant faculty and staff.

**GOAL 1.0 MARINE BIOTECHNOLOGY: CREATE AND ENHANCE PRODUCTS AND PROCESSES FROM COASTAL RESOURCES USING MARINE BIOTECHNOLOGY**

The exciting discoveries of modern biotechnology are an extension of practices that are thousands of years old, such as using yeast in bread-making and fermentation in wine production. Within the general field of biotechnology as an applied science that seeks to enhance human life and environmental quality, the newer field of “marine biotechnology” is becoming established. Simply, marine biotechnology seeks to develop goods and services from the organisms and processes of the ocean. For example, a compound from coral is used as an anti-inflammatory drug, as part of a larger quest for new medicines. Other scientific investigations are seeking ways to detect environmental contaminants, discover new industrial compounds, or assure quality of seafood.

The rich and diverse ocean environments ringing Florida’s coastline are one of America’s most promising living laboratories for marine biotechnology research, development, education and commerce. Thus it is only logical that the Florida Sea Grant College Program does its utmost to nurture this field. Florida Sea Grant is continuing its leadership in research and education concerning marine biotechnology. It has surveyed the commercial marine biotech industry, participates with BIOFlorida on behalf of the marine biotech research community, and maintains a database of university faculty interested in and working with marine biotechnology projects. Its partners in academia, business and government have combined forces to analyze novel compounds with potential to treat cancer, arthritis and other diseases, to search for materials to reduce drag on boat hulls and to create methods to identify pollutants in the environment. Florida Sea Grant seeks to support Florida’s best scientists, train the scientists of the future, and then disseminate findings to lay and technical audiences.

Work for 2004-05 represents a combination of research and education projects and activities that are completing prior work, beginning new work and continuing ongoing activities that support both research and education. The two new projects scheduled to end in early 2006 result from the statewide competition held during 2003. Of 85 Statements of Interest (SIs) originally received, 14 were funded. Seven of the 85 SIs were in the area of marine biotechnology, and two were funded as full proposals. The five that were not funded included four SIs focused on pharmaceuticals from marine natural products and SIs using transgenic fish as toxin sentinels in harmful algal blooms.

Goal 1: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
Create and enhance products and processes from living coastal resources. Develop marine bioproducts and sustainable sources of supply. Improve health and production of marine organisms. Promote human health and environmental quality. Facilitate informed consumer, business and technical decisions.	Scientists. Executives in business, academia, government. Media. Funding organizations for research and outreach.	Technical knowledge. Inventions and patents on new products and processes. Trained students. Formats: primary literature, news releases, websites, workshops, conference displays, one-pagers, list serve.	Program management. Research faculty. Communications staff.	New inventions, patents, products, business lines, investments, research funding, conservation of natural resources; greater reporting by media.	Research infrastructure established and funded sustainably. Expanded level of business activity.

Specific Activities 2004-2005					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop a biotechnical production method of <i>elisabethadione</i> , an anti-inflammatory agent produced by the seawhip (R/LR-MB-14)	Scientists. Pharmaceutical companies.	Scientific journal articles. Scientific conference presentations.	Russell Kerr (FAU) Jose Lopez (HBOI)	Patents. Process adopted in industrial production.	2004
Develop rapid, quantitative, cost-effective technology to identify <i>Vibrio</i> spp. pathogens in oysters (R/LR-MB-15)	Scientists. Regulatory agencies. Seafood processors and retailers.	Scientific journal articles. Scientific conference presentations. Industry presentations.	Anita Wright (UF) Gary Rodrick (UF) Keith Schneider (UF)	Protocols for use at retail to certify oysters as "Vibrio free."	2004
Develop anti-fouling products for marine surfaces from natural products (R/LR-MB-16)	Scientists. Regulatory agencies. Paint companies.	Scientific journal articles. Scientific conference presentations. Industry presentations.	William Kem (UF) Ferenc Soti (UF) Dan Rittschof (Duke)	Patents. Potential products developed for industrial use by paint companies.	2004
Design and field test ability of compounds and paints to alter settlement. Follow-on to R/LR-MB-16 (R/LR-MB-20)	Scientists. Regulatory agencies. Paint companies.	Scientific journal articles. Scientific conference presentations. Industry presentations.	William Kem (UF) Ferenc Soti (UF) Dan Rittschof (Duke)	Identification of products and compounds with highest potential for industry anti-fouling application.	2006
Obtain a novel set of conopeptides from cone snails and evaluate use as therapeutic agents (R/LR-MB-18)	Scientists. Pharmaceutical companies.	Scientific journal articles. Scientific conference presentations.	Frank Mari (FAU) Gregg Fields (FAU)	Patents. Testing of compounds by biotech/ pharmaceutical companies. Ultimate use in product production.	2004
Expand the set of conopeptides from cone snails and evaluate therapeutic potential. Follow-on to R/LR-MB-18 (R/LR-MB-21)	Scientists. Pharmaceutical companies. K-12 and university educators.	Scientific journal articles. Scientific conference presentations. Lectures at schools and marine laboratories.	Frank Mari (FAU) Gregg Fields (FAU)	Patents. One drug lead with significant commercial value. Licensing to pharmaceutical companies.	2006
Define the molecular target of Iasonolides and identify process used to kill cancer cells (R/LR-MB-17)	Scientists. Pharmaceutical companies.	Scientific journal articles. Scientific conference presentations.	Amy Wright (HBOI)	Patents. Licensing by pharmaceutical company for clinical trials.	2004

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Create a foundation of knowledge about the fledgling marine biotechnology industry in Florida (PD-03-3)	National biotechnology companies. University scientists. Venture capitalists. National Sea Grant researchers. BioFlorida.	Published report. Posting on <a href="http://www.flseagrant.org">www.flseagrant.org</a> . Executive education short course. Industry presentations.	William Seaman (UF/FSG) Dorothy Zimmerman (UF/FSG) Mark Schrope (Consultant)	More companies linking to Florida scientists and projects.	2005
Inform and educate the general public about marine biotechnology (E/T-11)	K-12 students and teachers. Scientists. University graduate students. General public. Industry.	Online website focused on biomedical applications of marine natural products and environmental aspects of marine biotechnology.	James Masterson (HBOI) Shirley Pomponi (HBOI) Mary Clark (HBOI) John Reed (HBOI)	Number of people accessing website. Requests for information resulting from website.	2004
Advance science and commerce in Florida marine biotechnology	National biotechnology companies. University scientists. Venture capitalists. National Sea Grant researchers. BioFlorida.	Membership on BioFlorida Board of Directors, Sea Grant National Theme Team. Maintain statewide faculty listserv. Briefings for legislative and trade groups. Biotechnology Summit IV.	William Seaman (UF/FSG) Various faculty as needed.	Growth in interest by: faculty, legislature, companies, venture capitalists.	Ongoing through 2006

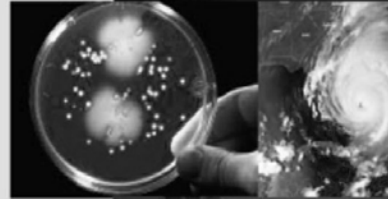


**Florida Sea Grant  
College Program  
Strategic Plan  
2002 - 2005**



**Science Serving  
Florida's Coast**

a statewide program based at the University of Florida that partners NOAA Oceanic and Atmospheric Research with Florida universities, marine research organizations, businesses, governments and citizens



TP-108

***GOAL 2.0 FISHERIES: DETERMINE PRODUCTION AND MANAGEMENT TECHNIQUES THAT MAKE FISHERIES SUSTAINABLE AND COMPETITIVE.***

Recreational and commercial fisheries comprise multi-billion dollar industries in Florida. Increasing demands for both high quality seafood products and memorable recreational fishing opportunities have placed increased pressure on the stocks of finfish and shellfish species which inhabit the coastal waters of Florida. Increased usage associated with this demand dictates the need for more effective fisheries management programs. Effective management requires knowledge on the life history of the target species, sustainable catch levels, appropriate distribution of the catch among commercial and recreational users, by-catch associated with different types of fishing gear, impact of fishing activities on essential habitats, and many other issues. Biological, economic, and social expertise must be brought to bear by research and educational programs in a manner such that the sustainable use of Florida's marine finfish and shellfish resources can be ensured.

The Florida Sea Grant College Program has a long history of funding research and educational programs associated with fisheries management. This research has focused on a wide variety of topics including biological modeling of fish stocks, understanding the economic characteristics of the fisheries-based industries, improving the design of artificial habitats, recognizing the social impact of marine resource regulations, measuring the contribution of marine habitats to fisheries production, and others. And making sure the findings are effectively transferred to industry participants, recreational fishers, and resource managers is vital. By focusing on the wise utilization of Florida's fisheries resources, Florida Sea Grant can help ensure that these resources can be appreciated by generations yet to come.

The plan for fisheries represents a mixture of research activities that are ending in 2004 and 2005 and several new projects beginning in 2004. It also represents an organized fisheries extension component and several related extension and outreach activities. Two new fisheries projects were chosen from four full proposals that were invited from 13 SIs received in this area. The two new projects concentrate on species-specific shark management and on improving spiny lobster stock level predictions. SIs not funded focused on blue-crab trap bycatch, reef design, shrimp larvae, coastal shark management, seagrass habitat, St. Johns River fisheries, snook, using SCUBA for data collection and land crabs. Two fisheries projects result from National Strategic Initiative competitions.

Goal 2: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To ensure that fisheries are managed based on the best scientific analysis. To ensure that fisheries are managed to achieve maximum sustainable economic and biological returns from the fishery. To reduce the number of overfished stocks.	Scientists. GMFMC. SAFMC. FFWCC. GSMFC. ASMFC. Commercial and recreational fishermen. Conservation groups.	Science journals. Serving on advisory committees of management councils and commissions. Journal articles. Workshops on fish management concepts. Reports and technical papers.	Research faculty. State Extension faculty, County Extension faculty. Communications staff.	Decreases in the numbers of stocks overfished. Achieving maximum economic yield from a fishery. Achieving sustainable stocks and level of fishing effort over time. Determining if management objectives are being met.	Exit when stocks are fished at a sustainable economic and biological level.

