



FLORIDA SEA GRANT COLLEGE PROGRAM 2007 PROGRESS REPORT





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Florida Sea Grant 2007 Progress Report

“Science Serving Florida’s Coast”

August 2008
TP 161

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1.0 INTRODUCTION

The Florida Sea Grant College Program is committed to enhancing the practical use and conservation of coastal and marine resources for a sustainable economy and environment in a state whose coastline stretches for over 1,300 miles. 2007 represents the 37th year for Sea Grant in Florida. The program operates through a statewide, research, education and extension partnership of state and federal agencies, businesses and citizens. All eleven public universities, three private universities, and two private non-profit research laboratories constitute this virtual college. The University of Florida serves as the host campus. Florida Sea Grant is one of 32 Sea Grant programs nationwide that together form the National Sea Grant College Program as authorized by federal legislation. It is the only university-based, statewide coastal research, education, extension/outreach and communications program in Florida.

This annual progress report for 2007 is the tenth annual progress report submitted by Florida Sea Grant under the program evaluation procedures adopted during 1998 by the National Sea Grant College Program. This report covers the year 2007, but some historical data are included to provide baseline information for subsequent annual progress reports.

Florida Sea Grant had 7 different NOAA grants in effect during 2007. This annual report covers work completed and ongoing under all 7 grants.

Table 1.1 Florida Sea Grant awards from NOAA activities during calendar year 2007.

Number	Keyword Identifier	Start Date	Current End Date
NA16RG-2195	Omnibus Research, Extension, Communications, Management	02/01/02	12/31/08
NA06OAR4170014	Omnibus Research, Extension, Communications, Management	02/01/06	01/31/10
NA17RG-2992	South Florida Marine Ecosystem Outreach E/T-9	09/01/02	09/30/08
NA07OAR4170027	Knauss Fellow E/ST-36	02/01/07	01/31/08
NA07OAR4170028	Knauss Fellow E/ST-34	02/01/07	01/31/08
NA07OAR4170029	Knauss Fellow E/ST-35	02/01/07	01/31/08
NO04NOS4730008	E/T-14 Manatee	04/01/04	03/31/07

Every Florida Sea Grant activity and accomplishment reported on in this progress report satisfied three simple but tough criteria: it 1) was based on a strong rationale; 2) demonstrated scientific or educational merit; and 3) produced 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 was funded on a competitive basis, with scientific merit as the most important criterion. Extension programs and activities were 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 was placed on the involvement of a large number of participating institutions in research, education and extension program Graduate student involvement was also high.

3) **Accountability.** Both external and internal processes were used to measure a wide range of achievements. These included tracking the scientific publication output of faculty and students, understanding the contribution to society of scientific discovery, and determining the economic impact or level of new business activity resulting from a research project.

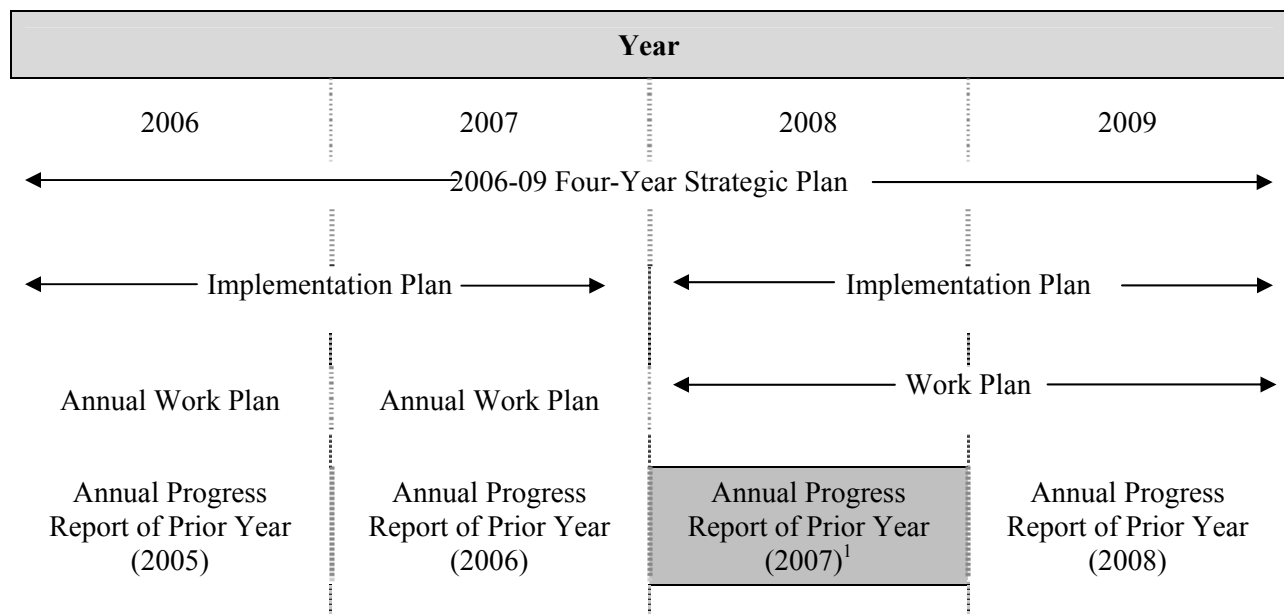
4) **Connection with Users.** A strong advisory process was used to define research priorities, to plan extension programs, and to measure the impact of program activities. It was also used to build public and private support for Florida Sea Grant.

5) **Partnerships.** Faculty, students, and citizens all benefited from functioning in a partnership mode. Scientific results and education projects reached greater success levels and were implemented when partners, from agencies to businesses, provided financial support to an activity.

6) **Impacts and Accomplishments.** Funded projects must demonstrate significant scientific, economic or social benefits.

Table 1.2 places the 2007 Progress Report in the context of Florida Sea Grant’s four-year cycle strategic plan, implementation plan and annual work plan.

Table 1.2. Florida Sea Grant four-year cycle, 2006-2009.



¹ Representation of this document on the timeline.

Table 1.3. Complete names of Florida Sea Grant personnel referenced in 2007 Annual Report text.

Name	University/Unit	Title	Specialization
Karl Havens	FSG	Director	aquatic ecology, toxic algae, food webs
Charles Sidman	FSG	Assoc Director	waterway planning and GIS
Mike Spranger	FSG	Assoc Director	coastal marine extension
Steve Kearn	FSG	Comm Director	communication
Dorothy Zimmerman	FSG	Comm Coordinator	communication
Chuck Adams	UF Food and Resource Economics	Extension Faculty	fisheries and marine economics
Tom Ankersen	UF Law School	Extension Faculty	coastal and marine law
David Fann	Boating & Waterway Mgt. Program	Geographer	GIS and mapping applications
Susie Fann	Boating & Waterway Mgt. Program	Program Assistant	GIS analyst
Bill Lindberg	UF Fisheries and Aquatic Sciences	Extension Faculty	fisheries ecology and behavior
Steve Otwell	UF Aquatic Foods Products Lab	Extension Faculty	seafood safety and sustainability
Bob Swett	UF Fisheries and Aquatic Sciences	Extension Faculty	waterway management and GIS
Brian Cameron	FSG	Marine Agent	fisheries, habitat, coastal development
LeRoy Creswell	FSG	Marine Agent	aquaculture, water quality, marine ecology
Andrew Diller	FSG	Marine Agent	aquatic ecology, conservation, sea turtles
Pam Fletcher	FSG	Marine Agent	coastal ecology and conservation
Bryan Fluech	FSG	Marine Agent	fisheries, habitat, water quality, boating
Doug Gregory	FSG	Marine Agent	fisheries, resource management
Joy Hazell	FSG	Marine Agent	water quality, fisheries, habitat
Scott Jackson	FSG	Marine Agent	marine ecology
Eddie Leonard	FSG	Marine Agent	water quality, habitat, fisheries, boating
Bill Mahan	FSG	Marine Agent	oysters, seafood safety, marine ecology
Carlos Martinez	FSG	Marine Agent	aquaculture
Maia McGuire	FSG	Marine Agent	coastal ecology and conservation
Brooke Saari	FSG	Marine Agent	wetlands, non-native species
Betty Staugler	FSG	Marine Agent	fishing, water quality, habitat
John Stevely	FSG	Marine Agent	sponges, fisheries, habitat, artificial reefs
Leslie Sturmer	FSG	Marine Agent	aquaculture
Don Sweat	FSG	Marine Agent	scallop aquaculture, commercial fisheries
Chris Verlinde	FSG	Marine Agent	shoreline erosion, conservation

2.0. ACCOMPLISHMENTS AND BENEFITS

Florida Sea Grant (FSG) has for many years reported annually its accomplishments and benefits for each research project that is completed or ongoing during that year. It has also reported the accomplishments of each task planned for the year by the extension faculty. That process continues with this 2007 report, which additionally identifies project outcomes and realized or potential project impacts within the context of strategic planning goals. To facilitate gathering this information, principal investigators are required to report on: 1) contributions of their projects to science and technology; 2) firsts from FSG research; 3) new scientific methods developed; and 4) impacts to society, the economy and the environment. Accomplishments and benefits are organized according to seven thematic focus areas (aquaculture, biotechnology, coastal hazards, fisheries, ecosystem health, seafood safety, waterfront communities) and two cross-cutting areas (graduate education, marine education) identified in the current (2006-09) FSG Strategic Plan.

Goal 1: Biotechnology: Use marine biotechnology to create and enhance products and processes from Florida's coastal resources.

The measurable goal for this programmatic area is to develop marine bio-products that promote human and ocean health and productivity. A primary objective is to engage industry and governmental interests towards the growing biotechnology field that holds promise of providing clean high-wage jobs for Floridians. The following projects reflect the wide range of ongoing activities in this focus area.

Biotechnology Research Projects

- 1.1 **Development of Low Toxicity Anti-Fouling Paint.** Sponges produce chemicals called pyridyl alkaloids that can affect barnacle larvae. The objective is to develop single analogs of pyridyls that can be economically synthesized and that could be practical anti-fouling additives for marine paints that are less harmful to the marine environment than currently used paint additives. (Kem/Soti: R/LR-MB-20)

This project was completed in 2007 and it documented that methyl bipyridyls in marine paint can reduce the settlement and survival of barnacle larvae, offering an alternative to toxic metal-based compounds presently in use. The one unexpected result of this study was that the active ingredient rapidly leaches from the paint, so that after a relatively short period of time, anti-fouling agents no longer are present. Follow up research is addressing this issue, and it may be that simply changing the paint will reduce this problem.

Potential Impacts: With a federal ban on copper sulfate additives in hull paint for vessels in effect, alternative anti-fouling paints are critically needed. The growth of barnacles on the hulls of ships leads to drag that reduces fuel efficiency and speed of transport. Since oceanic transport is a major human activity that will increase over time, and because fuel costs are rapidly rising, an effective anti-fouling compound that also has low environmental toxicity will save money, reduce fossil fuel consumption and environmental impacts and enhance transport efficiency.

- 1.2 **Isolating Therapeutic Agents from Snails.** This project was completed and reported in 2006. (Mari/Fields: R/LR-MB-21)

- 1.3 **Developing New Drugs from Marine Algae.** Marine cyanobacteria produce a great diversity of compounds, mostly non-ribosomal peptides and lipopeptides, with over 200 natural products reported. Marine cyanobacteria provide an exceptional resource for new natural products because of their tremendous biodiversity and chemical diversity. This

research project is identifying new natural products from Florida benthic marine cyanobacteria that may be useful as drugs in the treatment of human disease. This will be the first systematic approach to studying benthic cyanobacteria from Florida coastal waters for biotechnological applications. (Paul/Ross/West/Luesch: R/LR-MB-22)

The project deadline has been extended and it is scheduled to be complete in 2008. Preliminary analysis of relatively little explored cyanobacterial collections in Florida waters are yielding new elastase inhibitors that can reduce chronic inflammatory diseases, cardiovascular disorders and obstructive pulmonary disease (including emphysema and chronic bronchitis).

- 1.4 **Developing New Drugs from Sponges.** There is a need for information on the genome of marine organisms that produce potentially beneficial marine bio-compounds. This research project will develop a novel approach to recombinant production of potent bioactive compounds produced by the marine sponge genus *Discodermia*. The resulting molecular sequence data will serve as a novel genetic resource (e.g. toolkit) for research and industry, enabling downstream experiments and sustainable production of unique bioactive marine natural products (Lopez: R/LR-MB-23). The project deadline has been extended and it is scheduled to be complete in 2009.

This project is in progress. The first two goals of 1) cloning cDNA from sponges and 2) sequencing selected cloned sponge cDNA's have been met. SymBio is partnering with the PI on the project and is implementing the cDNA sequencing and analysis. Preliminary results support the hypothesis that proteins from sponges and their symbiotic microbes can produce anti-tumor and anti-microbial chemicals. The cloning of sponge proteins could obviate the need to collect new specimens from critical habitat.

- 1.5 **Commercial Scale Production of Marine Bio-Products.** This project was terminated in 2007, without results, due to the principal investigator relocating to Canada. (Kerr: R/LR-MB-24)

Goal 2: Fisheries: Create and deliver production and management techniques that make fisheries sustainable and competitive.

The measurable goal is to ensure that fisheries are managed in a way to achieve sustainable populations and economic returns. Primary objectives include: improving catch rates; determining the social and economic impacts of fishery management strategies; minimizing bycatch; identifying essential fish habitat; measuring the effects of stock enhancement practices; and applying research results through extension and outreach.

Funded research projects within this goal area that were ongoing or completed during 2007 supported primary objectives listed above. In addition, a number of extension-related activities were undertaken to support priority areas related to recreational and commercial fisheries management. Recreational and commercial fisheries extension was comprised of activities devoted to ethical angling (e.g., catch and release education); artificial reef deployment and monitoring; habitat restoration (e.g., restoration of oyster beds, mangrove habitat, scallop and sponge habitat); and providing expert advice to the commercial fishing industry, local governments and citizens through service on committees, at workshops, and participation at other organized meetings and events (e.g., fishing tournaments, fishing camps).

Florida Sea Grant research and extension led to a new fishing regulation. Beginning June 1, 2008, persons onboard vessels harvesting any species of reef fish in the Gulf of Mexico waters must use non-stainless steel circle hooks when fishing with natural baits, as well as a de-hooking device and a venting tool. The venting tool was developed and tested by Florida Sea Grant, and we are partnering with the Florida Fish and Wildlife Conservation Commission (FWC) in disseminating information regarding the new regulation to the fishing public.

Fisheries Research and Extension Projects

- 2.1 **Enhancing Marine Fisheries Extension.** Florida's recreational fisheries utilize 110+ species along the state's 1,350 mile shoreline. A project was established in 2004 to provide Extension service to this sector. During 2007 the project was modified due to the resignations of some of the key personnel in the original project (Spranger: SGEP-13-FE-C).

The project and its work elements now focus on reducing recreational fishing mortality, artificial reef enhancement, educational materials for ethnic groups and fostering industry input to regulatory matters. A Release Methods / Techniques Educational Tool Kit was developed and distributed to all FSG county faculty. A training program on recreational fishing mortality reduction was held in October 2007 for all FSG faculty at the annual FSG Extension planning meeting in Cedar Key, Florida. Supplemental funds were received by UF/IFAS Extension to develop a recreational fishing Web site (to be completed in June, 2008). FSG faculty continued planning for several regional artificial reef workshops that will be held in 2008. A proof of concept pilot was developed to demonstrate the usefulness of available sea surface data for the for-hire and offshore anglers in two regions of Florida. This project has been extended through May 2008.

- 2.2 **Quantifying Shark Migration.** Knowledge of shark migration routes and local movement patterns could contribute to more effective resource management. Recent advances in electronic tagging technology make it possible to gather and store detailed information on swimming depth, water temperature, and a daily record of location that can be uploaded to ARGOS satellites. Objectives of this research are to identify and characterize the seasonal migratory patterns of bull sharks in the northern and eastern Gulf of Mexico off Florida, identify and characterize their habitat use patterns, and determine survival rates and overall fitness of those caught by longline fishing (Burgess: PD-05-4).

This project was completed during 2007. The goal was to outfit two bull sharks (one adult and one sub-adult) with passive acoustic transmitters in order to study habitat preferences and migratory movements. The results show significant differences in movements and depth range between the two sharks, with the adult shark migrating over 1,400 km from the attachment site and spending a much greater proportion of time in deeper water. The differences in depth of occurrence and movement patterns during the same period of time for these sharks indicate further study is needed to determine if these differences were due to differences in life history stage (mature v. immature) or occurred for some other reason. The study provides some of the first evidence of long and short migratory movements of the bull shark within the southern portion of Florida and the Gulf of Mexico. The data will be provided to both federal and state management agencies and will help to define the essential fish habitat of the bull shark.

- 2.3 **Using Fish Acoustics in Black Drum Population Analysis.** Many fisheries scientists throughout the southeast U.S. use passive acoustics to identify spawning habitat of sound-producing fishes. This study examines whether sound analyses can yield quantitative data on

the number of eggs spawned by black drum. It will serve as a test case that can be used as a model for future studies of other important species, such as red drum and spotted sea trout, where issues such as egg transport and egg identification may be more difficult. (Mann: R/LR-B-58)

This project has been extended and is scheduled to be completed in 2008. The initial findings suggest that active black drum spawning sites can be detected using passive acoustic sensors. The inference is that this information can be used to delineate essential fish habitat for this commercially important species.

- 2.4 **Evaluating Essential Fish Habitat.** This project will develop an approach to evaluate the essential nature of fish nursery habitat by linking nursery-specific juvenile production with eventual recruitment to adult habitat. Researchers will examine population dynamics specific to gray snapper, but also will establish a quantitative, process-oriented approach to assessing habitat value that could be applied to any finfish species with a bipartite life history that includes distinct nursery and adult habitats. (Patterson/McBride/Allman: R/LR-B-59)

This project is ongoing. Information from this project on gray snapper age-growth relationships in various coastal regions in Florida will be important for effective management of this fishery by NOAA. The project deadline has been extended with an anticipated completion date in 2008.

- 2.5 **DNA Fingerprinting of Shark Fins.** Conservation of sharks in the U.S. and worldwide in the face of intensive exploitation to supply the international fin trade requires comprehensive management and trade monitoring. The goal of the project is to make possible shark conservation, management, and trade monitoring on a species and population-specific basis by providing a comprehensive, multi-genetic marker assessment of global population structure in fin-trade sharks, determining the population of origin of market derived shark fins, and elucidating shark mating systems. (Shivji: R/LR-B-60)

The authors are using microsatellite loci and mitochondrial control region sequences from probeagle and scalloped hammerhead sharks to determine their global population structure. This information will be compared with Hong Kong market-derived genetically identified fins of those species to determine the population of origin for those fins. The preliminary results on scalloped hammerhead fins reveals that the contemporary trade is globally sourced with a substantial presence of fins from imperiled western Atlantic stocks. This interesting study has received extensive national and international media coverage. In addition, the DNA forensics research is to be part of the Smithsonian Ocean Hall display. The project is scheduled to be completed in 2008.

Fisheries Extension Activities

- 2.6 Chuck Adams has continued to serve on the Gulf of Mexico Regional Fisheries Management Council's Scientific and Statistical Committee. He attended two meetings related to Gulf Council Fishery Reef Fish and Coastal Pelagics Amendment deliberations.
- 2.7 Adams traveled to Oregon with Marine Agents John Stevely and Don Sweat to interact with Oregon Sea Grant field staff regarding venting tool use. He assisted in conducting a fisherman's workshop on the various venting tools and barotrauma mitigation techniques currently available.

- Sweat prepared and delivered a presentation describing the use of reef fish mortality reduction devices. He also presented a workshop to commercial fishermen in Oregon at the request of Oregon State Sea Grant Program.
- 2.8 Adams served as the Florida representative on the Southeast Regional Fisheries Extension Enhancement (FEE) Committee.
 - 2.9 Adams, Stevely and Chris Simoniello continue work on an annotated bibliography of studies involving release survival, release methods, techniques, etc for recreational targeted species, particularly in the Gulf and South Atlantic region. This bibliography will lead to an FSG brochure that summarizes the science-based benefits of utilizing the various release methods and techniques currently available to recreational anglers.
 - 2.10 Adams led a meeting in Cedar Key that focused on the use of various handling and release methods to reduce release mortality of recreationally caught fish. The meeting was followed by a trip onboard the UF research vessel Discovery where the techniques were demonstrated on live catch/release fish.
 - 2.11 Faculty (Adams w/Von Harten, Baker, and Liqori) helped organize and conduct the FEE Regional Fisheries Management Workshop in Bluffton, SC, in which a state fisheries manager from NC, SC, GA and FL met to discuss issues of mutual interest concerning blue crab management. The workshop report was distributed to all interested marine agents and state managers.
 - 2.12 A proposal to assess the economic impact of the commercial fishing/seafood industry on the Atlantic coast of Florida to the state economy was submitted to the National Marine Fisheries Service (NMFS) but was not funded due to lack of funds (Adams w/Stevens and Mulkey).
 - 2.13 A proposal to develop a storm damage assessment/projection method for the trap fisheries in the Florida Keys was submitted to the NMFS but not funded (Adams w/Gregory, Shivilani, and Murray).
 - 2.14 A study was funded by the FWC and West Coast Inland Navigation District (WCIND) to determine the economic impact of artificial reefs to the SW Florida economy. Work is progressing on surveying the general boating population and the for-hire sector regarding the use of artificial reefs in SW Florida (Adams w/Larkin, Sidman, and Swett).
 - 2.15 Catch-and-release workshops were conducted to teach fishers the importance of venting fish, using circle hooks, proper handling skills, and proper length measurements. 80% of 250 fishermen taking part in the ethical angling program stated they gained knowledge regarding venting tools, circle hooks, and proper handling techniques and will begin practicing these new methods to reduce release mortality of grouper and snapper (Brian Cameron).
 - 2.16 Educational programs at the Panama City Anglers Club addressed fisheries management issues with regard to red snapper, grouper, and amberjack resulting in 90% of the 30 attendees reporting an increase in knowledge gained regarding how government agencies determine regulations (Cameron).
 - 2.17 In Bay County, 16 clients were educated regarding the county's artificial reef deployment program. More than 62% of the participants gained a better understanding of the permitting process of deploying artificial reefs. They can identify who issues the permits as well as external funding sources for artificial reef development and monitoring. Over 87% of participants also gained knowledge of artificial reef material and site design to provide an adequate habitat for fish shelter, spawning, and an increase in biodiversity (Cameron).