Specific Activities 2004-2005					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Link essential fish habitat to gag grouper population dynamics (R/LR-B-53)	GMFMC. FFWCC. SFA. OFF. CCAF. NMFS. Fisheries scientists.	Scientific journal articles. Scientific conference presentations. Industry presentations, membership on scientific and statistical committees and stock assessment panels of GMFMC.	William Lindberg (UF) Doran Mason (NOAA) Debra Murie (UF)	Predictions that will influence fishery management options and regulations. Quantification of how essential fish habitat affects fish stocks. Adoption of approach to manage other reef fish.	2004

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop methods to identify species from shark carcasses and fins that will facilitate species-specific management (R/LR-B-54)	UNFAO. NMFS. Highly Migratory Species Division. Packard Foundation. Wildlife Conservation Society. Regional Fishery Management Councils. NMFS regional laboratories. NOAA office of law enforcement.	Scientific journal articles. Training workshops. Scientific conference presentations.	Mahmood Shivji (NSU)	Use of technique to manage pelagic sharks on species specific basis. Use by NOAA law enforcement to identify confiscated shark carcasses and fins by species.	2004
Continue method development for shark identification and test if blue shark fins from the market can be assigned to population of origin. Follow-on to R/LR-B-54 (R/LR-B-56)	UNFAO. NMFS. Highly Migratory Species Division. Packard Foundation. Wildlife Conservation Society. Regional Fishery Management Councils. NMFS regional laboratories. NOAA office of law enforcement.	Scientific journal articles. Training workshops. Scientific conference presentations.	Mahmood Shivji (NSU)	Use of technique to manage pelagic sharks on species specific basis. Use by NOAA law enforcement to identify confiscated shark carcasses and fins by species.	2006
Provide essential fish habitat information necessary to manage the lemon shark and baseline data for a planned marine protected area (R/C-E-47)	UNFAO. Wildlife Conservation Society. International Union for Conservation of Nature. NOAA. NMFS. Bahamas Reef Environment Educational Foundation. Caribbean Marine Research --- Shark Trust. Center for Marine Conservation. Bahamas National Trust. Bahamas Department of Fisheries.	Scientific journal articles. Scientific conference presentations. Direct interaction with NMFS scientists and fishery managers.	Samuel Gruber (UM) John Hoenig (VIMS) Mary Ashley (UI at Chicago)	Establishment of a no-take marine protected area at Bimini, Bahamas. Incorporation of data with NMFS Highly Migratory Species Management Plan. Designation of shark nurseries at Marquesas Key, FL, and Bimini, Bahamas as habitat areas of critical concern. Evaluation of success of designated areas for intended purposes.	2005

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Test the application of underwater video units to measure the behavior and ecology of nurse, bull and hammerhead sharks (R/MI-12)	Scientists. General public. Visitors to aquaria.	Scientific journal articles. Scientific conference presentations. Public lectures. Popular articles. Natural history documentaries. Educational displays at Mote Marine Laboratory.	Jeffrey Carrier (Albion College) Michael Heithaus (FIU) Greg Marshall (Natl. Geographic Television)	Adoption of technique to study and manage shark populations. Increased knowledge by general public on the behavior, ecology and management of sharks.	2005
Determine causes and resolve uncertainties of inter-annual changes in stock levels of the Florida spiny lobster (R/LR-B-57)	Fisheries scientists. GMFMC. SAFMC. FFWCC. SFA. MCCA. UNFAO. NOAA/AOML.	Scientific journal articles. Scientific conference presentations. Industry workshops. Membership on scientific and statistical committees of GMFMC.	Nelson Ehrhardt (UM) Donald Olson (UM)	Ability to predict inter-annual stock level variation and adjust management and industry effort accordingly.	2006
Develop and teach new and innovative ways to manage fisheries and evaluate the effectiveness of management decisions on resources and user groups: (a) sponge impact and recovery; (b) direct input to federal fishery management decisions; (c) decrease undersize fish mortality through venting; (d) properly design and evaluate artificial reefs; (e) demonstrate fish stock enhancement techniques; (f) Gulf of Mexico shrimp fishery (FL 317a Design Team)	Sponge fishermen. GMFMC. FFWCC. SAFMC. Recreational fishermen. County artificial reef coordinators. Commercial fishermen. Shrimp fishermen.	Membership on GMFMC and SAFMC scientific and statistical committees and stock assessment panels. County-based workshops. Print and electronic media. Statewide conferences and workshops. Participate in Gulf of Mexico shrimp summit.	Chuck Adams (UF/FSG) John Stevely (Manatee Co./FSG) Don Sweat (Pinellas Co./FSG) Doug Gregory (Monroe Co./FSG) Chris Combs (Brevard Co./FSG) Marella Crane (Miami-Dade Co./FSG) Scott Jackson (Okaloosa Co./FSG) Rich Novak (Charlotte Co./FSG) Bob Wasno (Lee Co./FSG) William Seaman (UF/FSG) To be hired (Bay Co./FSG) To be hired (Collier Co./FSG) Myron Floyd (UF) Steve Holland (UF)	Determine if sponge stocks are increasing through surveys. Determine if science-based decisions come from fishery regulators. Determine if reef fish stock sizes are recovering. Determine if artificial reefs increase productivity of stocks and use to be evaluated. Measure survival rates of stocked fish.	Ongoing through 2006

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Increase the interaction among fisheries managers and scientists in Florida and countries sharing common fisheries problems (SGEP-13)	Fishery management agencies and scientists of Latin American and Caribbean countries. Members of the GCFI.	Seminars on topics relating to economics of fishery management, release mortality of reef fish and sponge biomass. Organize annual proceedings of Gulf and Caribbean Fisheries Institute.	Chuck Adams (UF/FSG) LeRoy Creswell (Martin Co./FSG) Don Sweat (Pinellas Co./FSG) John Stevely (Manatee Co./FSG)	Changes in management regulations among countries that consider economic and biological issues of all countries for linked stocks.	Ongoing through 2006
Determine migratory patterns of bluefin tuna (SGEP-13)	NMFS. ICCAT.	Participate as member of tagging team from Stanford, Duke, Monterey Bay Aquarium and NMFS.	Rich Novak (Charlotte Co./FSG)	Description of migratory patterns of bluefin tuna that change management regulations and appropriate stock conservation.	Ongoing through 2006
Continue a comprehensive marine resource economics program on the value on utilization of fisheries resources (SGEP-13)	GMFMC. SAFMC. FFWCC. Commercial and recreational fishermen in southeast U.S. Fisheries economists in professional societies. Universities and agencies.	Applied research. Presentations at scientific conferences. Scientific journal articles. Workshops. SG Technical papers and reports.	Chuck Adams (UF/FSG)	Management options that include economics adopted. Surveys at workshops to measure knowledge changes.	Ongoing through 2006
Participate in both the Gulf of Mexico and South Atlantic Regional Fish Extension projects (E/FE-FSG; E/FE-GM; E/FE-SA) Implement new Bay and Collier County and recreational fisheries Extension program.	GMFMC. SAFMC. FFWCC. Recreational and commercial fishermen.	Publications and articles on various fishery issues. Workshops including Gulf of Mexico shrimp summit, marine protected areas and essential fish habitat.	Mike Spranger (UF/FSG) Chuck Adams (UF/FSG) Chuck Jacoby (UF/FSG) All FSG Extension county faculty Myron Floyd (UF) Steve Holland (UF)	Increased knowledge about the status of Florida fisheries and management options.	Ongoing through 2006

### ***GOAL 3.0 AQUACULTURE: DEVELOP THE FOOD AND HOBBY SEGMENTS OF THE MARINE AQUACULTURE INDUSTRY***

The commercial aquaculture industry in Florida continues to grow in economic importance and diversity. The farm-gate value of commercial aquaculture in Florida is about \$100 million, while the number of species currently being cultured exceeds that found in any other state in the nation. Although most of the industry's value is associated with an incredible assortment of freshwater ornamental fish, a growing marine aquaculture sector is becoming more visible and attractive to potential investors.

The culture of molluscan shellfish, such as hard clams, now dominates the marine component of this new industry. However, increased attention is being directed to the culture of a host of other marine species, such as marine ornamentals, marine shrimp, and several marine finfish species. The commercial attractiveness of these candidate species is being driven by expanding domestic and global markets and improved culture technologies, each of which strengthens the economic viability of the culture process.

The culture of marine species for food purposes is only one of the factors motivating the expansion of this industry. The culture of larvae and fingerlings provides the necessary input for commercial grow-out and stock enhancement purposes. In addition, increased attention is being given to the culture of marine species for the aquarium trade, which represents the second largest component of the nation's pet industry. The fact that these culture activities are occurring in both confined systems and submerged leases in near-shore coastal waters further illustrates the diversity which characterizes this industry. Florida Sea Grant is uniquely situated to provide the applied research and technology transfer needed to support the continued growth in commercial aquaculture. Further research and educational efforts directed toward culture technologies and economic viability will help ensure continued growth in this exciting industry.

The plan for aquaculture represents a mix of research activities that are ending in 2004 and three new projects beginning in 2004. Initially, 20 aquaculture projects were submitted as SIs. Eight full proposals resulted from the 20 and three funded projects were selected from among the eight. SIs that were not funded focused on the following areas: ecolabeled marine ornamentals, sea urchin, marine shrimp, juvenile red drum, sublethal stress, clams, conch, biosecurity, toxic algae, clam larvae, flounder hybrids, angelfish, hatchery drum, recirculating systems, inland culture, caviar production, pond shrimp and food fish market potential. Work in this area also represents an organized extension program in aquaculture, focused principally on the further development of the clam culture industry. Florida Sea Grant has chosen to focus priority on three areas in its call for work in aquaculture: marine ornamentals, enhance bivalve molluscan shellfish production and reducing bottlenecks in key species. It is clear the implemented work fits these areas.

Goal 3: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To increase the volume and value of cultured marine species products in Florida. To increase the number and value of marine ornamental species products in Florida. To achieve an environmentally and economically sustainable collection rate of marine ornamentals from the wild stocks.	Scientists. Food species culturists. Marine Ornamental species culturists. Local, state and federal regulatory agencies.	Scientific journals. Workshops, conferences, personal visits. Reports and training materials.	Research faculty. State Extension faculty. County Extension faculty. Communications staff.	Increase in the volume and value of food species cultured. Increase in the volume and value of marine ornamental species cultured. Sustained landings in wild harvest at regulated levels.	Successful culture of food target species achieved. Successful culture of marine ornamental target species achieved. Economically viable culture and trade target species. Then, move to next group of potential species. Permitted and sustained harvest of wild marine ornamental species.

Specific Activities 2004-2005					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Increase the availability of live feeds that are suitable for cultivating the early life history stages of marine ornamental fish and invertebrates (R/LR-A-36)	Scientists. Growers of marine ornamental fish and invertebrates.	Scientific journal articles. Scientific conference presentations. Industry workshops. Manual to describe methods.	Nancy Marcus (FSU)	Success in providing samples to industry and academic researchers for testing. 1-3 copepod species suitable as alternative feeds.	2004
Develop protocols to cultivate marine ornamental shrimp species <i>Lysmata grabhami</i> (E/INDST-2)	Scientists. Growers of marine ornamental species. FAA. WAS. MO'04.	Scientific journal articles. Scientific conference presentations. Workshops and industry tours.	Junda Lin (FIT) Andrew Rhyne (FIT) Bruce Calman (Maritech, Inc.)	Commercial cultivation of <i>L. grabhami</i> by at least one company.	2004



Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
To determine the effect of ascorbic acid deficiency on the development of lesions consistent with diagnosis of head and lateral line erosion syndrome (HLLES) in tangs and surgeonfish (E/INDST-3)	Scientists. Growers of marine ornamental fish. Aquaria. Veterinarians.	Scientific journal articles. Scientific conference presentations.	Ruth Francis-Floyd (UF) Christopher Tilghman (UF) Andrew Stamper (Disney Epcot Living Seas) Ilze Berzins (Florida Aquarium) Charles Cichra (UF)	Elimination of HLLES and lesions in captive tangs and surgeonfish.	2004
Improve hard clam culture by determining if triploid clams exhibit superior survival during summer stress periods (R/LR-A-39)	Scientists. Clam growers.	Scientific journal articles. Scientific conference presentations. Industry workshops. Technical reports and Extension publications.	John Scarpa (HBOI) Leslie Sturmer (UF/FSG) Roy Kibbe (Kibbe & Company) Dan Leonard (Bull Bay Clam Farm) Cedar Key Aquaculture Assn. Shirley Baker (UF) Chuck Adams (UF/FSG)	Use of triploid clams in clam production. Increase in survival rates of clams due to summer environmental stress.	2006
Determine key feeding factors and guidelines that will reduce the cost of hatchery production of marine ornamental larval fish (R/LR-A-41PD)	Scientists. Marine ornamental fish hatcheries. Students.	Scientific journal articles. Scientific conference presentations. Industry updates through list-serve. Trade magazine articles. Industry workshops. Technical manual.	Ralph Turingan (FIT) LeRoy Creswell (Martin Co./FSG) Kevin Gaines (Ocean Reefs and Aquariums)	Adoption of feeding protocols by hatcheries. Reduction in cost and increase in survival of hatchery larval fish.	2006
Adopt a quantitative microbial management technology to enhance the fingerling production of cobia (R/LR-A-40)	Scientists. Marine fish growout facilities.	Scientific journal articles. Application in industry setting. Extension demonstrations and publications.	Dan Benetti (UM) Refik Orhun (UM) Philippe Douillet (EcoMicrobials, LLC) Jorge Alarcon (Aquaculture Center of Florida Keys) Owen Stevens (Aquaculture Center of Florida Keys) Carlos Martinez (UF)	Reduction in use of antibiotics to treat diseases in hatcheries. Use of pro-biotic bacteria in hatcheries. Reduction in hatchery costs.	2006

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Improve larviculture protocols for emerald crab and Caribbean reef lobster (PD-03-09)	Scientists. Marine ornamental species growers.	Scientific journal articles. Presentations at scientific and association conferences.	Junda Lin (FIT)	Commercial culture of the emerald crab and Caribbean reef lobster.	2004
Develop and teach information that will remove bottlenecks to the development of the Florida marine culture industry: (a) maintain a clam culture extension network; (b) maintain and evaluate CLAMMRS project; (c) conduct annual hard clam growers conference; (d) quarterly shellfish aquaculture newsletter; (e) improve culture practices of individual clam growers; (f) update economic data on clam culture; (g) community economic impact assessment of bay scallop stocking; (h) red drum stocking (FL317b Design Team) (SGEP-13)	Shellfish growers. Shellfish regulators. FAA. FDACS. FFWCC.	County and statewide workshops and conferences. Newsletters. Individual consultations. Print and electronic media.	Chuck Adams (UF/FSG) Leslie Sturmer (Levy Co./FSG) Chris Combs (Brevard Co./FSG) LeRoy Creswell (Martin Co./FSG) Bill Mahan (Franklin Co./FSG) Rich Novak (Charlotte Co./FSG) Bob Wasno (Lee Co./FSG) Don Sweat (Pinellas Co./FSG)	Increase in profitable culture of hard clams and oysters. Demonstrated value of scallop stocking.	Ongoing through 2006

#### ***GOAL 4.0 IMPROVE THE SAFETY AND QUALITY OF SEAFOOD PRODUCTS***

The U.S. seafood and aquaculture industry faces many challenges as it enters the 21<sup>st</sup> century -- global competition, complex trade policies, strict regulations and a limited seafood supply. Florida's seafood industry, consumer demands, demography and related environmental concerns exemplify these challenges, particularly in temperate and tropical regions. Florida's 400-plus licensed processing and wholesaling plants -- more than any other state -- account for over \$500 million in annual processed value, and include some of the world's largest shrimp and fish processors, as well as specialized processors of oysters, blue crabs, and calico scallops.

When you combine this industry with the emerging products of aquaculture and the value generated from recreational fisheries, Florida possesses some of the most valuable aquatic resources in the nation. Unfortunately, the state's waters and productive climates also promote the most prominent concerns for recurring aquatic food product safety and quality, including illnesses due to raw molluscan shellfish consumption, certain natural toxins and various cross-contaminants.

Florida Sea Grant's response is to invest resources to provide high-quality research and outreach programs that benefit the state's seafood industry and consumers. Sea Grant has been the driving force behind construction of the state-of-the-art Aquatic Food Products Laboratory at the University of Florida. Researchers at the facility have contributed to numerous advances in the development of anti-microbial treatments for shrimp, as well as rapid and sensitive methods to detect contaminated seafood.

Florida Sea Grant also provides national leadership to ensure a safe seafood supply in the U.S. Through its participation in the Seafood HACCP Alliance, a nationwide network of processors, university researchers, and governmental agencies, Sea Grant provides essential training that helps seafood processors and importers meet federal food-safety regulations. Since 1995, the seafood HACCP alliance has trained almost 90 percent of the nation's processors in compliance techniques.

Mandated regulatory approaches give some direction, but education and research offer the necessary understanding and solutions for change. Through its academic centers of technical expertise and training, Florida Sea Grant will continue to partner with business, consumers, and regulatory agencies to offer innovative and cost-effective responses to issues of seafood safety, and help the U.S. seafood industry prosper.

The plan for seafood safety and quality includes a mix of basic and applied research and an internationally recognized extension and training program. Five projects are completing in 2004-05. These include four projects that were funded through the national Gulf oyster industry competitions. One new project builds on earlier work designed to reduce illnesses and death from high-risk consumers that consume oysters contaminated with *Vibrio vulnificus*. Four SIs were submitted in the area of seafood safety; two were invited as full proposals and one was funded. The three not funded sought funding in packaging techniques, microbial decomposition and shellfish depuration.

Goal 4: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To maintain the value and strength of seafood commerce in Florida, be it cultured, harvested, or imported.	Harvesters. Processors. Wholesalers. Retailers. Importers/exporters. Regulators. Scientists. Students Secondarily, consumers, media.	Science journals. Educational courses. Training schools. Websites. Seminars. Association meetings. Personal visits. Training materials to support all of these. Some in Spanish.	Research faculty. State faculty. County Extension faculty. Communication staff.	Value and volume of seafood commerce. Decreases in the number of seafood-borne illnesses. Fewer number of product recalls. Application of new technologies. Industry compliance.	Industry compliance. Periodic evaluations. Private sector taking over. Reduction of seafood-borne illnesses. Regulatory action reduced.

Specific Activities 2004-2005					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop “smart labels” for time-temperature integration and film permeability in seafood packaging (R/LR-Q-22)	Seafood processing companies. Regulatory agencies. FDA. NFI. SFA.	Scientific journal articles. Scientific conference presentations. Disseminate results through conferences and industry workshops. Extension publications.	Murat Balaban (UF) Steve Otwell (UF/FSG) Bruce Welt (UF) Hordur Kristinsson (UF) National Fisheries Institute Winn-Dixie Rock-Tenn Company Save-on-Seafood MC Fresh, Inc. Cox Technologies Praxair	Increase in the safe use of vacuum and modified atmosphere packaging by seafood companies. Strengthen regulatory restrictions to insure safety.	2004

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Increase oyster product sales through new post-harvest treatment technology and linked education and promotion strategies (R/LR-Q-23)	At-risk consumers. At-risk consumer foundations and associations. Pharmacies. Alcohol treatment centers. Media relations offices. Wholesalers, retailers and consumers.	Develop, implement and evaluate a <i>V. vulnificus</i> education program. Post-harvest treatment demonstration projects.	Judy Jamison (GSAFDF) Ewell Smith (Louisiana Seafood Promotion and Marketing/Gulf Oyster Task force) JoAnne McNeely (FDACS, Bureau of Seafood and Aquaculture Marketing) Ruth Posadas (MDMR/BST) Mike Voisan (Motivatit Seafood) Chris Nelson (BonSecur Fisheries)	Reduction in deaths and illnesses from consuming oysters. Scientifically proven safer oyster products due to post-harvest treatment. Increases in oyster consumption.	2004
Develop effective methods to reduce <i>V. vulnificus</i> contamination of harvested oysters (R/LR-Q-24)	Scientists. Oyster processors (long-term). Regulatory agencies (long-term).	Scientific journal articles. Scientific conference presentations.	Donna Duckworth (UF) Paul Gulig (UF) Gary Rodrick (UF) Anita Wright (UF)	Ultimate process that will eliminate <i>V. vulnificus</i> in harvested oysters.	2004
Evaluate and improve molecular detection and typing methods for <i>V. vulnificus</i> in order to standardize evaluation of oysters and seafood samples (R/LR-Q-26)	Scientists. Analytical testing laboratories. Regulatory agencies. FDACS (Aquaculture Lab). FDA.	Scientific journal articles. Scientific conference presentations. Field testing of techniques.	Anita Wright (UF) David Heil (FDACS)	Establishment of reliable enumeration methods that allow evaluation of post-harvest treatments.	2005
Define genetic elements that regulate phase variation from virulent to avirulent forms of <i>V. vulnificus</i> (R/LR-Q-27)	Scientists. Analytical testing laboratories. Regulatory agencies. FDACS. FDA.	Scientific journal articles. Scientific conference presentations.	Anita Wright (UF) William Brown (ABC Laboratories)	Development of more cost effective molecular detection and enumeration of <i>V. vulnificus</i> . Development of effective post-harvest treatment.	2006