- 2.18 Cameron also conducted two kids fishing clinics with the FWC, Half Hitch Tackle and City of Panama City. These events resulted in 250 youth learning about responsible angling, knot tying, casting and fish identification.
- 2.19 LeRoy Creswell produced and distributed the 58th and 59th Proceedings of the Gulf and Caribbean Fisheries Institute to GCFI members, libraries, and electronic databases throughout the world.
- 2.20 Creswell also served as the program chair for the 60th annual meeting of the GCFI, Punta Cana, Dominican Republic, and published the Book of Abstracts for the conference.
- 2.21 Creswell conducted the Grand Slam Trash Can Youth Fishing Tournament for underprivileged children in St. Lucie County. Marine science education, including clean boating, sustainable angling and environmental stewardship, was an important component of the event.
- 2.22 Escambia and Santa Rosa county marine agents distributed educational information on artificial reefs during presentations to recreational fishermen. In addition, the agents began early planning for a Panhandle Artificial Reef Workshop in 2008 (Andrew Diller and Chris Verlinde).
- 2.23 Diller trained more than 70 recreational fishermen in proper catch-and-release methods including fish venting, circle hooks and handling. He introduced more than 500 youth to basic fishing skills at Escambia County 4-H Fall Harvest Days and the Wildlife Sanctuary's Wildfest events.
- 2.24 Bryan Fluech organized and ran 2 fishing camps reaching 17 youth. He assisted local FWC staff in developing and running a mini Kids Fishing Clinic that reached 35 youth. He helped arrange the participation of 110 Hispanic youth in the Annual FWC Kids Fishing Clinic. All 162 participants received free fishing poles. The 17 youth who participated in the fishing camps completed surveys and 100% indicated they improved their sport fishing skills and knowledge by some degree after completing the camps.
- 2.25 Fluech educated over 500 recreational anglers on circle hooks, handling practices and venting tools through presentations and outreach events. He also participated in a local TV angling show to discuss fish venting techniques. The show has a viewership of 6,000.
- 2.26 Work was not done this year in regard to assisting state specialists with a charter captain artificial reef needs assessment because the county was unable to participate. (Fluech)
- 2.27 Fluech assisted Rookery Bay's research staff for three months on the fish monitoring project.
- 2.28 Richard Makopondo left the University of Florida in summer 2007 before a Hispanic focus group could be coordinated and interviewed.
- 2.29 A quarterly newsletter targeting Hispanic audiences that covers topics related to sustainable fisheries, seafood safety and regulations was developed and is being distributed. A comprehensive program that targets these audiences is being developed.(Fluech)
- 2.30 Doug Gregory participated in 15 fishery management meetings (primarily Scientific and Statistical Committees and Limited Access Committees) throughout the southeastern US to address issues of fishing, overfishing, and marine resource protection for stocks of fish important to the local fishing industry (e.g., grouper, yellowtail snapper, mutton snapper, king and Spanish mackerel, and lobster).

2007 Fishery related Government Committee Appointments:

Gulf of Mexico Fishery Management Council Scientific and Statistical Committee

Gulf of Mexico Fishery Management Council Grouper IFQ Panel
South Atlantic Fishery Management Council Scientific and Statistical Committee
South Atlantic Fishery Management Council Limited Access Privilege Program Panel
NOAA Florida Keys National Marine Sanctuary Advisory Board
NOAA National Marine Fisheries Service Acropora Coral Recovery Team

- 2.31 During 2007 the fishing industry undertook a greater responsibility in organizing the Florida Keys Seafood Festival in Key West and by the 2009 festival it is anticipated Sea Grant will step down from being a full partner in the festival to being only a supporting sponsor with the goal of taking the lead in developing more educational material for the event (Gregory).
- 2.32 At the request of the Marine Extension Advisory Committee Gregory has been active in efforts to help preserve the working waterfronts in the Florida Keys. In his capacity as an appointed member of the Monroe County Marine and Port Advisory Board, he participated in 11 local government meetings dealing with the working waterfront issue by either providing information or testimony regarding the local commercial fishing industry.
- With assistance from the Organized Fishermen of Florida the Monroe County Marine and Port Advisory Board successfully negotiated with Florida Department of Environmental Protection (FDEP) and Florida Department of Transportation (FDOT) to prevent the Lower Matecumbe trap storage area from being displaced by the Florida Keys Heritage Trail. This action allowed 12 lobster and stone crab fishermen to remain in business in the Upper Keys.
- 2.33 Joy Hazel held meetings with various groups regarding the continuation of the REDStart program. However, it was decided that the program be discontinued 2008.
- 2.34 Fluech provided input on the development of a Release Methods/Techniques Kit by suggesting that FWC's series of marine fisheries videos be included.
- 2.35 An electronic publication of the existing FSG venting tool brochure will be completed in 2008. (Stevely, Adams, Kearl, Zimmerman)
- 2.36 Fluech and personnel for Mote Marine Laboratory shot video footage for a release methods film to be used in FSG field agent's outreach efforts at the annual FSG meeting.
- Eddie Leonard conducted several fish identification classes.
- 2.37 Bill Lindberg contributed to the enhancement of artificial reef science, technology and use in Florida. He led program activities related to the Steinhatchee Fisheries Management Area and to the development of artificial reef BMPs, and provided expertise to county and multi-county reef extension programs. The following five activities relate to this project.
- FWC artificial reef funding was obtained by Taylor County, in partnership with Dixie and Wakulla Counties, for the construction of fishing reefs in the northern corner of the Steinhatchee Fisheries Management Area (SFMA), which had been zoned for fishing reefs. The placement strategy for that zone was developed by FSG Extension (Lindberg) and executed by a private reef builder under contract to Taylor County.
- A formal partnership was initiated between FWC, FSG and UF IFAS Fisheries and Aquatic Sciences (FAS) with funding for the construction of conservation reefs within the SFMA awarded. Bid specifications for contractor selection were provided to FWC, and the placement strategy for the SFMA conservation zone finalized. This arrangement will continue for about 4 years, until the SFMA construction is completed.

The Taylor County FSG extension position has not yet been filled, so local extension programming related to reefs has been curtailed, except that the County Extension Director oversaw the contracting referred to above.

- 2.38 The FWC Artificial Reef Science Colloquium was held July 24-25, 2007, with a panel of five Sea Grant or NOAA-sponsored researchers (including Lindberg) and approximately 20 FWC staff from the Division of Marine Fisheries Management, Division of Habitat and Species Conservation and the Florida Fish and Wildlife Research Institute, as a professional continuing educational program and state-of -the-science advisory forum. As a result, policy positions of the management agency are continuing to shift toward the targeted application of reefs designed for fisheries conservation objectives.
- 2.39 The Florida West Coast Artificial Reef Coordinators Workshop was held December 6, 2007 with approximately 60 participants, including extension advisory committee members and reporters. Of the 26 respondents to the evaluation survey, 100% indicated that they would use the information presented, and 88% indicated that they were committed to doing so. This program was primarily organized and lead by John Stevely.
- 2.40 Lindberg is continuing to develop the extension publication “Understanding the Attraction-Production Issue,” targeted primarily for county artificial reef coordinators and industry sectors engaged in artificial reef development, to help foster more scientific approaches to reef development.
- 2.41 Bill Mahan provided 68 one-on-one consultations to seafood processors, harvesters and retailers on a wide-range of seafood related topics. Examples included *Vibrio* illnesses, species substitution, HACCP, and the impacts of the drought on the local seafood industry.
- 2.42 Mahan planned to continue multi-state collaboration with Gary Graham (commercial fisheries specialist – Texas Sea Grant) on shrimp industry related topics such as turtle excluder devices (TEDs), by-catch reduction devices and electronic log books (ELBs) to assist area shrimp fishermen in dealing with current economic and fishery management issues. However, due to a delay in implementing the new federal fishery regulations pertaining to TEDs and by-catch reduction devices (BRDs) the work in this area has been postponed until 2008. A BRD workshop is scheduled for the spring of 2008.
- 2.43 Mahan worked closely with the members of the Oyster and Seafood Industry Task Force to address a number of Apalachicola Bay management issues. These included: FL red tide; the impacts of coastal development on shellfish harvesting areas; stormwater run-off; dredging oysters; task force membership and by-laws and the Apalachicola, Chattahoochee, and Flint River water-use conflicts. As a result of this participation, Mahan is being asked to provide research-based information and technical assistance to the seafood industry and elected officials.
- 2.44 Mahan presented 20 extension update reports to the Board of County Commissioners (BOCC), general public and media during the board’s regularly scheduled meetings on the first and third Tuesday of each month. In February of this year the local cable channel (Forgotten Coast TV) began broadcasting the commission meetings on a taped delay. In addition, the Franklin Chronicle Newspaper began reprinting the Extension Updates as a featured news column in its newspaper. As a result of these reports, Mahan has had an increased number of requests from county officials to supply research-based information on a range of fisheries and environmental topics. In addition, city officials have requested that Mahan attend their meetings to provide them with technical information on resource management issues. This has led to an increased number of general public contacting the extension office for additional information on reported topics.

- 2.45 Mahan provided several DACS updates to the commissioners red tide and *Vibrio* illness reduction issues as they came up during the year. As a result of this role, both DACS and the members of the BOCC rely on Mahan to foster better communications between the two groups.
- 2.46 Mahan collaborated with Florida State Marine Lab faculty and staff on several fishery management issues (red grouper and oyster management) and grant proposals.
- 2.47 Bill Seaman presented an invited talk at the International Artificial Reef Conference.
- 2.48 Chris Simoniello determined the availability of marine fisheries-related citation incidence data by ethnic group. Citation information is available but it cannot be used reliably to determine ethnicity. However, it can be used to evaluate the seasonal and geographic distribution of fishing violations.
- 2.49 Simoniello conducted proof of concept on the usefulness of available sea surface data for the for-hire and offshore anglers in the Tampa Bay area. There is significant interest on the part of for-hire and offshore anglers for data that includes temperature, salinity, turbidity, currents and bathymetry. Those interviewed would like to see HF radar made widely available, showing both surface currents and wave heights. The information as presented on the www.seacoos.org Web site was of value to some (those with advanced degrees in science), but not to most. The Rutgers CoolRoom was presented to several people and was better received as a more friendly way to display (and explain) information. There were requests for clear explanations and examples of how information could be applied.
- 2.50 Simoniello planned to evaluate utility of data buoy deployed on the West Florida Shelf in 2006 that is coupling physical oceanographic data with fisheries data test deployment. However, the buoy of interest has been off-line.
- 2.51 Simoniello worked with FSG Extension faculty, Southeast Atlantic Coastal Ocean Observing System (SEACOOS) researchers and National Weather Service forecasting offices to develop pilot oceanographic maps and real-time data Web sites that provide timely information to recreational fisheries. See also item 7.11
- 2.52 Stevely and Sweat continued evaluation of sponge population recovery in Florida Keys following a widespread mortality with project funds from the FWC. Sweat conducted an annual survey of commercial sponge abundance in Florida Bay. This formed the basis for the recommendation to open sponge grounds west of 84 degree longitude and the recommendation to require that sponges harvested in open areas be cut, rather than hooked. This was accepted and disseminated by FWC.
- 2.53 Betty Staugler continued work to enhance artificial reef habitat in Charlotte County. She identified a new site that was permitted. Funding for reef enhancement was obtained late in 2007 and will occur in 2008. A new brochure was developed to educate resource users on reef locations and proper etiquette for using reef resources. The brochure is available through the Boating and Angling Guide and on the Sea Grant extension Web site. Fundraising events including a car wash and a bike run raised awareness of the artificial reef program.
- 2.54 The Kids Cup Redfish Tournament took place in April 2007. Staugler expanded her role this year by introducing a tagging project to the tournament with the support of Mote Marine Laboratory and other research and education interests.
- 2.55 Staugler continues to work cooperatively with this group. This interaction has lead to a greater partnership with FWC staff members who are currently providing assistance with other Sea Grant initiated projects.