Specific Activities 2004-2005 (continued)					
Action	Audience	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Increase knowledge of medical professionals regarding appropriate information provided to high-risk <i>V. vulnificus</i> oyster consumers (E/TP-3)	Florida Medical Association (30 chapters). ISSC. Florida Dietetic Assn. Florida Nurses Assn.	Training sessions at annual association meetings. Training sessions at 30 Chapters of FMA. Train-the-trainer workshops.	David Heil (FDACS) Charles Bickley (Consultant)	Reduction in the number of deaths and illnesses among high-risk consumers of oysters.	2005
Teach practices and techniques that incorporate the latest scientific findings and achieve the goal of safe and high quality seafood from processors and retailers: (a) domestic shrimp school; (b) international shrimp school; (c) clam processing school; (d) HACCP and SCP training; (e) coordinate national HACCP alliance SCP training; (f) Franklin County Oyster Industry Workshop; (g) County sanitation workshops; (h) serve on Florida <i>Vibrio vulnificus</i> Risk Management Group (FL312 Design Team; SGEP-13)	Scientists. Owners/operators of seafood processing and wholesaling companies. Individuals in regulatory agencies. FDA. FDACS. Firms importing seafood into US.	Conferences. Workshops. Train-the-trainer workshops. Training manuals. Interaction with regulatory agencies.	Steve Otwell (UF/FSG) Bill Mahan (Franklin Co./FSG)	Reductions in the number of seafood related illnesses. Adoption of new practices by companies and regulatory agencies. Reduction in the number of plant closures and regulatory actions due to safety and quality.	Ongoing through 2006

## ***GOAL 5.0 INCREASE THE COMPETITIVENESS AND SUSTAINABILITY OF COASTAL WATER-DEPENDENT BUSINESSES***

Florida's economic well-being is inextricably linked to its coastal and marine resources. Coastal communities face a difficult, yet critical management challenge: how to sustain economic viability while maintaining and restoring the environmental integrity of coastal resources.

This task is complicated by rapid population growth, a concurrent increase in recreational boating and other water-related activity, declining natural environments, and coastal and marine resources that are, in many cases, overburdened. The diverse and often competing uses of coastal resources have increased the number and intensity of user conflicts. For instance, the decline in public waterway access to recreational boaters, major contributors to Florida's economy, is a particularly contentious issue.

A compelling need exists to foster community development and resource management strategies that are compatible, sustainable and equitable. If coastal communities are to achieve sustainability, all stakeholders, including users, policy makers, regulators and resource managers need new methods and information sources with which to address pressing economic and environmental issues.

Florida Sea Grant, with its partners, aims to achieve an acceptable balance among environmental sustainability, recreational small-craft use, and growth in coastal communities through science-based research and extension. An operating principle is that self-regulation is an effective management framework to reduce regulatory costs, keep boating and its support industries economically productive, and reduce environmental impacts from boating.

Products and services have evolved within this science-based management framework to address boating-environmental issues that benefit regulators, agencies, industries and citizens. They include: economic and environmental assessments of the boating sector; Geographical Information System (GIS) procedures for ecological planning; prioritization systems for evaluating storm damage to vessels; boat traffic monitoring schemes; regional recreational boating characterizations; boat channel maintenance and spoil management planning; marine land and water use site planning; methods of shallow-water bathymetric surveying for charting recreating boating waterways and prioritizing waterway management; and the development of strategic plans for inland navigation districts.

The plan for water dependent businesses includes three projects related to the Sea Grant coastal communities funding and one new project designed to ultimately protect manatees from interaction with boaters. Two other SIs considered but not funded requested work on working waterfronts and a boat traffic tracking system. Research in this area is complemented by the nationally recognized extension program in waterways and boating management.

Goal 5: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To reduce regulatory costs associated with waterway management and maintenance. To reduce the environmental effects on habitat from boating. To reduce the number of boating-related regulations by teaching boaters to self-regulate their boating activities. To cause boating regulations and behavior to be based on scientific principles.	Scientists. Resource managers. Navigation districts. Local, regional and state regulatory authorities. Boaters. Marinas and other boating support businesses.	Science journals. Training programs and materials. Workshops and conferences. Websites. Sea Grant Reports and Technical Papers.	Research faculty. State and County Extension faculty. Communications staff.	Decreases in waterway management/maintenance costs. Adoption of scientific principles for waterway and boating management by resource management and regulatory agencies. Reduction in the number of boating incidences that are harmful to habitat.	When the effects of boating on habitat is no longer a major regulatory issue. When statewide adoption of scientific principles occurs. When the number of boating regulations implemented is reduced to a level acceptable to industry and regulators.

Specific Activities 2004-2005					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Determine and assign priorities, develop program objectives, create partnerships and evaluate program accomplishments in coastal communities and waterways program (R/C-P-24)	NOAA (Marine Chart Division and NOS). FDCA/CZM. FDEP. FFWCC. SFRPC. WCIND. JID. Counties (Manatee, Sarasota, Charlotte, Lee, Collier); towns (Anna Maria, Bradenton Beach, Palmetto, Holmes Beach, Longboat Key). BAIL. SWFMTA.	Attend monthly partner meetings. Symposium. Build partnerships. Field surveys of anchorages. In-service training courses. Boaters guide.	Bob Swett (UF/FSG) Mike Spranger (UF/FSG) WCIND	Reduction in number of boating/waterway conflicts. Adoption of model ordinances. Use of techniques developed by districts, counties, towns. Improvements in regulation.	2004



Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Increase the ability of Florida coastal communities to plan and implement economically and environmentally sustainable growth strategies (R/C-P-28CC) (SGEP-13-EP)	NOAA (Marine Chart Division and NOS). FDCA/CZM. FDEP. FWCC. SFRPC. WCIND. JID. Counties (Manatee, Sarasota, Charlotte, Lee, Collier); towns (Anna Maria, Bradenton Beach, Palmetto, Holmes Beach, Longboat Key). BAIL. SWFMTA. Extension faculty. EPA.	Provide science-based information, planning models, tools and methods. Employ geographic information technologies. Develop training opportunities.	Charles Sidman (UF/FSG) Mike Spranger (UF/FSG) WCIND	Fewer conflicts in boating and waterways.	2006
Reduce negative impacts and costs on waterways in Florida by improving the legal framework for public access to waterways and waterfronts by determining: (a) scope of federal maintenance responsibility; (b) legal basis of using vessel registration for data collection; (c) rights of navigation; (d) issues surrounding coastal property purchase; (e) identifying regulatory and non-regulatory options for working waterfronts; (f) holding conference on waterways and waterfronts (R/C-P-27CC)	City, County and State governments. Florida Bar Association. Sea Grant Extension faculty. FDCA.	Legal research. Training manuals. Technical publications. Waterfront policy toolkit. Statewide conference.	Thomas Ankersen (UF) Richard Hamann (UF) Timothy McLendon (UF) WCIND	Fewer conflicts in boating and waterways.	2006

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop an efficient, cost-effective method to signal boaters that manatees are present (R/MI-13-PD)	Individual boaters. FFWCC. FWS. MIAF. Scientists. Technology companies.	Scientific journal articles. Scientific conference presentations. Website for presentation of results.	Christopher Niezrecki (UF) Diedrich Beusse (UF)	Reduction in the number of manatee struck by boats with injury or mortality.	2006
Develop and teach new ways to keep water dependent businesses sustainable: (a) inform Southwest Florida Harbor Board; (b) provide GIS training; (c) update anchorage web page; (d) boating simulation model; (e) create Clean Marinas (FL315 Design Team)	SWFHB. Extension faculty. Boaters. WCIND. Marinas. FDOT. FFWCC. FMRI. Local and County governments.	In-service training. Website. Reports and publications. Displays at boat shows. Marina surveys. Historical geography atlas. Workshops. Conferences.	Bob Swett (UF/FSG) David Fann (UF/FSG) Charles Sidman (UF/FSG) Gustavo Antonini (UF/FSG) Don Jackson (UF/FSG)	Increase in number of clean marinas. Less conflict in anchorages. Less environmental impact by boaters. More self-regulation by boaters.	Ongoing through 2006.



Photo courtesy South Florida Water Management District

**GOAL 6: PROTECT AND ENHANCE COASTAL WATER QUALITY AND SAFETY**

Florida’s coastal waters support valuable coastal systems. If coastal water quality deteriorates, 80% to 90% of commercial and recreational fisheries, the annual income from up to one million boaters and divers, and the quality of life we all enjoy will be lost. Floridians recognize the importance of water quality, and they ranked it as their second most important issue in a recent survey of environmental concerns.

All of Florida sits within the coastal zone, which means activities anywhere in the state have the potential to affect our coastal water quality. We have significantly improved our management of sewage outfalls, industrial outfalls and other point sources of nutrients and pollutants, but diffuse sources associated with stormwater or the atmosphere remain a prime concern. For example, development, landscaping, agriculture and home maintenance put pressure on coastal water quality by adding nutrients and pollutants to our watersheds. Managing these diffuse inputs requires all of us to share and base our decisions on a strong scientific understanding of Florida’s watersheds and their responses to our actions.

Fostering improved stewardship of our coastal water quality remains a key goal of the Florida Sea Grant College Program. Our website highlights some of the efforts sponsored by Florida Sea Grant. Examples include basic research to identify sources, transport and fate of materials entering our coastal waters; applied research to determine best management practices; and communication of science and science-based management to lay audiences.

Work for the next two years includes one completing project, a nationally funded project scheduled for completion, one new project resulting from the Florida Sea Grant statewide competition and an organized extension program. Nine other SIs in water quality were considered during the statewide competition. They included proposed work on coral bleaching, pollutants, nutrients, natural tracers, metal contamination, pollution indicators and work specific to Apalachicola Bay, the Indian River Lagoon and Charlotte Harbor. Florida Sea Grant will not fund proposals in the area of water quality unless it is at the site of existing research by some government entity, it is proposed in partnership with that entity, or it complements an ongoing Sea Grant Extension educational activity. Otherwise, the number of proposals that would be received in this area would be tripled.

Goal 6: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To reduce the sources, impacts and costs of non-point source contamination on Florida coastal waters. To increase the involvement of citizens in improving the quality of Florida coastal waters.	Scientists. Coastal homeowners. Local management agencies. Coastal businesses. Extension faculty.	Scientific journal articles. Publications. Website. Workshops.	Phase 1: researchers Phase 2: Extension faculty Communications staff.	Increase municipality use of methodology. Measureable increases in water quality/citizen participation.	When the state takes on a coastal water quality monitoring program. When education, legislation and enforcement abate pollution.

Specific Activities 2004-2005					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Determine the potential for septic tank sewage contamination on Sarasota Bay (urban) and Apalachicola Bay (rural) (R/C-E-44)	Scientists. FGS. Sarasota Bay NEP. FDEH/BOSP. County and City Environmental Departments. FFWCC. FDEP. FCZM.	Scientific journal articles. Scientific conference presentations. Sea Grant brochures. Workshop.	Jeff Chanton (FSU) William Burnett (FSU) Florida Sea Grant Extension faculty.	Reduction in number of septic tanks in coastal counties. Reduction in number of closed water areas to human use.	2004
Evaluate the effectiveness of remote sensing techniques to monitor and measure red tide outbreaks (R/LR-Q-25)	Scientists. FDACS. County and City Environmental Departments. FFWCC/FMRI. FDEP. FCZM. Shellfish culture growers. ISSC. ICSR.	Scientific journal articles. Scientific conference presentations.	Sherman Wilhelm (FDACS) Gary Kirkpatrick (MML)	Incorporation into the National Shellfish Sanitation Model Ordinance. Use by agencies.	2005
Estimate the quantity of different rainwater sources (rain, canal, groundwater) into Biscayne Bay (R/C-E-51)	Scientists. BBRRCT. Miami-Dade Department of Planning and Zoning. Miami-Dade Department of Environmental Restoration. SFWMB. FDEP. USACE. NPS.	Scientific journals. Scientific conference presentations. Presentations to BBRRCT. Presentations to Florida Bay and surrounding ecosystem meetings. Website.	Rene Price (FIU) Peter Swart (UM)	Development of new scientific technique. Changes by regulatory agencies regarding quantities of freshwater flows into Biscayne Bay.	2006

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Deliver educational programs that maintain and increase the quality of water in Florida's estuaries and ecosystems: (a) advise Sarasota Bay National Estuary Program; (b) participate in coastal beach and underwater clean-up activities; (c) make presentations on water quality at local and regional workshops and events (Design Team FL316: SGEP-13)	Extension faculty. Citizens. Estuary program managers. Regulatory agencies.	Brochures. Reports and publications. Workshops. Displays.	John Stevely (Manatee Co./FSG) Dianne Behringer (Palm Beach Co./FSG) Chris Combs (Brevard Co./FSG) Marella Crane (Miami-Dade Co./FSG) Andrew Diller (Escambia Co./FSG) Maia McGuire (Nassau/Duval/St. Johns/Flagler Co./FSG) Chris Verlinde (Santa Rosa Co./FSG) Bob Wasno (Lee Co./FSG) Scott Jackson (Okaloosa/Walton Co./FSG)	Decline in the amounts of coastal debris. Declines in the number of water bodies with minimally acceptable water quality.	Ongoing through 2006
Develop and deliver outreach program for a part of the Conservation Everglades Research Program (SFWMD-CERP-1)	General public. Teachers. Extension faculty. Business leaders. Tourists.	Needs assessment. Television segments. Newspaper articles. Radio advertisements. Website. Tabletop displays. Teacher workshops. Extension agent training. Field days. Workshops for business leaders.	Mike Spranger (UF/FSG) Chuck Jacoby (UF/FSG) Alex Score (Miami-Dade/Monroe Co./FSG)	Increased knowledge about the water quality issues related to Everglades restoration.	2005

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Maximize NOAA and FSG research and Extension resources in South Florida related to the South Florida marine ecosystem (E/T-9)	NOAA/AOML. NOAA/NMFS/SEFC. FKNMS. Florida citizens. Federal, state and university researchers.	Identify audience and needs. Match needs with NOAA products. Relay needs to researchers. Provide science-based information. Overall program development.	Mike Spranger (UF/FSG) Alex Score (Miami-Dade/Monroe Co./FSG) NOAA/AOML FKNMS NOAA/NMFS/SEFC	Policy decisions, regulatory changes and increases in compliance related to the restoration of the South Florida marine ecosystem.	2004



Photo courtesy South Florida Water Management District

**GOAL 7.0 PROTECT, RESTORE AND ENHANCE COASTAL HABITATS**

Coastal habitats represent ancient and productive natural areas that provide us with significant value. Along Florida’s 1,350 mile general of coastline and 8,426 mile tidal coastline, habitats range from temperate saltmarshes and seagrasses in the north to subtropical mangroves and coral reefs in the south. These habitats shield Florida’s coastline from damage by storms, provide food and shelter for 80% to 90% of all commercial and recreational fish and shellfish, draw over one million boaters and divers each year, and attract over 75% of Floridians to the state’s 35 coastal counties.

Florida’s residents and tourists value our coastal habitats, and also put pressure on them. Development, pollution, boating and other activities have removed 50% of our saltmarsh, 60% of our seagrass and 85% of our mangroves. We manage dredging, sewage inputs and other obvious pressures on coastal habitats far better now than in the past, but we have only begun to deal with impacts from stormwater and other diffuse sources of pollution. Effective management of our coastal habitats requires all of us to share and base our decisions on a strong scientific understanding of these habitats and their responses to our actions.

Fostering a shared, science-based understanding of coastal habitats represents a key goal of the Florida Sea Grant College Program. Work for the next two years spans the range of scientific endeavor from basic research to coastal ecology through applied efforts and to protect or improve coastal habitats by dissemination of science to lay audiences.

Six organized projects and a focused outreach plan will yield dividends over the next two years. Five of the research projects result from national competitions and will be completed through 2005. The new project resulted from the biennial Florida Sea Grant competition and was one of 13 SIs considered in this area. Those not chosen for funding included work on reef restoration (2), tarpon habitat, calico scallop habitat, snook habitat (2), estuarine fish habitat, non-indigenous species (2), green mussel, reef monitoring and fish foraging.

Goal 7: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To restore habitat essential to the production of fish. To prohibit and/or eliminate aquatic nuisance species from coastal waters. To increase the number of artificial reefs constructed using current scientific knowledge.	Scientists. Coastal homeowners. Local and state management agencies. Local and state artificial reef managers and builders.	Scientific journal articles. Publications. Workshops.	Research faculty. State and county Extension faculty. Communications staff.	Increases in the amount of habitat restored. No entry, or, elimination of aquatic nuisance species. Adaptation of artificial reef guidelines by local and state artificial reef managers.	When habitat levels are deemed adequate by managers and regulators. When aquatic nuisance species are no longer a threat. When reef guidelines become mandatory by rule or law.

Specific Activities 2004-2005					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Determine the impact of boat wakes on intertidal oyster reefs (R/C-E-45)	Scientists. CANA. SJWMD. FDACS/AG.	Scientific journal articles. Scientific conference presentations. Sea Grant Extension faculty. Managers of federal, state and local protected areas.	Linda Walters (UCF) Loren Coen (SCWMP) Raymond Grizzle (UNH)	Termination of decline in oyster reefs. Management regulation is adopted that causes oyster reefs to increase.	2005
Learn how swamp eels are introduced in Florida and develop methods to control introductions (R/C-E-46)	Scientists. USGS/FCSC. ENP. FFWCC. SFWMD. USFWS.	Scientific journal articles. Scientific conference presentations. USGS Fact Sheet. Website. Seminars. Workshops.	Timothy Collins (FIU) Joel Trexler (FIU) Leo Nico (USGS/FCSC) William Loftas (USGS/ENPFS)	Regulating measures adopted to eliminate swamp eel introductions. Reduction in the number of swamp eel introductions. Decline in population of swamp eels.	2004
Increase the knowledge of aquatic nuisance species in Gulf of Mexico (Florida portion) (E/NS-2)	Informal marine science educators. Marine Extension faculty. K-12 teachers. FDOE.	Workshops. Research updates and lesson plans.	Mike Spranger (UF/FSG)	Pre- and post-surveys to determine knowledge gained. Incorporation of aquatic nuisance species into teacher lesson plans.	2004
Reduce the likelihood that <i>Caulerpa taxifolia</i> will become established in Central Florida (R/C-E-49)	Scientists. FFWCC. Aquatic resource managers. Aquarium shops. Florida Aquarium. CANA. MINWR. Sea Grant Extension faculty. Florida conservation organizations. High School science teachers in Central Florida. Tampa Baywatch. Indian River Lagoon.	Scientific journal articles. Scientific conference presentations. Fact sheets. Website. Lesson plans.	Linda Walters (UCF) Jeanine Olsen (UGr.)	Prevention of <i>Caulerpa taxifolia</i> from entering Florida waters.	2005
Quantify gray snapper movements in three coastal habitats that will lead to science-based management plans (R/C-E-48)	Scientists. FMRI. FFWCC. ENP. BNP. FKNMS. Media. Individual fishermen (charter boat crews, fishing clubs/associations.	Scientific journal articles. Scientific conference presentations. Meetings with fishery managers.	Jiangang Luo (UM) Su Sponaule (UM) Joseph Serafy (NMFS/SEFC) Jerome Lorenz (NAS)	Management of gray snapper based on scientific findings.	2005



Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop a methodology that allows the determination of essential fish habitat for multi-species reef fisheries (R/C-E-50)	Scientists. SAFMC. GMFMC. FKNMS. BNP. FFWCC/FMRI. DTNP.	Scientific journal articles. Scientific conference presentations. CD-ROM. Service on fishery council advisory committees.	Jerry Ault (UM) Steven Smith (UM) James Bohnsack (NMFS/SEFC) Peter Rubec (FMRI)	Use of methods to manage reef fish. Reef fish stocks ultimately maintaining desired levels.	2006
Determine the potential that <i>Caulerpa brachypus</i> will establish populations in the Indian River Lagoon (PD-03-11)	Scientists. Managers of regulatory and conservation entities within the Indian River Lagoon.	Scientific journal articles. Presentations at scientific conferences.	Elizabeth Irlandi (UCF)	Implementation of management measures if needed to reduce potential for introduction.	2004
Deliver a focused outreach program that maintains and increases the critical coastal habitat in Florida: (a) achieve clean/marina boatyard designation; (b) educate K-12 teachers; (c) educate Master Gardeners; (d) educate homeowners; (e) educate governments and property owners on coastal dune restoration; (f) educate fisheries scientists (Design Team FL316: SGEP-13)	Marinas and boatyards. K-12 teachers. Master Gardeners. Homeowners. Governments. Fishery scientists.	Workshops. Conference presentations. Newsletters. Fact sheets. Websites.	Dianne Behringer (Palm Beach Co./FSG) Don Jackson (UF/FSG) Chris Combs (Brevard Co./FSG) Marella Crane (Miami-Dade Co./FSG) LeRoy Creswell (Martin Co./FSG) Andrew Diller (Escambia Co./FSG) Scott Jackson (Okaloosa/Walton Co./FSG) Maia McGuire (Nassau/Duval/St. Johns/Flagler Co./FSG) Chris Verlinde (Santa Rosa Co./FSG) Charles Jacoby (UF/FSG) William Seaman (UF/FSG) John Stevely (Manatee Co./FSG)	Increased knowledge by pre and post-evaluation.	Ongoing through 2006