- 2.56 Sweat assisted USF graduate student with oyster reef restoration program. This project will result in the students master's thesis and graduation in May 2008.
- 2.57 Verlinde coordinated volunteers and provided ethical angling, coastal habitat, water quality and fish ID materials and activities for 302 Woodlawn Beach Middle School seventh grade PE students. Students indicated that this was their best field trip ever.
- Verlinde provided ethical angling and fishing tips to 112 4-H marine campers at Camp Timpooshee and 84 campers at the Santa Rosa/Bay county 4-H camps.
- Verlinde provided fishing and ethical angling activities at the Seagrass Awareness Celebration and Coastal Encounters events. More than 800 locals and tourists attended these events.
- Verlinde provided ethical angling and FSG information to the Pensacola Recreational Fishing Association.
- 2.58 Verlinde coordinated the Santa Rosa County FY 2008-2009 FWC artificial reef monitoring proposal application for \$20,000. The proposal was not funded.
- 2.59 Sweat created a recreational work action group that held a training session for FSG agents. This training was held aboard the R/V Discovery and taught agents the use of reef fish mortality reduction devices such as circle hooks, dehooking tools and venting techniques to overcome barotraumas – see also 2.10.
- Diller participated in recreational fishing and artificial reef work action group discussions during the annual Sea Grant Extension meeting in Cedar Key and will continue effort in both areas.
- Jacoby participated in production of a video on sustainable fishing practices for inclusion in the Living Green series.
- Verlinde participated in recreational fisheries work action team planning and training in Cedar Key.

Goal 3: Aquaculture: Develop the food and ornamental fish segments of Florida's marine aquaculture industry.

Florida's aquaculture industry is valued at over \$100 million. The commercial culture of hard clams is one major success story and FSG now is supporting research to develop the marine ornamental species sector. The following are examples of research and extension activities aimed at increasing the value and sustainability of these aquaculture sectors.

Aquaculture Research Projects

- 3.1 **Evaluating Diets of Marine Ornamental Fish Larvae.** High mortality during larval culture remains a major obstacle to the successful rearing of a large number of marine ornamental fish species. In particular, catastrophic mortality is associated with first-feeding or the "critical period" during which larvae switch from endogenous to exogenous feeding. This phenomenon creates a need for research aimed at determining the causes of mass mortality during the early stages of exogenous feeding in hatchery-reared marine ornamental fish larvae. (Turingan/Creswell/Gaines: R/LR-A-41PD)
- This project provided new information regarding the development of the feeding apparatus, variation in prey capture performance, swimming behavior in relation to capture of

zooplankton prey and mortality and growth of economically important species of marine ornamental fish.

Potential Impacts: Feeding guidelines developed as part of this project can be used by the marine ornamental fish hatchery program in Florida to increase efficacy of fish production.

- 3.2 **Evaluating Triploid Clams for Tolerance of Heat Stress.** Florida has approximately 350 active clam growers producing a crop worth \$18.2 million in 2001. Recently, the need for a hardier clam strain has become evident as clam culturists in Florida report below average survivals or total losses during the prolonged hot summers. Triploid clams may be a solution to this problem as they are virtually sterile, thereby spawning does not occur and energy is available during this stressful period for basic metabolism (Scarpa/Baker/Sturmer/Adams: R/LR-A-39)

This work is in progress. The investigators have successfully cultured replicated groups of triploid and diploid clams under controlled experimental conditions and survival is being compared under different environmental conditions. Adams finished an analysis of the marginal change in hatchery costs associated with producing triploid clam seed. The project is scheduled to be completed in 2008.

- 3.3 **Enhancing Production of Marine Ornamental Fish Larvae.** The goal of this study is to develop effective and sustainable hatchery technology for the difficult-to-raise marine ornamental fish species *Centropyge flavissimus* (lemonpeel angelfish) and *Liopropoma carmabi* (candy basslet). These species demand a high price in the aquarium trade and have been successfully spawned in captivity. Researchers will use a novel approach that integrates the development of feeding kinematics, feeding mechanisms and feeding performance in the development of stage-specific feeding regimes that will enhance survivorship during the larval rearing of these species. (Turingan/Creswell/Gaines: R/LR-A-43)

Preliminary results indicate that use of high-speed videography, feeding performance trials and mortality experiments will provide empirical bases for formulating effective feeding management strategies for marine ornamental fish that will lead to increased productivity for the aquaculture industry. Progress on this important effort to enhance production of ornamental marine fish has produced positive results in increasing survival of larval marine species, and the results were recently presented by Creswell at the 4th International Conference of the Marine Ornamental Community in Orlando. This project is scheduled to be completed in 2008.

- 3.4 **Diversifying the Clam Industry.** The Florida clam industry is built on a single species. Diversifying the shellfish industry by developing farming technology and markets for other bivalve species, such as the sunray venus clam, will increase the economic stability and growth of the industry. The sunray venus clam, *Macrocallista nimbosa*, is an attractive venerid clam distributed from South Carolina to Florida and the Gulf states. The study goal is to develop, test and demonstrate biological and technical methods to spawn and culture the sunray venus clam for its potential as a new molluscan species for Florida shellfish producers. (Scarpa/Sturmer/Creswell: R/LR-A-44)

In an effort to diversify the Florida clam aquaculture industry, the researchers successfully produced juvenile sunray venus clams through hatchery techniques and are collaborating with shellfish growers to produce harvestable clams for market analysis. During 2007 a total of 80,000 sunray venus clams were planted in growout systems (soft bags, bags with internal PVC frames, or hard cages) at densities of 20 to 70 ft². These field trials are being conducted in collaboration with four industry partners at lease areas in two counties (Franklin and

Levy) to develop, test and demonstrate biological and technical methods to culture the clam. This project is scheduled to be completed in 2009.

Aquaculture Extension Activities

- 3.5 Adams is continuing work on a NSG-funded study with University of Connecticut concerning the economic feasibility of bio-fouling control for commercial shellfish culture operations. A national survey of molluscan shellfish growers has been completed and will be the focus of a presentation to be given at the 2008 National Shellfisheries Association Meetings in Providence, R.I.
- 3.6 Adams completed a FWC/ARC funded study with Mote Marine Aquaculture Park regarding the economic feasibility of pompano culture in Florida. The study focused on the cost of producing pompano fingerlings utilizing the Mote culture methods. A final report has been submitted to Mote Marine Laboratory.
- 3.7 As a follow-up to the successful project above, Adams has been asked to further assist Mote Marine in addressing the economic feasibility of several marine finfish and crustacean species.
- 3.8 Adams gave a presentation on a hypothetical shrimp culture facility at the Aquaculture 2007 meeting in San Antonio. Approximately 30 people were in attendance. Several expressed strong interest in the low-cost, low-investment culture technique as a viable means for circumventing the commodity shrimp market for local producers.
- 3.9 Adams assisted Leslie Sturmer in work concerning the triploid hard clam project and the sunray venus clam project. Work on the sunray venus project will continue into 2008 and 2009.
- 3.10 Adams and Sturmer completed a FSG project report that addresses the additional costs associated with producing triploid hard clam seed. The analysis identifies the production increases that would need to be achieved in order to recover the additional production costs with seed sales.
- 3.11 Adams continued to work on the FSG-funded sunray venus clam culture project (w/ Leslie Sturmer and John Scarpa).
- 3.12 Adams continued to serve as Chair of M.S. student Jennifer Clarke. Clarke completed her thesis and won the Best Thesis Award in her academic department. She has also been nominated for a similar award at the national level for both the American Agricultural Economics Association and the International Association of Aquaculture Economics and Management. Her thesis will serve as the basis for a professional paper to be given at the Aquaculture America 2008 meetings in Orlando.
- 3.13 Adams served as the FSG representative of the FWC AICC. He prepared and submitted an annual report on FSG aquaculture activities.
- 3.14 Adams served as the FSG representative on the Aquaculture Sub-committee of the Florida Oceans and Coastal Resources Council. He provided information used in a final report prepared by the Council staff.
- 3.15 Creswell and Courtney Ohs developed a new series of electronic publications to address the potential of specific marine fishes and invertebrates for commercial aquaculture development. As the genesis of an ongoing series, the first were dedicated to establishing criteria for choosing aquaculture candidates, spiny lobster culture and farming croaker (an

- economically important baitfish species). Extension fact sheets for several other potential aquaculture species are being prepared to continue the series.
- 3.16 Six 30-minute radio programs were broadcast over WPSL, Port St. Lucie, (150,000 listeners) devoted to aquaculture topics, including clam culture, the history of Florida aquaculture, baitfish culture, queen conch, shrimp farming and others (Creswell).
 - 3.17 A workshop on the potential for baitfish/shrimp aquaculture in Florida was postponed until 2008. (Creswell/Ohs)
 - 3.18 A manual for the cultivation of ponderous and blood ark clams as a diversification of the hard clam aquaculture industry is in preparation, to be published in spring 2008 (Creswell, Sturmer, Nunez, Baker).
 - 3.19 Preliminary results from the project to demonstrate the aquaculture potential of the sunray venus clam will be presented at the annual meeting of the World Aquaculture Society in 2008 – see 3.4 (Scarpa/Sturmer/Creswell: R/LR-A-44). In fall 2007, Creswell had an article in the “Bivalve Newsletter,” published by Leslie Sturmer and distributed to Florida’s clam growers, presenting the positive results of the hatchery and nursery phase of the project. Sunray venus clams will be harvested in spring 2008 for market evaluation as the final phase of the project.
 - 3.20 Fluech attended an aquaculture workshop in January of 2007.
 - 3.21 Leonard conducted several workshops on pond management.
 - 3.22 No activities related to the Brevard County clam industry were conducted.
 - 3.23 Mahan provided one-on-one consultations to 43 people to answer their fresh and saltwater aquaculture questions. As a result of the consultations, 40 of the individuals decided that aquaculture was not a business in which they wanted to be involved. The remaining three requested additional aquaculture information.
 - 3.24 Mahan worked with the FDACS Division of Aquaculture to improve coordination between Florida’s aquaculture regulatory agencies and the aquaculture industry. The goal is to ensure that marine aquaculture activities are conducted appropriately and the needs of both industry and resource managers are met. No major issues arose this year that required any action on the Agent’s part.
 - 3.25 Sturmer and Mahan continued to work with local farmers on topics such as marketing their clams. As a result, farmers now offer their clams for sale at the newly formed Farmer’s Market in Apalachicola, are working with local chefs to feature local clams on their menus and are getting ready to sell their clams at a Farmer’s Market that is scheduled to open in Port St. Joe in early 2008.
 - 3.26 An electronic publication on Recommendations for Ornamental Aquaculture Production Facility Emergency Preparedness is being reviewed by the USDA/APHIS aquaculture epidemiologist Hartman (Carlos Martinez).
 - 3.27 Martinez continues to work with the Sherriff’s Training and Respect (STAR) program and its aquaculture production of both redfish and tilapia.
 - 3.28 Martinez continues extension and outreach activities to support all marine ornamental producers throughout Florida.
 - 3.29 Martinez hosted the Focus on Aquaculture Commodities training at the Tropical Aquaculture Laboratory in Ruskin. This provided technical support, training, and information on marine ornamentals and resulted in three electronic publications.