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Present science-based information on aquatic nuisance species to community leaders, resource managers as part of a four-state effort in Florida, Alabama, Mississippi and Delaware (E/T-13)	Community leaders. Resource managers. General public. Outreach professionals. National Invasive Species Council.	Teacher workshops. Extension agent workshops. Communications support.	Mike Spranger (UF/FSG) Chuck Jacoby (UF/FSG)	Increased knowledge about the status and potential impacts of aquatic nuisance species.	2005



## ***GOAL 8.0 PREPARE FOR AND RESPOND TO COASTAL STORMS***

The Florida coastline is at risk from a variety of natural hazards, most notably the winds, waves, and floods generated by tropical storms. Risks to life and property from these recurring hazards will increase with the anticipated growth of coastal populations over the coming decades. What is needed is a dedicated effort to reduce the economic and social costs of natural hazards.

Through research and education, Florida Sea Grant is involved in several efforts to enhance preparedness for coastal storms and reduce their effect. One area of research has focused on loss prevention, design and retrofitting homes and buildings to better withstand storms. Another vein involves the analysis and management of costs associated with hurricane damage to assist community leaders with land-use planning and hazard mitigation. There is also research underway to study sand and sediment movement along coastal shores, which has helped project planners and developers deal with shoreline change from both normal and storm activity. Most recently, Sea Grant researchers are developing a predictive model of rip currents that may help dramatically reduce the number of drownings caused by rip currents each year. In 2003, Florida Sea Grant researchers collaborated with South Carolina Sea Grant and NOAA's Atlantic Oceanographic and Meteorological Laboratories (or NOAA's Hurricane Research Division) on the design and deployment of portable wind towers that recorded ground-level wind speeds and barometric pressure of Hurricane Isabel. It marks the first time detailed coastal tower wind data were transmitted in real time from the field to the National Hurricane Center during a land falling hurricane. The data gave hurricane researchers an unprecedented up-close view of Isabel's fury, providing a more accurate map of the approaching hurricane's wind speeds and forces.

Sea Grant's participation in a nationwide pilot project, the NOAA Coastal Storms Initiative, will help emergency planners and the public in general better prepare for storm surges, flooding, spill tracking, mitigation and evacuation route planning. The project is actually a compilation of nine projects in Northeast Florida that will result in a large suite of new and improved tools, forecast models, and training for the coastal communities in the pilot study area.

Both research efforts and extension programs will continue to develop information and provide data for better prediction of, reaction to, and recovery from storms.

Work in the area of coastal storms and hazards focuses on four completing projects, three new projects resulting from the biennial competition and two highly focused outreach/extension activities dealing with coastal ocean observation systems. Thirteen SIs were considered in this area; five were requested as full proposals, and three were funded. SIs not funded included coastal mapping, storm surges, effect on sea turtles, shear walls in buildings, tidal inlets, tiled roofs, marine paints, sediment, coastal morphology and reinforced concrete.

Goal 8: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To improve the ability of coastal communities to identify risk and potential loss from storms and natural hazards. To increase the cost effectiveness of structure retrofitting and storm mitigation. To reduce the loss of human life, property and environmental resources from coastal storms and hazards.	Builders. Builders associations. Insurance industry. Public agency planners. Homeowners associations. Property management companies. Realtors. Homeowners. State building code inspectors. Banking industry. Community decision makers. Emergency preparedness officials. Environmental consulting firms. Scientists.	Beach signage. Trade journals. Builders shows. Website. Journal articles. Technical reports. Workshops, seminars. Extension agent newsletters.	Extension faculty. Research faculty. Energy Extension faculty. Communications staff.	Completion of risk management workshops by county officials. Decrease in post-storm erosion and damage estimates. Development of insurance incentives to get structures compliant. Decrease in insurance rates. Reduced loss of life, injury after storm. Adoption of retrofitting techniques into the building code. Increased acreage of restored shoreline.	Exit not likely due to continual threat of coastal storms and increased habitation at water's edge. Adoption of mitigation techniques in building code. When sufficient number of structures become compliant.

Specific Activities 2004-2005					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop a protocol that will allow the efficient micropropagation of sea oats for commercial application in coastal dune stabilization and restoration (R/C-S-41)	Scientists. Commercial micropropagation laboratories in Florida. Commercial nursery operators. Florida Yards & Naturalist program.	Scientific journal articles. Scientific conference presentations. Extension publication. Industry workshop.	Michael Kane (UF) Sandra Wilson (UF)	Adoption of technology for use by laboratories in producing sea oats for dune restoration. Increase in the number of dunes planted in sea oats.	2004
Develop rip current threshold criteria that will improve a Sea Grant developed model to predict the occurrence of rip currents (R/C-S-42)	Scientists. National Weather Service. Florida and National Lifeguard Associations. County and city governments.	Scientific journal articles. Scientific conference presentations. Newsletters.	Robert Thieke (UF) Dan Hanes (UF) Robert Dean (UF)	Ultimate adoption by weather service and agencies for prediction. Ultimate reduction in number of beach-going deaths from rip currents.	2004

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Develop a predictive index for strength of rip currents and field test the model. Follow-on to R/C-S-42 (R/C-S-44)	Scientists. National Weather Service. Florida and National Lifeguard Associations. County and city governments.	Scientific journal articles. Scientific conference presentations. Workshops.	Robert Thieke (UF) Dan Hanes (UF) Andrew Kennedy (UF)	Ultimate adoption by weather service and agencies for prediction. Ultimate reduction in number of beach-going deaths from rip currents.	2006
Measure ground-level hurricane wind fields and model resultant interaction with man-made coastal structures (R/C-S-43)	Scientists. FDCA. FDOI. Builders. Coastal homeowners. Insurers. NWS. IHRC. NOAA/AOML	Scientific journal articles. Scientific conference presentations. Meetings with audience. Software package for data set management.	Kurtis Gurley (UF) Jean Paul Pinelli (FIT) Chelakara Subramanian (FIT)	Development of new techniques and equipment that will measure ground level winds. Cost effective methods to retrofit at-risk housing stock and new codes for new stock.	2004
Develop a retrofit risk/cost assessment component for model to evaluate the cost effectiveness of housing mitigation measures. Follow-on to R/C-S-43 (R/C-S-45)	Scientists. FDCA. FDOI. Builders. Coastal homeowners. Insurers. NWS. IHRC.	Scientific journal articles. Scientific conference presentations. Meetings with audience. Software package for data set management.	Kurtis Gurley (UF) Jean Paul Pinelli (FIT) Chelakara Subramanian (FIT)	Development of new techniques and equipment that will measure ground level winds. Cost effective methods to retrofit at-risk housing stock and new codes for new stock.	2006
Determine the effectiveness of growth management policies and land development regulations in mitigating vulnerability of coastal communities to hurricane flood damage and assess adequacy of hurricane evaluation zone (R/C-P-26)	Scientists. FDCA. County and city governments. FEMA.	Scientific journal articles. Scientific conference presentations. Report with recommendation to FDCA. Panel of experts convened for workshop.	Robert Deyle (FSU) Tim Chapin (FSU) Earl Baker (FSU)	Increased ability of local and state governments to meet federal state mitigation plan requirements. Cost effective reduction in community vulnerability to hurricanes.	2006

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Write and publish a book describing the transformation and relationship of Florida beaches over time and document research needs relating to beach management.	Coastal engineers. Coastal property owners. FEMA. FDCA. FDEP. City and county governments. USACE.	Book. Research report. Presentations at scientific and association conferences. Workshop.	Robert Dean (UF)	Increased knowledge regarding the evolving nature of Florida beaches. Research funded on highest priority needs.	2004
Serve as the Florida NOAA Coastal Storms Initiative pilot project coordinator for Northeast Florida.	FEMA. EPA. National Estuary Program. FEP. FFWCC. SJRWMD. FIND. NWS. FDCA. USCG. County Chambers of Commerce. Coastal Business Operators. County Extension faculty. County school districts.	Materials for meetings. Identification of key contacts. Network of educators. Training programs.	Don Jackson (UF/FSG)	Reduction in the negative impacts of coastal storms on watersheds and communities.	2004
Provide Florida outreach component for regional SEA-COOS project (E/T-12)	Coastal businesses. First responders to coastal storms. Teachers.	Hire regional outreach coordinator. Train Florida Sea Grant Extension faculty. Identify key stakeholders. Organize and participate in stakeholder meetings	Mike Spranger (UF/FSG) Don Jackson (UF/FSG) Maia McGuire (Duval/Nassau/St. Johns/ Flagler Co./FSG) Chris Combs (Brevard Co./FSG) LeRoy Creswell (Martin Co./FSG) Diane Behringer (Palm Beach Co./FSG) Bob Wasno (Lee Co./FSG) Rich Novak (Charlotte Co./FSG) Don Sweat (Pinellas Co./FSG)	Needs of stakeholders incorporated into coastal ocean observing system. Increased knowledge about usefulness of data and forecasts from system.	Ongoing through 2006

**GOAL 9.0 PRODUCE A HIGHLY TRAINED WORKFORCE**

The future quality of science related to ocean and coastal economic well-being, environmental quality and national security depends on high-caliber graduate education programs. Nowhere is this more critical than in state and federal agencies that manage the coast and in industries that rely upon coastal resources. Over the past several decades, graduate education support for the ocean sciences has been less than the support for the life sciences. The looming “bubble” of retirees during the first decade of the 21<sup>st</sup> century is compounding the situation, and a critical shortage of scientists, ocean policy experts and industry leaders is predicted. That is why producing trained scientists is a high priority.