- 3.30 Martinez collaborated with researchers at North Carolina State University in developing a multi-state Induced Spawning Workshop.
- 3.31 Due to scheduling conflicts, Martinez was unable to participate in the regional small farms conference that will be held at the UF/IFAS Mid-Florida Research and Education Center in Apopka.
- 3.32 Martinez continued to provide technical assistance in hands-on demonstration projects and field visits to marine ornamental farmers in such topics as water quality, fish health and disease, induced spawning and restricted-use pesticide training.
- 3.33 In 2006, the Florida legislature appropriated funding to assist hurricane-affected clam farming businesses. During 2007, Sturmer assisted a clam industry task force in identifying a multi-service assistance program. The local growers' organization established eligibility criteria and administered the program resulting in payments being made to 12 hatcheries to improve their capabilities to increase clam seed production, and assistance to 105 growers to purchase seed (a total of 1.5 million clam seeds) and culture equipment, and to growers to assist in lease clean-up and replacement of lease markers. In addition, these funds were directed towards purchasing and distributing educational/informational signs for lease areas in six counties, and replacement equipment to re-establish water quality monitoring stations.
- 3.34 Sturmer participated in two international conferences during which she gave nine presentations about Florida shellfish aquaculture on topics such as disaster response, clam health, ark clam culture, triploidy and water quality monitoring.
- 3.35 Sturmer provided technical assistance in counties where clam farming is ongoing (Levy, Dixie, Charlotte, Lee, Collier, Brevard, St. Lucie, Indian River and Franklin). This year she also led a workshop where faculty from the UF Department of Fisheries and Aquatic Sciences reported on ongoing projects that have application to the clam farming industry, such as genetic diversity, hybridization, triploidy, health assessment and coastal eutrophication. Afterwards over 75 industry members participated in break-out sessions providing feedback and direction to the researchers. This format will be used to conduct annual meetings for timely information exchange between growers, extension agents and researchers.
- 3.36 With funding through a USDA special research grant, Sturmer led a team of researchers to investigate the use of stock hybridization for improving clam production and to assess the soil characteristics of lease areas. During 2007, triplicate families of northern hard clams, southern quahog clams, and their reciprocal hybrids were produced following standard protocols used in hard clam culture. In 2008, approximately 40-60K clam seed of each family will be field nursed and grown under commercial conditions. Production characteristics, e.g., growth and survival, will be compared between these families at several stocking densities and site locations. This applied research project addresses problems growers are experiencing during the summer months with increasingly high mortalities and unreliable production.
- 3.37 Sturmer continued to evaluate the production and processing for alternative techniques and alternative species of clams for Florida clam growers (Sturmer).
- 3.38 Sturmer provided statewide service to clam grower associations (Cedar Key Aquaculture Association, Statewide Clam Industry Task Force, Florida Aquaculture Association). By participating in these meetings, she gained timely input from a cross section of the state's industry on programming needs in extension.

- 3.39 Sturmer provided easy access to up-to-date information on shellfish aquaculture in Florida through a Web site (<http://shellfish.ifas.ufl.edu>), quarterly newsletters (The Bivalve Bulletin), articles in other newsletters (WaterWorks, East Coast Shellfish Growers Association, Florida Aquaculture), two electronic fact sheets (The Role of Temperature in Hard Clam Aquaculture, The Role of Salinity on Hard Clam Aquaculture), and articles in national trade magazines (Global Aquaculture Alliance).
- 3.40 Sturmer maintained a shellfish aquaculture research and education facility in Cedar Key. This salt-water running laboratory on Florida's Gulf of Mexico coast allows UF faculty to address the research needs of clam farmers and was used in providing support to several USDA-funded projects.
- 3.41 Sweat provided aquaculture consultations to 48 clients. At the request of Franklin County CED, he visited a shrimp farm in Port St. Joe in Oct., providing consultation.
- 3.42 Sturmer was involved in the following activities in addition to those identified in the 2007 work plan.

With UF Department of Fisheries and Aquatic Sciences faculty she initiated an examination of clam stocks in the Cedar Key area during the problematic summer months to determine if environmental diseases or pathogens are present. In addition, USDA Hatch funding allowed for the purchase of temperature loggers which were deployed at 18 lease sites in the Cedar Key area during the summer months to provide detailed and broad coverage of water temperatures and to adequately describe spatial variability.

She continued a project in Cedar Key, funded through hurricane disaster relief federal funds, which allows for clam shells to be picked up at participating wholesalers and stored at a county site until used in oyster shell replanting efforts by the FDACS.

With a local growers association, she hosted and conducted a ribbon-cutting, clam bake and educational presentations for project partners and the clam farming community to celebrate the grand opening of a parking lot for trucks and boat trailers. Two lots in Cedar Key were purchased and site improvements made with funding obtained from a USDA Rural Development grant. This allows 48 growers designated parking adjacent to a boat ramp, providing them with access to their businesses located in inshore coastal waters.

With the Suwannee River Partnership and funding procured through the state legislature and the Suwannee Valley RC&D Council she implemented a pilot program to recover damaged clam farming equipment ("derelict" bags) and to reuse them as building blocks for oyster restoration. Over 1,600 derelict clam bags were removed from 28 leases and a 0.1-acre oyster reef was created. Positive benefits of the pilot program included 1) reclaiming impaired shellfish leases; 2) providing an opportunity to recycle marine debris for a beneficial use; 3) supplying a valuable alternative source of cultch material to construct and restore oyster and fisheries habitat; 4) providing service-related business opportunities; and 5) contributing to the recovery of small-scale clam farming businesses. A grant was submitted to the NOAA Marine Debris Program to provide funding to expand this program in 2008.

A cooperative partnership agreement among the USDA CSREES, the Shellfish Aquaculture Extension Program and FDACS with funding from the USDA Risk Management Agency has allowed for continued operation of water quality monitoring stations. Five real time weather and water quality monitoring stations were maintained at lease areas in four coastal counties (Dixie, Franklin, Indian River, and Levy). Monthly data is archived and provided in

farmer friendly graphs to the clam farming industry, allowing them to make timely and informed management decisions.

Sturmer upgraded a clam farming exhibit, including a mock clam farm, and participated in the Sunbelt Agricultural Exposition, Georgia; Seafood Festival, Cedar Key; and the FSU Marine Lab Open House, Carrabelle. With the clam growers association, she hosted the 4th Annual CLAMerica Celebration held on 4th of July in Cedar Key. This food festival featured Clamania events for children, a cook-off to showcase a variety of clam recipes, clam cooking and shucking demonstrations, and other clammy educational experiences for the public.

Goal 4: Seafood Safety: Improve the quality and safety of Florida's seafood products.

Florida has about 5,000 seafood processing plants and firms that range from small retail shops to the Nation's largest shrimp processors. All are responding to increasing demand, shifts in available seafood supply, increasing international trade and competition, new regulatory inspection mandates and environmental concerns. The broad goal of this programmatic area is to maintain and enhance the safety, value and volume of seafood products in Florida and in the United States. Sea Grant sponsored research is working to 1) enhance the production and marketing of seafood; 2) eliminate biological and chemical hazards in seafood; and 3) promote the safe handling and processing of seafood.

Seafood Safety Research and Extension Projects

- 4.1 **Controlling Oyster Infection with *Vibrio vulnificus*.** A project dealing with genetic control of virulence in *Vibrio vulnificus* was completed and reported in 2006 (Wright: R/LR-Q-27).
- 4.2 **Evaluating Oyster Marketing.** A historical change is occurring in the production and marketing of oyster products due to federal mandates for alternative processing methods and changes in public perceptions and preferences. Specifically, the mandate for post-harvest testing will influence the sensory attributes of the traditional oyster products. Concurrently, public confidence is growing weaker concerning the safety of raw oysters and buyers are using more scrutiny in selection of raw oysters. Four university Sea Grant programs (UF, LSU, MSU, OSU) will collaborate in the development of a non-biased, scientific based sensory description analysis (DA) or profile description of raw oysters that provides the necessary product descriptors (lexicons), reference standards, vocabulary and intensity scales for a complete product characterization (PC) program (Ottwell: R/LR-Q-28).

The researchers have established panels and conducted group meetings to develop standard profile descriptions, lexicons and ratings for oyster product characterizations. In addition, group meetings have been convened to develop a 'condensed version' of the product characterization that can be used in eventual virtual training and technology transfer to commercial and agency groups. The project has been extended due to impacts from Hurricane Katrina and is scheduled to be completed during 2008.
- 4.3 **Reducing the Risk of Contaminated Oysters.** In 2003, the Gulf of Mexico region produced 72 percent of the national oyster harvest (29.2 million pounds of meat), totaling \$74.16 million. One factor negatively affecting the Gulf oyster industry is the pathogen *Vibrio vulnificus*. Consumption of this pathogen by healthy individuals may result in ephemeral illness, but for individuals considered "at-risk" (i.e., those with compromised immune systems, diabetes or liver disease), *V. vulnificus* infections can result in a >50% mortality rate. The objectives of this research are to: 1) conduct market segmentation studies

to determine oyster consumer groupings and their demographic and oyster eating preferences to better direct educational and marketing efforts to reach the general and at-risk oyster consuming population; 2) utilize the results of the consumer segmentation research in complementary educational campaign targeting the general oyster consumer to increase awareness of Value Added Product (VAP) and Post Harvest Processed (PHP) oyster products that reduce the risk of *V. vulnificus*; 3) disseminate results of the consumer segmentation analysis to the Gulf oyster industry and other interested parties to allow them to assess the market/business potential of PHP and VAP oyster products in underdeveloped and new oyster-consuming markets; and 4) disseminate results of a concurrent oyster sensory research program during educational efforts to allow oyster consumers and interested parties to identify and connect with the inherent flavor differences between oysters. This project is scheduled to be completed in 2008. (Jamison: R/LR-Q-29).