For a number of years mission agencies, particularly in the federal sector, have been encouraged to support a significant number of graduate student opportunities in a range of marine fields to ensure well-educated professionals in the coming decades. The NOAA strategic plan for 2003-08 includes a priority to increase the number and diversity of college students each year in ocean, climate, atmospheric and social sciences. Florida Sea Grant has responded to this challenge. Financial support is provided to graduate students for scientific investigation guided by a faculty mentor. The results are answers to scientific questions and solutions to real-world problems. Another result is the completion of a masters or doctoral degree with the student becoming a part of a highly trained work force. These individuals will one day design the creative management concepts to protect the coastal environment and provide economic sustainability to the industries that use coastal resources.

Florida Sea Grant’s support for graduate education includes various scholarship and fellowship opportunities, as well as traditional research assistantships, funded from both public and private sources. Sea Grant’s multidisciplinary approach gives students scientific knowledge with interdisciplinary perspective; they use multiple contexts to solve problems; and they learn to communicate complex ideas. Over time, this support has produced significant results. Former scholars now hold professional roles in education, resource management and business. They have indeed positively influenced sustainable use of marine and coastal resources -- in Florida, nationally and internationally. Their performance affirms Florida Sea Grant’s role in the training of future scientists as part of its total commitment to “Science Serving Florida’s Coast.”

Goal 9: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
Produce a highly trained force of multidisciplinary professionals to work in academics, government and industry	Graduate students. Secondarily, undergraduate students.	Research assistantships. Industry Fellowships. Knauss Fellowships. SG/NMFS Fellowships. Aylesworth and Old Salt Scholarships. Skoch Scholarships. Seminars. Conferences. Workshops.	Sea Grant Management. Research faculty. Communications staff. Management staff.	Percentage of total SG funds supporting assistantships. Success rates in competitions for funds. Amounts of private funds raised for scholarships. Numbers of students completing degrees.	Track which disciplines are being funded. Focus funds in disciplines where graduates are in short supply. Never will exit completely, but more a refocusing from time to time. Track where students are employed.

Specific Activities 2004-2005					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Participate in National Sea Grant competitions for fellowships: (a) Knauss Marine Policy; (b) Industrial Fellowships; (c) SG/NMFS Fellowships; (d) NOAA CSC Fellowships	Graduate students	Advertise and encourage applicants from Florida universities.	Jim Cato (UF/FSG) Campus Coordinators	Achieve at least an average of one fellowship per program per year.	Ongoing through 2006
Support graduate research assistantships as part of each funded research project from core budget.	Graduate students	Require graduate students be included in research proposals.	Jim Cato (UF/FSG) Campus Coordinators	An average of one MS or Ph.D. student graduate per project each year. At least 25% of core research funds used for graduate student support. Track students to determine placement in industry, agencies or organizations.	Ongoing through 2006
Support graduate and undergraduate students through private funding: (a) Aylesworth Scholarships; (b) Old Salt Scholarships; (c) Skoch Scholarship	Graduate students. Undergraduate students.	Advertise and encourage applicants from Florida universities.	Jim Cato (UF/FSG) Campus Coordinators	A minimum of five graduate students and one undergraduate receiving funds each year.	Ongoing through 2006
Sponsor Elise B. Newell Seminar Series	Faculty. Graduate students.	Advertise and encourage seminar applications from Florida universities.	Bill Seaman (UF/FSG) Campus Coordinators	At least four seminars funded annually.	Ongoing through 2006
Encourage broad participation from Florida universities and wide participation from academic disciplines in FSG programs	Faculty. Graduate students. Academic departments.	Advertise funding opportunities widely at FSG's 16 participating institutions. Maintain fair and transparent funding process.	Jim Cato (UF/FSG) Bill Seaman (UF/FSG) Campus Coordinators	At least 15 different academic disciplines and six different universities receive funding during each proposal cycle.	Ongoing through 2006



Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Use program development funds to support travel to conferences and workshops to present FSG funded results and FSG participation	Faculty. Graduate students.	Encourage faculty and graduate student participation at local to international conferences.	Bill Seaman (UF/FSG)	Fund trips where possible if consistent with published guidelines.	Ongoing through 2006
Provide in-service training to Sea Grant Extension faculty: (a) annual SGEF staff meeting; (b) biennial workshops of South Atlantic and Gulf of Mexico SG programs; (c) formal Extension training; (d) attendance at professional meetings	Sea Grant Extension faculty	Attendance at meetings. Participation through posters and papers at professional meetings.	Mike Spranger (UF/FSG) All SGEF faculty	Incorporation of learned skills in county and statewide programs. Attendance by each faculty member at one professional meeting.	Ongoing through 2006

**GOAL 10.0 CREATE SCIENTIFICALLY AND ENVIRONMENTALLY INFORMED CITIZENS**

Florida Sea Grant seeks to increase marine literacy among people of all ages and offers a variety of programs and resources in marine and environmental sciences. Florida is a major marine and coastal state. Its 16 million residents and 50 million visitors have a special interest and attraction to this marine environment.

Florida Sea Grant faculty provide marine education programs to formal educators who teach pre K-12 students and to non-formal educators in aquaria, environmental education centers, and museums. Florida Sea Grant faculty also work closely with 4-H youth faculty and their volunteers in the development and delivery of marine science educational programs.

These programs range from developing “training-the-teacher” programs in such topics as marine invasive species, ocean science, marine ecology, fish management and environmental stewardship to working directly with youth at such events as state and county marine camps, kids’ fishing days, coastal beach clean-ups, dune restoration projects, state marine ecology contests, ocean day poster contests, and field trips to local coastal sites. In most cases, these activities involve both classroom activities and field experiences with hands-on exposure to the marine habitats.

Through these programs, it is Sea Grant’s goal that Florida’s citizens will have a better understanding and better appreciation of our marine and coastal systems. Our young people will not only learn more about our marine resources, but also be stimulated to explore future careers in the marine and coastal sciences so they have the skills and expertise to deal with the future issues that face Florida.

Goal 10: Broad goals, audiences, products, performance, impact and exit strategy					
What are the broad goals?	Who is the audience?	What are the products and activities?	Who will deliver the products and activities?	What are the performance indicators and measures of impact?	What is the exit strategy?
To increase the knowledge of citizens about coastal and marine issues and increase the use of science in decision-making about the use and conservation of coastal and marine resources	Florida citizens. Citizens outside Florida where appropriate. K-12 teachers. Non-formal educators involved in outreach programs.	Website. Publications. Workshops and conferences. Advisory panels. Partnerships with other marine/coastal local, state and federal programs. Citizen-based activities.	Research faculty. State and county Extension faculty. Communications staff. Management staff.	Increases in the amount of knowledge gained from a particular event or activity. Feedback from advisory panels. Determining the amount of science-based information used in designing management regulations or the way that business is conducted. Evaluation by external groups.	Education is a never-ending process. The key is to move to new issue areas when success has been achieved on an area of focus.

Specific Activities 2004-2005					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Conduct Florida portion of Regional Center for Ocean Excellence Education (COSEE) - Gulf of Mexico. (COSEE-GOM)	Strengthen ocean sciences education through interpretation of research results.	General public. Precollege teachers and students. Informal educators. University and community college faculty and students.	Two day informal workshop each year for 20 educators. Fifteen day COSEE Institute for 24 middle school teachers each year. Website.	Mike Spranger (UF/FSG)	Pre- and post-tests of workshop and Institute participants.
Educate the 21 <sup>st</sup> century workforce toward literacy in marine and aquatic sciences: (a) marine science; (b) beaches and sea turtles; (c) Indian River Lagoon; (d) angling ethics; (e) aquaculture; (f) aquatic nuisance species; (f) food safety; (g) fisheries management (Design Team FL214/714:SGEP-13)	4-H youth. Minority youth. High school students. Teachers. Coastal homeowners and renters. Beach tourists and tourist bureaus.	4-H marine science camps. 4-H statewide marine ecology event. Smithsonian Ecosystem Exhibit. "Take a Kid Fishing" program. Kid's Day Fishing Tournament. Teacher training workshops. National Marine Educator Association Conference. Newsletters. Newspaper articles.	Andrew Diller (Escambia Co./FSG) Scott Jackson (Okaloosa Co./FSG) Bill Mahan (Franklin Co./FSG) Chris Verlinde (Santa Rosa Co./FSG) Chris Combs (Brevard Co./FSG) Maia McGuire (Nassau/Duval/St. Johns/Flagler Co./FSG) LeRoy Creswell (Martin Co./FSG) Don Sweat (Pinellas Co./FSG) Mike Spranger (UF/FSG)	Pre- and post-tests of increased knowledge. Increased requests for information after educational program.	Ongoing through 2006

Specific Activities 2004-2005 (continued)					
Action	Audiences	Products and activities	Implementer	Short- and long-term performance indicators	Timeline for project completion
Support FSG research extension and education programs by developing and implementing diverse and wide ranging communication efforts that deliver relevant information (COMM-5)	Sea Grant partners. Florida and U.S. residents. Visitors to Florida. All audiences for research and Extension described in individual actions within each of the 10 goal areas.	Scientific journal articles. Workshop training materials. Brochures. Videos. Website. Electronic databases. Pell Library. SG reports. SG Extension Fact Sheets. Sea Grant Technical Papers. Book chapters. Books. Conference proceedings. Staff papers. Newsletters. Posters. Signage. CD-ROMS. Thesis and dissertation abstracts.	Dorothy Zimmerman (UF/FSG) Steve Kearn (UF/FSG) Campus Coordinators	Feedback from recipients of information. Sales of publications. Increases in number of requests for information.	Ongoing through 2006

### Investments, Audiences and Implementers

Florida Sea Grant's recent funding history indicates an increased reliance on funding from other than federal Sea Grant dollars. Over the last three years, federal NOAA Sea Grant core program funds represented about 43 percent of total Florida Sea Grant program effort. Federal NOAA Sea Grant national competitions have represented another 10 percent. The remaining funds have come from faculty match, other federal and non-federal grants and state and county appropriations. Thus, the work presented in this implementation plan is funded from all these sources. It is not possible to determine the exact percentages until the end of the implementation period. However, in keeping with National Sea Grant Office policy, the core program elements of the implementation plan represent the following investments for 2004-05: research (51%), extension (31%), communications (8%), management (10%).

Florida Sea Grant audiences and the faculty and other implementers who will produce the products and activities designed to educate those audiences are provided within each action in each of the 10 goal areas. However, to make clear the diversity of the audiences, e.g., from individuals to businesses to regulating agencies and scientists, and from local to international, the audiences are summarized by goal area in the following table. The diversity of the academic institutions and cooperators who will implement these actions are also summarized. They also range from county governments to international organizations.

Summary of local, state and national participants partnering with Florida Sea Grant in this implementation plan		
Goal	Audiences	Implementers
1. Marine Biotechnology	Scientists. K-12 and university educators. Regulatory agencies. Pharmaceutical companies. Seafood processors and retailers. Paint companies. Biotechnology companies. Venture capitalists. BioFlorida	Duke. FAU. HBOI. UF.
2. Fisheries	Scientists. NOAA. NOAA/AOML. CCAF. FFWCC. GCFI. GMFMC. ICCAT. NMFS. SAFMC. SFA. OFF. Bahamas Department of Fisheries. Bahamas National Trust. Bahamas Reef Environment Educational Foundation. Caribbean Marine Research--Shark Trust. International Union for Conservation of Nature. UNFAO. Packard Foundation. Wildlife Conservation Society. Fishers. County artificial reef coordinators.	Albion College. FIU. NSU. UF. UI-Chicago. UM. VIMS. NOAA. National Geographic Television Counties: Brevard, Charlotte, Lee, Manatee, Martin, Miami-Dade, Monroe, Okaloosa, Pinellas
3. Aquaculture	Scientists. FAA. FDACS. FFWCC. WAS. MO '04. Aquaria. Clam growers. Marine fish growout facilities. Marine ornamental growers. Shellfish growers. Shellfish regulators. Veterinarians.	FIT. FSU. HBOI. UF. UM. Aquaculture Center of Florida Keys. Bull Bay Clam Farm. Cedar Key Aquaculture Assn. Disney Epcot Living Seas. EcoMicrobials, LLC. Florida Aquarium. Kibbe & Company. Maritech, Inc. Ocean Reefs and Aquariums. Counties: Brevard, Charlotte, Franklin, Lee, Levy, Martin, Pinellas.
4. Seafood	Scientists. FDA. FDACS. NFI. SFA. Regulatory agencies. Florida Dietetic Assn. Florida Medical Association. Florida Nurses Association ISSC. Alcohol treatment centers. Analytical testing laboratories. Foundations and associations. Media relations offices. Oyster processors. Pharmacies. Seafood importers. Seafood processing companies. Wholesalers. Retailers and consumers. At-risk consumers.	UF. FDACS. GSAFDF. MDMR/BST. National Fisheries Institute. ABC Laboratories. BonSecur Fisheries. Cox Technologies. Louisiana Seafood. Motivait Seafood Promotion. Winn-Dixie. McFresh, Inc. Praxair, Rock-Tenn Co. Save-on-Seafood. Gulf Oyster Task Force. Counties: Franklin
5. Water-Dependent Businesses	Scientists. FOCA/CZM. NOAA/NOS. BNL. EPA. Florida Boaters Association. FDEP. FDOT. FFWCC. FMRI. JID. MIAF. SFRPC. SWFHB. SWFMTA. WCIND. Sea Grant Extension faculty. Technology companies. Individual boaters. Counties: Charlotte, Collier, Lee, Manatee, Sarasota. Towns: Anna Maria, Bradenton Beach, Holmes Beach, Longboat Key, Palmetto. City, county and state governments.	UF

6. Water Quality	Scientists. BBRCT. FCZM. FDEH/BOSP. FDEP. FFWCC. FFWCC/FMRI. FGS. ISSC. ICSR. Miami-Dade depts. of planning and zoning and environmental restoration. Sarasota Bay NEP. NPS. SFWMB. USACE. County and city environmental departments. Shellfish growers.	FIU. FSU. MML. UF. UM. NOAA/AOML. NOAA/NMFS/SEFC. FDACS. FKNMS. Counties: Brevard, Escambia, Lee, Manatee, Miami-Dade, Monroe, Nassau/Duval/St. Johns/Flagler, Okaloosa/Walton, Palm Beach, Santa Rosa.
7. Water Quality	Scientists. BNR. CANA. DTNP. ENP. FDACS/AG. FFWCC. FDOE. FKUMS. FMRI. GMFMC. MINWR. SAFMC. SFWMD. SJWMD. USFWS. USGS/FCSC. National Invasive Special Council. Indian River Lagoon NEP. Marine Extension faculty. Florida Aquarium. Tampa Bay Watch. Florida conservation organizations. Informal marine science educators, high school science teachers in coastal Florida. K-12 teachers. Master Gardeners. Aquatic resource managers. Aquarium shops. Marinas and boatyards. Homeowners.	FIU. UCF. UF. UM. UNH. University of Groningen. FMRI. NAS. NMFS/SEFC. SCWMP. USGS/ENDFS. USGS/FCSC. Counties: Brevard, Escambia, Manatee, Martin, Miami-Dade, Nassau/Duval/St. Johns/Flagler, Okaloosa/Walton, Palm Beach, Santa Rosa.
8. Storms	Scientists. NOAA/AOML. NWS, FDCA, FDOI, IHRC. Florida and National Lifeguards Association, Florida Yards and Naturalist Program, commercial propagation laboratories in Florida, commercial nursery operators. City and county governments. Coastal homeowners.	FIT. FSU. UF. Counties: Brevard, Charlotte, Duval/Nassau/St. Johns/Flagler, Lee, Martin, Palm Beach, Pinellas.
9. Trained Workforce	Graduate students. Undergraduate students. Faculty. Academic departments. Extension faculty.	UF. Campus Coordinators at each of 16 participating Florida institutions. NOAA. All SGEP faculty.
10. Informed Citizens	4-H youth. Minority youth. High school students. Teachers. Coastal homeowners and renters. Beach tourist and tourist bureaus. Florida and U.S. residents. All audiences for research and Extension described within each goal area. Nonformal educators. Community college faculty and students.	UF. Campus Coordinators at each of 16 participating Florida institutions. Counties: Brevard, Escambia, Franklin, Martin, Nassau/Duval/St. Johns/Flagler, Okaloosa, Pinellas, Santa Rosa.

## Appendix I

### Acronyms Used

AOML - Atlantic Oceanographic and Atmospheric Laboratory  
ASMFC - Atlantic States Marine Fisheries Commission  
BAIL - Boating Action and Information League  
BBRRCT - Biscayne Bay Regional Restoration Coordination Team  
CANA - Canaveral National Seashore, National Park Service  
CCAF - Coastal Conservation Association of Florida  
CLAMMRS - Clam Lease Assessment, Management and Modeling Using Remote Sensing  
COSEE - Center for Ocean Science Education Excellence  
ENP - Everglades National Park  
EPA - Environmental Protection Agency  
FAA - Florida Aquaculture Association  
FAU - Florida Atlantic University  
FCZM - Florida Coastal Zone Management Office  
FDA - Food and Drug Administration  
FDACS - Florida Department of Agriculture and Consumer Services  
FDACS/AG - Florida Department of Agriculture and Consumer Services/Aquaculture Group  
FDCA/CZM - Florida Department of Community Affairs/Coastal Zone Management  
FDH/BOSP - Florida Department of Health/Bureau of Onsite Sewage Program  
FDOE - Florida Department of Education  
FDOI - Florida Department of Insurance  
FDOT - Florida Department of Transportation  
FEMA - Federal Emergency Management Agency  
FFWCC - Florida Fish and Wildlife Conservation Commission  
FGS - Florida Geological Survey  
FIND - Florida Inland Navigation District  
FIT - Florida Institute of Technology  
FIU - Florida International University  
FKNMS - Florida Keys National Marine Sanctuary  
FMA - Florida Medical Association  
FMFMC - Gulf of Mexico Fishery Management Council  
FMRI - Florida Marine Research Institute  
FSG - Florida Sea Grant  
FSU - Florida State University  
FWS - Fish and Wildlife Service  
GCFI - Gulf and Caribbean Fisheries Institute  
GMFMC - Gulf of Mexico Fishery Management Council  
GOM - Gulf of Mexico  
GSAFDF - Gulf and South Atlantic Fisheries Development Foundation  
GSMFC - Gulf States Marine Fisheries Commission  
HACCP - Hazard Analysis Critical Control Point  
HBOI - Harbor Branch Oceanographic Institution  
ICCAT - International Commission on the Conservation of Atlantic Tuna  
ICSR - International Conference on Shellfish Restoration  
IHRL - International Hurricane Research Center  
ISSC - Interstate Shellfish Sanitation Conference  
JID - Jupiter Inlet District

MCCA - Monroe County Commercial Fisheries Association  
MDMR/BST - Mississippi Department of Marine Resources, Bureau of Seafood Technology  
MIAF - Marine Industries Association of Florida  
MINWR - Merritt Island National Wildlife Refuge  
MML - Mote Marine Laboratory  
MO '04 - Marine Ornamentals 2004  
NAS - National Audubon Society  
NEP - National Estuary Program  
NFI - National Seafood Institute  
NMFS - National Marine Fisheries Service  
NMFS/SEFC - National Marine Fisheries Service/Southeast Fisheries Center  
NOAA - National Oceanic and Atmospheric Administration  
NOS - National Ocean Service  
NPS - National Park Service  
NSU - Nova Southeastern University  
NWS - National Weather Service  
OFF - Organized Fishermen of Florida  
SAFMC - South Atlantic Fishery Management Council  
SCP - Sanitation Control Procedures  
SCWMR - South Carolina Wildlife and Marine Resources  
SEA-COOS - Southeast Atlantic Coastal Ocean Observing System  
SEFC - Southeast Fisheries Center  
SFA - Southeastern Fisheries Association  
SFRPC - South Florida Regional Planning Council  
SFWMD - South Florida Water Management District  
SGEP - Sea Grant Extension Program  
SJWMD - St. Johns Water Management District  
SWFMTA - Southwest Florida Marine Trades Association  
UCF - University of Central Florida  
UGr. - University of Groningen  
UI - University of Illinois  
UM - University of Miami  
UNFAO - United Nations, Food and Agriculture Organization  
UNH - University of New Hampshire  
USACE - U.S. Army Corps of Engineers  
USCG - U.S. Coast Guard  
USFWS - U.S. Fish and Wildlife Service  
USGS/ENPFS - U.S. Geological Survey, Everglades National Park Field Station  
USGS/FCSC - U.S. Geological Survey, Florida Caribbean Science Center  
VIMS - Virginia Institute of Marine Science  
WAS - World Aquaculture Society  
WCIND - West Coast Inland Navigation District



## Appendix II

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