The Gulf and South Atlantic Fisheries Foundation, Inc. has partnered with the Mississippi Department of Marine Resources and the Mississippi State University Coastal Research and Extension Center to determine Raw Oyster Consumption (ROC) eating preferences and to evaluate consumer acceptability of PHP raw oyster products through a Willingness to Buy (WOB) model. Initial results show that people who were aware of the health risks and methods to reduce risks were positively influenced in their willingness to buy PHP products. The Mississippi State Department of Marine Resources has promoted the consumption of PHP products in a variety of venues (public radio, Web site, trade conventions and festivals). This project has been extended due to impacts from Hurricane Katrina and is scheduled to be completed during 2008.

- 4.4 **Rapid Testing of Oyster Safety.** The FDA recently mandated validation and verification protocols for oysters that quantify *Vibrio vulnificus* before and after treatment. However, standard assays are time-consuming, labor intensive, expensive, and unreliable. Direct comparison of quantitative PCR (QPCR) assays to standard methods is needed to establish the most effective approach for the seafood industry to address the validation and verification of PHP for reduction of *V. vulnificus* in oysters. Research will provide experimental analysis and field-testing of improved QPCR methods designed to provide the seafood industry with more accessible, practical, and cost-effective analysis of *V. vulnificus* in PHP oysters (Wright/Rodrick: R/LR-Q-30).

This project is scheduled to be completed during 2008. Initial results indicate that the QPCR assay was comparable or more sensitive than standard methods.

Potential Impact: This new method will eliminate two to three days of assay time, and can be performed by a single technician.

- 4.5 **Evaluating Efficacy of Consumer Notifications.** Objective information is needed to inform consumers of the potential risks associated with *Vibrio vulnificus*. Researchers will implement Web and telephone-based surveys to determine consumer behavior toward seafood safety information across different media sources. Consumer responses will be measured and their relative impact on consumer behavior quantified (Morgan/Huth/Martin: R/LR-E-19-PD).

This project seeks to quantify the effectiveness of different information sources (i.e., telephone versus Web-based) to reach and characterize oyster consuming populations regarding knowledge of *V. vulnificus* and different oyster treatment processes. The project is scheduled to be completed during 2008.

- 4.6 **Improving Fish Preservation Methods.** The possibility, extent and quantification of color enhancement of fish using carbon monoxide is unknown. Computer machine vision, electronic nose, microbial analysis, and sensory panel tests will be conducted to generate a complete data set regarding possible color enhancement of various fish. This type of data is needed to give regulatory agencies a scientific basis for decision making and to guide the industry to develop effective CO treatment methodologies without the potential pitfalls and disadvantages of this technology (Balaban/Kristinsson/Otwell: R/LR-Q-31).

The researchers have developed and applied a method, using carbon monoxide, to treat fish so that it retains a fresh appearance for longer periods. The method was developed and tested on tilapia and is now being implemented on catfish and amberjack. The development of an objective test for smell (for better discrimination of quality) using an electronic nose is also planned. This project has been extended and is scheduled to be completed during 2008.

Seafood Safety Extension Activities

- 4.7 Mahan continued work with Steve Otwell (FSG Seafood Specialist) on USDA CREES grants to develop and certify PHP techniques to reduce that number of *Vibrio vulnificus* bacteria to non-detectable levels in PHP oysters. As a result of this work, three processors have had their oyster PHP methods certified to meet the Food and Drug Administration's (FDA) requirements to label their product as PHP oysters. Thus, Florida has also met FDA's requirement that Florida have the capacity to PHP 25% of the oysters that are harvested for the half-shell raw consumption market.
- 4.8 Mahan and Otwell also continued to provide technical assistance to Florida's oyster industry as it works to develop management strategies to address concerns that the FDA and the Interstate Shellfish Sanitation Conference have about *Vibrio parahaemolyticus* and reducing the number of illnesses caused by this bacteria.
- 4.9 Mahan attended the 2007 ISSC Meeting in Albuquerque and was appointed by the Chairman of the ISSC Executive Board to serve on the following committees; *Vibrio* Education Subcommittee, Biotoxin, Education, Foreign Relations and Post Harvest Processing Review Committees.
- 4.10 Mahan participated in the first Oyster School held in Apalachicola in October, which proved to be a big success with the 20-national/regional seafood buyers/distributors who attended as well as the local industry and community. It was so successful that plans are already underway to have the second Oyster School in 2008 and to expand the school to include clams.
- 4.11 Mahan was reappointed by the Chairman of the Executive Board to the *Vibrio* Education Subcommittee and the Education and Biotoxin Committees for 2007. In addition, Mahan was appointed to a new Foreign Relations committee for the 2007 meeting. As a result of these appointments Mahan was updated on the pressing issues in these areas and was able to share this information with the FL oyster industry and State, County and City officials.
- 4.12 Mahan continued to work with the FDACS *Vibrio vulnificus* work group monitoring the *Vibrio vulnificus* illness rate in Florida and in Gulf of Mexico. Based on 2007 illness data it seems unlikely Florida and the other Gulf states will meet the 60% illness rate reduction by the end of 2008. In addition, Mahan was appointed to the new FDACS *Vibrio parahaemolyticus* (Vp) work group charged with developing a state management plan that will comply with new FDE regulations to reduce Vp illnesses in the U.S.

- 4.13 Mahan provided 53 one-on-one/small group consultations to seafood processors, harvesters and retailers about assorted seafood safety issues and topics (see also 2.41).
- 4.14 Otwell held a cooked shrimp processor certification school for 40 processors in New Orleans on February 19-21, 2007.
- 4.15 The first annual Shrimp Product Development School was postponed.
- 4.16 Otwell conducted the annual international shrimp school at UF, June 2-5, 2007.
- 4.17 Otwell continued oversight inventory and operation of HACCP educational materials for the national program.
- 4.19 Otwell continued to coordinate the National Seafood HACCP Alliance.
- 4.20 More than 600 trainers and users attended a seafood HACCP update session conducted by Otwell at various sites across the United States.
- 4.21 Otwell continued leadership and advisory positions with number of seafood technology organizations, as follows:

 Otwell continued as Executive Director of the Seafood Science and Technology Society (SST). He participated in the annual SST conference in Seattle, WA.

 He was U.S. Representative on the Board of Directors for the International Association of Fish Inspectors (IAFI) – convened in Ireland.

 He was U.S. Advisory Representative to the European Seafood Plus organization involving every European nation collaborating in various aspects of seafood safety and quality research. Otwell attended the annual meeting held in Copenhagen, Denmark in June 8-11, 2007.
- 4.22 Otwell continued research in the use of Post Harvest Treatments (PHT) for production of safer Florida oysters for raw consumption. He conducted Oyster School for the wholesalers and processors in Apalachicola. He also conducted the first National Seafood Buyers program in Apalachicola on October 17-18, 2007.
- 4.23 Otwell continued to participate in the development of a Mark of Quality program for the U.S. domestic shrimp industry, and worked in collaboration with Sea Grant staff at TAMU, LSU, MSU, UGA, Clemson and NCSU.
- 4.24 Sweat held seafood safety workshops and demonstrations in four locations.
- 4.25 The recreational scallop restoration program was terminated due to loss of funding.
- 4.26 Verlinde participated in a two day seafood safety in-service training.

Goal 5: Waterfront Communities: Increase the economic competitiveness and environmental sustainability of coastal communities and water-dependent businesses.

Managing coastal development and waterways is a critical challenge in Florida. Water-dependent small businesses are at risk and FSG is supporting research and policy development to help water-dependent businesses maintain access to coastal waters. More than one million boaters use Florida’s waterways, creating the need for improved waterway access and maintenance, greater public safety, improved boater education and enhanced resource management. FSG is supporting coastal planning, legal analysis and policy

initiatives within this goal area to ensure safe navigation, promote recreational and commercial access to waterways and to encourage the responsible use and management of Florida's waterways.

Extension activities were devoted to supporting FSG sponsored research and outreach programming which included 1) participation in the Clean Boating Partnership and Clean Marina Program; 2) participation in the Southeast Atlantic Coastal Ocean Observing System program; 3) working with marine advisory committees and local governments to preserve working waterfronts and to promote waterway access and navigation; and 4) developing and conducting GIS training courses.

Waterfront Community Research and Extension Projects

- 5.1 **Promoting Smart Coastal Growth.** In coastal communities across the nation, there is a growing concern that current development patterns, dominated by what some call sprawl, are contributing to water quality and environmental degradation. Though supportive of growth, communities are increasingly seeking solutions to balance growth with community and environmental values. Projects will be developed on smart growth activities that address the land/water interface, in consultation with agencies and local decision-makers (Spranger/Sidman: R/C-P-28CC).

Much of the existing spatial information used for comprehensive planning is land-oriented and does not characterize important human uses of coastal resources, such as recreational boating. There is a growing need for spatially explicit boating data as expressed by various entities throughout Florida (e.g., state agencies, local governments). To address the broadening spectrum of both spatial and behavioral boating data needs, FSG has partnered with the FWC Fish and Wildlife Research Institute (FWRI) to implement a series of recreational boating characterizations throughout the state. Most recently, Brevard County requested boating data in support of the County's Comprehensive Maritime Management Master Plan.

Impacts: Brevard County is using the information from this study to determine the use profiles of public marine facilities to determine which facilities are being used to capacity and which are being underutilized. The results have allowed Brevard County to determine the extent to which boating facilities accommodate local and visiting populations as a means to compete for limited state boating facility improvement grants. The methods and results of the Brevard County study have been summarized as a FSG Technical Paper (TP 160).

- 5.2 **Fostering Safe and Effective Waterway Management.** The FSG Boating and Waterway Management Program (BWMP) is enhancing comprehensive waterway planning implementation strategies in Florida by 1) identifying and pursuing opportunities for coastal smart growth collaboration with communities and state agencies, 2) developing science-based information, planning models, and innovative tools and methods to encourage sustainable growth and waterway management 3) applying Geographic Information Technologies (GIS) to provide solutions that foster sustainable shorefront development, waterway resource stewardship, and boating safety, and 4) providing training opportunities for Extension faculty who will use the information in their individual education and outreach activities (Spranger, Swett, Sidman: R/C-P-29).

This project has been continued through 2009 to partially support the efforts of a FSG Coastal Planning Specialist who will work within the Boating and Waterway Management

Program on a variety of GIS-based waterway management / planning projects and applications.

Impacts: The Coastal Planning Specialist completed a recreational boating characterization study for Brevard County which is serving as input to the County's Comprehensive Maritime Management Master Plan. The Coastal Planning Specialist has developed a model to evaluate boating safety risk along Florida's waterways as input to a boating safety zone analysis for the FWC Division of Law Enforcement, Boating and Waterway's Section. This information will form the basis for the development of new boating safety zone rulemaking for Martin and Palm Beach County waterways.

5.3

Implementing Effective Waterfront Planning and Policy. Local waterfront governments are benefiting from a comprehensive legal analysis of their coastal policy making authority, especially in the confusing nearshore jurisdictional environment, and from a systematic assessment of the planning tools at their disposal that is packaged in a usable format. This project will be an applied legal and policy research and model code development project, coupled with legal and planning extension to disseminate results. Working with selected communities, investigators will marshal information and develop locally applicable policy plans adapted to individual community needs (Ankersen/Hamann/McLendon: R/C-P-30).

This grant has been continued to support legal extension to state and local policy professionals across a range of waterway and waterfront issues including recreational and working waterfronts, boating and waterway management, and coastal development policy. This research has resulted in the development and implementation of a waterfront policy tool kit focusing on public waterway access.

Impacts: Researchers are now working with interested communities around Florida to adapt and apply this tool kit to meet local needs and future circumstances (e.g., climate change and sea level rise). For example, several communities have made use of the policy planning tools in drafting the coastal management element of their plans (Punta Gorda, Bradenton Beach), and creating public access overlay districts (Panacea). A "Waterways and Waterfronts: A Community Guide and Policy Tools" Web site has been developed to disseminate policy guidelines generated from this project. Another important project outcome includes the design and implementation of a spatially explicit geo-referenced legal database which compiles coastal community ordinances establishing on-water regulatory zones (this project was coordinated with researchers associated with the Florida Sea Grant Boating and Waterway Management Program: project R/C-P-28CC). The database has been invaluable to ongoing legal assistance to communities and counties and to the FWC.

A coastal community waterfront policy tool kit focusing on public water access has been developed in partnership with the UF Law School Center for Governmental Responsibility. This tool kit includes a set of model goals, objectives and policies that local governments can adapt to their unique circumstances in order to comply with legislative coastal access planning mandates. Goals, objectives and policies must be included in every element of every local government comprehensive plan in Florida. The model goals, objectives and policies developed have been reviewed and accepted by the Florida Department of Community Affairs, charged with overseeing implementation of the legislation. To disseminate this information, a Web site titled "Waterways and Waterfronts: A Community Guide and Policy Tools" has been developed that responds to each of the issues areas stated in the objective and populates the page with the resources being developed (<http://www.law.ufl.edu/conservation/waterways/>). The Center for Governmental

Responsibility continues to provide legal and policy support to the Florida Department of Community Affairs Waterfronts Florida Partnership Program and its participating communities. Recently, the Center received extramural funding to conduct a comprehensive plan compliance review of the program's graduate communities and to assist new communities with integration of their waterfront vision into their comprehensive plan (Ankersen).

- 5.4 **Supporting SE Atlantic Coastal Ocean Observing.** FSG Extension will continue its fifth year of outreach activity as a component of SEACOOS. Regional products and resources include: 1) completion of a fourth SEACOOS/COSEE poster, *Catching the Current: Who Goes with the Flow*, and related Web activities for the classroom at <http://seacoos.org/CommunityandClassroom/currents-classroom/>; and 2) completion of an instrumented model buoy and written content for its companion kiosk. One kiosk is on display at the Roper Mountain Science Center, Greenville, SC; two more are in development for the SC Aquarium (Charleston) and SC Science Center (Columbia). The project will end in March, 2008 (Simoniello).

- 5.5 **Supporting Gulf of Mexico Coastal Ocean Observing.** Mike Spranger continued to provide leadership in the development and evolution of the Gulf of Mexico Coastal Ocean Observing System Regional Association (GCOOS-RA), the Southeast Atlantic Coastal Ocean Observing System Regional Association (SECOORA) and the Florida Coastal Ocean Observing System (FL COOS) Consortium.

Spranger coordinated and chaired the first-ever meeting of the Gulf of Mexico Coastal Ocean Observing System (GCOOS) Education and Outreach Council (EOC) and the Gulf of Mexico Environmental Education Network (EEN). The meeting was held to take advantage of shared memberships, to explore ways to complement the respective organizations, and to develop future collaborative educational projects. Approximately 45 individuals from a variety of educational institutions from the Gulf of Mexico region attended this meeting. Spranger also chaired a committee to develop a draft strategic plan for the EOC, and served as a member of a steering committee to hire a GCOOS Educational and Outreach Coordinator. He was also re-elected to the GCOOS Board of Directors, as well as the Executive Committee.

Spranger also participated in meetings where the Southeast Atlantic Coastal Ocean Observing System (SEACOOS) transitioned into the new Southeast Coastal Ocean Observing Regional Association (SECOORA). SEACOOS was a five-year research and education project funded by the Office of Naval Research. During the past five years, FSG received approximately \$750,000 to coordinate regional educational and outreach efforts. The SEACOOS project officially ends in March, 2008.

Spranger participated in several meetings of the new Florida Coastal Ocean Observing System Consortium (FL COOS) and was invited to serve on their Education and Outreach Subcommittee. The subcommittee provided formal comment to the Florida Department of Education on new learning standards for science.

- 5.6 **Developing a Waterway Master Plan for Alachua County.** Alachua County's system of freshwater springs, lakes, and rivers represents a unique resource in the regional recreational geography, serving as destinations for various recreational pursuits. The UF Department of Tourism, Recreation and Sport Management and the FSG Waterway Management Program assisted the County in the development of a countywide waterways master plan for

achieving sustainable water-based recreation through community visioning, education, and waterway planning and management.

Legal support to the Alachua County Waterways Master Plan was provided throughout the process. The Alachua County Board of County Commissioners accepted the final report for the countywide Waterways Master Plan and acted on the goals and recommendations provided by the UF team. (Holland/Swett/Delaney/Ruppert/Schnell/Davidson/Sidman/Jett)

Waterfront Community Extension Activities

- 5.7 Diller assisted during the certification process of two marinas at Pensacola Naval Air Station becoming Clean Marinas. More than 200 people signed the Clean Boating Pledge promising to follow best management practices while boating to protect water quality, habitat, and endangered species. He wrote and filmed a portion of the Resource Rangers: Pollution Prevention video demonstrating proper use of bilge socks and fueling donuts to eliminate fuel spills.
- 5.8 Gregory provided educational support for the Clean Marina program at Treasure Harbor Marina.
- 5.9 Gregory participated in 11 local government meetings aimed at preserving Florida Keys working waterfronts (see also 2.32).
- 5.10 Leonard assisted in the coordination of ramp and marina surveys in support of a Brevard County Recreational Boating Characterization (see activity 5.2 above).
- 5.11 Mahan completed a feasibility study on constructing a Seafood Industrial Park in Franklin County. A final report was written and presented to the county commission. Much of the report's water access/potential boat ramp section was based on the information that Mahan provided the consultants.
- 5.12 Mahan continued to work in Franklin County with state agencies and private land owners to identify potential boat ramp sites in the county. As a result, one site was purchased this year for improving an existing ramp site, one site is being prepared to begin construction of a new ramp and another site has been identified as a high-priority purchase site to support the commercial seafood industry.
- 5.13 Mahan provided information to Apalachicola officials on new state derelict vessel regulations that will allow the city to independently take steps to declare boats as derelict or abandoned and not have to wait for FWC officers to initiate legal action against the boat's owner. As a result, several boats have been declared abandoned and have been removed from the city's working waterfront area.
- 5.14 Mahan worked with Michelle Adamski (Wakulla County FCS Agent) to plan, coordinate and teach a regional low-impact development workshop with Pierce Jones and his low-impact development group at UF, targeting local city and county officials. As a result of the program, a total of 20 elected officials, county/city planners, and plan and zoning board members increased their knowledge about low impact developments in Florida. In addition, counties and cities that sent officials are now eligible for federal grants to implement low-impact principles in their comprehensive plans.
- 5.15 Mahan continued to work with county and city officials to address waterfront issues such as community development, public access, zoning issues and minimizing environmental impacts on coastal environments.

- 5.16 The Clean Marina Program in the Northeast District has slowed considerably in the past few years. No marinas or boatyards in the region were working towards designation.
- 5.17 Maia McGuire coordinated a meeting between the Georgia Sea Grant Clean Marina coordinator and the marina manager of a Florida Clean Marina in Amelia Island. The Georgia coordinator was very pleased with the meeting and stated that he had gained some new insights to apply to his state's fledgling program. He was also happy that the Florida marina manager was willing to come to Georgia as a guest speaker for a marine industries meeting. McGuire also connected him with a wetlands specialist in the state who is interested in taking the Georgia Clean Marina program to freshwater marinas.
- 5.18 McGuire worked with Volusia County extension faculty to investigate the possibility of developing a paddling trail through St. Johns County, Flagler County and Volusia County. She submitted a grant proposal in late 2007 to the FDEP requesting funds for printing of trail maps and production of podcasts.
- 5.19 Charles Sidman, Bob Swett, Susie Fann and Bill Sargent participated in activity 5.1 above.
- 5.20 Simoniello supported hurricane preparedness efforts of other Sea Grant agents by providing literature and explanation of technology used to measure topics of relevance (e.g. storm surge models, water level data), as well as maps of COOS asset locations so boaters can customize local forecasts and make more informed decisions.
- 5.21 Simoniello worked with FL COOS executive director to create the FL COOS information brochure (www.marine.usf.edu/flcoos/Brochure_Final_0607.pdf). The detailed Web site layout, including full site map and suggestions for content is completed and has been handed to SECOORA as part of transitional activities from SEACOOS to SECOORA.
- 5.22 Simoniello gave presentations and/or organized activities at: Ocean Sciences, Orlando; Conversation on Climate Change, St. Petersburg; SCUBAnauts International, St. Petersburg; Tampa Bay Science Leadership Group inaugural meeting; USGS Open House; FIO Operations Appreciation Day at the USCG Station, St. Petersburg; NOAA Ocean Exploration Workshop Part II, Clam Bayou; Marine Quest-FWRI; National Ocean Science Bowl-Spoonbill Bowl; Water Atlas workshop, Tampa; IOOS Key Messages and Themes Work Group; Great American Teach-In; and SEACOOS Document Team.
- 5.23 Staugler assisted with water dependent enhancement activities in Charlotte County, as follows:
- She conducted on-site training and guidance to assure Clean Marina or Clean Boatyard designation at 2 pledged marinas. One marina was designated a Clean Marina during 2007. Two additional marinas have pledged and are working towards that designation.
- She increased public awareness of Clean Marina/Clean Boatyard program through the distribution of the Boating and Angling Guide to Charlotte Harbor, and the Clean Boater outreach program. She provided Clean Boating outreach at a number of events during 2007. Over 50 boaters signed pledge cards.
- She worked with the Punta Gorda Boaters Alliance to develop a marine overlay district for the City of Punta Gorda waterfront. She also worked with the UF Law School (Tom Ankersen) to incorporate the elements of a marine overlay district into the City of Punta Gorda's comprehensive plan.

She worked with Team Punta Gorda to present information to the City of Punta Gorda regarding managed moorings. The City is currently working on permit applications for two mooring fields.

She worked with Swett to develop a regional waterway management system for Charlotte County. Funding to produce this guide was obtained in 2007 and work is underway.

She worked with Swett to develop a Cruising (Maritime History) Guide to Charlotte Harbor. Charlotte County Board of County Commissioners approved this project in January 2007. Staugler is working with Bob Swett to implement this project.

- 5.24 John Stevely developed information on boat ramp use that was provided to the Manatee County Board of County Commissioners.
- 5.25 Swett and David Fann are working with Lee County, FDEP, and the West Coast Inland Navigation District to implement a Noticed General Permit (NGP) for Lee County waterways using Regional Waterway Management System data and analyses. The Lee County NGP will implement non-combustion engine zones in areas of scarred seagrass to mitigate maintenance dredging activities in aquatic preserves. The rule is poised to be vetted in public meetings prior to its adoption.
- 5.26 With related extramural funding from the FWRI and the Center for Governmental Responsibility, Ankersen worked with the FSG boating and waterways program to develop an experimental spatially explicit database that maps the legally described boundaries and links the text of local ordinances that regulate boating on the water. A model has been developed, tested and presented to FWRI. This product may ultimately have utility in law enforcement and even general boater navigation. An intellectual property review by the UF Office of Technology and Licensing revealed that the concept has commercial value, but that there exists an existing pending patent over a similar method. The law/technology interface will continue to be promoted, and recommended for legislative sanctioning.
- The boating and waterways program, working with the UF College of Law, also identified, documented, mapped, and incorporated into a GIS database the myriad of local government, state manatee, and federal fishing regulations that govern boating on Florida's waterways. The FWC is including the boating regulations database in an intranet mapping service (IMS) that will be available in spring 2008 to employees throughout the agency to assist in the implementation of effective waterway management throughout Florida. Brevard County is using the database to identify conflicting and overlapping ordinances as it addresses the boating safety and interagency goals of its recently developed Comprehensive Maritime Management Master Plan. The FWC is using the database in vessel safety studies in Martin and Palm Beach counties (Swett/Ruppert/Fann).
- 5.27 Waterfront communities and coastal counties are increasingly aware of the need to develop long-term plans for their public waterways and to provide adequate public access to their coastal resources. Work on developing comprehensive boating and waterways management plans is ongoing with Bay, Brevard, and Santa Rosa counties. Legal research was provided to Brevard County staff, providing information needed to complete a marine master plan. Efforts are indirectly underway in other counties. Work is underway with FWC as well as Waterfronts Florida communities to integrate this type of planning into state law and comprehensive plan policies (Swett/Sidman/Ankersen/Cameron/ Leonard/Verlinde).
- 5.28 FSG, the Department of Fisheries and Aquatic Sciences and School for Forestry and Resource Conservation at UF conducted three GIS training sessions with 58 people attending. The UF faculty, staff and students, and agency staff who participated were asked

to evaluate the trainings. Overall, 31% of the participants rated the training “good” and 69% rated it “very good” (Swett/Lindberg/Fann/Andreu).

- 5.29 Work was done with coordinators of the Coastal Training Programs of Florida’s three NERRs, the Florida Conflict Resolution Consortium, and the Center for Economic Forecasting and Analysis to determine how to provide coastal decision-makers with the best available science-based information, tools, and techniques required to make responsible decisions about land use in Florida. Products included a literature review and a survey of decision-makers in Florida, the results of which are being used by the NERRs (Taylor/Harrington/Swett).
- 5.30 Chris Verlinde represented FSG at the 2nd quarterly Clean Boating Partnership meeting in Pensacola.
- 5.31 Verlinde completed the Angling Guide for Escambia and Santa Rosa counties. 20,000 copies were printed on tear- and waterproof paper. Many are being distributed throughout the two-county area and from the FWRI lab in St. Petersburg.
- 5.32 Verlinde provided a program on invasive species to the Bagdad (Florida) Waterfronts Partnership. Participants showed a 23% increase in knowledge concerning invasive species.
- 5.33 Verlinde supported the SRC Board of County Commissioners Marine Advisory Committee with timely information concerning waterway management issues including public access, funding resources, habitat restoration and artificial reefs.
- 5.34 Various agents worked with the Clean Boating Partnership and FDEP staff to designate new Clean Marinas and Boatyards and assist recovery of marinas damaged by hurricanes in 2004 and 2005.

In collaboration with FDEP, Creswell helped to designate two boatyards and two marinas. An educational display devoted to the Clean Marina/Clean Boater partnership and monofilament recycling was exhibited at two boat shows (Stuart, Fort Pierce), national marina day, the St. Lucie Co. Fair and four environmental festivals along the Indian River Lagoon. Information materials were distributed at all events.

Verlinde provided clean boating materials at Seagrass Awareness, Coastal Encounters and the PJC Forestry Conclave.

Goal 6: Ecosystem Health: Protect, restore and enhance coastal ecosystems.

Florida’s economy is intimately linked to the health of its coastal and marine ecosystems. The state is home to three of the nation’s 24 National Estuarine Research Reserves and four National Estuary Programs. Projects under this goal aim to improve water quality and protect and restore coastal ecosystem habitats by increasing the decision-making capacity of resource managers and by empowering citizens to be good stewards of the environment.

Extension and education activities pertaining to ecosystem health targeted: habitat restoration, including human dimension issues; Everglades ecosystem restoration; beach renourishment and habitat conservation; restoration of oyster bars, sand dunes and seagrass beds; water quality, which encompassed issues pertaining to red tide, storm-water runoff and participation in Florida’s LAKEWATCH and Non-point Education for Municipal Officials (NEMO) programs; monofilament recycling and other coordinated trash and debris pick-ups; and aquatic invasive species impacts.

Ecosystem Health Research and Extension Projects

- 6.1 **Developing a South Florida Natural Resources Outreach Plan.** South Florida represents a critical region for education and outreach on natural systems, their connections and how they respond to human activities. This region contains several unique natural systems, including the Everglades, Florida Bay and the Florida Keys. This project aims to design and deliver a public education and outreach plan for the region (Spranger/Fletcher: E/T-9).

The principal investigators continued developing a partnership with National Sea Grant, NOAA Atlantic Oceanographic and Meteorological Lab (AOML) and FSG Extension for the South Florida Marine Ecosystem Education Project. Mike Spranger met several times with National Sea Grant Office, AOML staff, and University of Miami. Several new small grants have been received. A new relationship is being developed with Greg Kiker, UF/IFAS Department of Agricultural and Biological Engineering to bring human dimension and decision-making modeling into this project. Several workshops that implemented the new technology for soliciting public input on resource management issues were held throughout the year. Specific extension activities related to the project follow in this report.

- 6.2 **Rapid Testing of Water for Bacterial Contamination.** Health-related management of recreational coastal sites is currently undertaken by monitoring fecal coliform and enterococci bacteria by membrane filtration. The problem with this standard monitoring is that there is a lag of at least 24-48 hours between when the sample is collected and when the data become available. The goal of the research is to develop portable sensor technology for rapid, sensitive and specific detection and quantification of enterococci bacteria in coastal water, providing health officials and coastal managers with near real-time data for decision making. (Patterson/Paul/Fries/Farmer: R/C-E-52).

- 6.3 **Restoration of Worm Rock Reefs.** The worm *Phragmatopma caudata* contributes to the construction of natural nearshore reefs that provide habitat for many marine species. These worms extract and glue sand together to make sand tubes, forming vast worm rock reefs in intertidal and shallow sub-tidal water from Cape Canaveral to Key Biscayne. Their formation is impacted by such things as sediment transported offshore from beaches naturally and from beach restoration projects. Mitigation techniques have not been consistently successful. Researchers are testing the applicability of a marine byproduct to aid in the recovery and recruitment of worms and reef formation. (McCarthy: R/C-E-53-PD).

Controlled laboratory experiments are underway to culture and expose worm larvae to a marine bioproduct (BHT). Preliminary results indicated no statistically significant differences in the number of metamorphosed larvae among the treatments. However, there was a higher number of both late-stage larvae and metamorphosed individuals settling on plates coated with the chemical attractant BHT. Further research is being conducted to more definitively assess the importance of BHT, and delays of metamorphosis, in affecting settlement in this species. This study will provide coastal managers with information on recovery rates of worm reefs along the Florida coast and will evaluate a chemical methodology for enhancing and speeding recruitment of *Phragmatopma caudata* larvae during nearshore worm reef mitigation.

Ecosystem Health Extension Activities

- 6.4 Work continues on an EPA-funded project to assess the economic implications of red tide events on the Gulf coast of Florida. The study is evaluating the economic effects of red tide events within a multi-county region and for a specific waterfront restaurant business in the

Manatee County, Florida region. A final report has been submitted on combined efforts. UF Food and Resource Economics (FRED) Ph.D. student Kim Morgan completed her Ph.D. project from this effort, and FRED M.S. student Brian King completed his thesis on the project (Adams/Larkin/Degner).

- 6.5 Adams gave a presentation at the Southwest Florida Community Workshop for the Gulf of Mexico Alliance on the ongoing red tide projects. A seminar was given to FAS students and faculty on the past and ongoing research oriented toward the economic implications of red tide events. A presentation was given at the Fourth Symposium on Harmful Algae Blooms in the U.S. (Woods Hole, Mass.) on economics of red tide events. A presentation was given at the Gulf and Caribbean Fisheries Institute meetings in Punta Cana, Dominican Republic on the economic implications of red tide events in Florida.
- 6.6 Adams and Stevely gave presentations at the Hazards Mitigation Symposium held at the American Fisheries Society (AFS) Annual Meetings in San Francisco. The presentation focused on the efforts to measure the economic implications of red tide events in Florida. The presentation was submitted as a refereed proceedings paper for publication in a book chapter by AFS.
- 6.7 Cameron created a storm drain marking program resulting in 150 storm drains being marked and stormwater runoff literature being delivered to 1500 households in Bay County. 38 Master Gardeners learned about rain gardens and their input to the landscape as a form of reducing stormwater runoff. As a result of the presentation, all 38 could distinguish a retention pond from a detention pond, and 18 stated they would be putting a rain garden in their landscape because of the presentation. 74 percent of the 115 participants in the NEMO Panama City Garden Club presentations indicated satisfaction with the information received about stormwater and nonpoint pollution.
- 6.8 Cameron developed the Northwest Florida Living Shorelines Program and two presentations were given in Bay County along with the beginning of a Grasses in Classes program in a Bay County Middle School.
- 6.9 Creswell worked with the St. Lucie County Artificial Reef Coordinator to establish two oyster reefs and 14 experimental sites to determine the extent of spat settlement in those areas. A project to further establish oyster recruitment through remote settlement of oyster larvae has been funded by the Association of National Estuary Programs and the permitting process is underway.
- 6.10 The St. Lucie County monofilament recycling program expanded with the deployment of 12 new collection sites and a special event during the annual Beach Clean-up program. Thirty new bins have been constructed for deployment at dune crossover sites in cooperating oceanfront condominium associations (Creswell).
- 6.11 Diller coordinated with Florida LAKEWATCH program to train residents living on Bayou Texar to begin sampling the Bayou's water quality. Residents sample monthly and pick up and drop off materials at the extension office.
- 6.12 Diller serves as chair of the Pensacola Bay Area Environmental Education Coordination Team which received grants for nearly \$50,000 to begin a Grasses in Classes program. The project will build production pads at high schools in each county from Escambia through Walton County to grow marsh grasses and dune plants for restoration projects. Sea Grant agents assisted in contacting schools, teachers, and finding locations for project plants (Diller, Verlinde, Jackson).

- 6.13 Diller assisted in finding volunteers for planting marsh grasses at the second site of Project Greenshores and continued using both sites as examples of successful coastal ecosystem restoration projects during educational programs.
- 6.14 Diller coordinated with the National Park Service and Santa Rosa Island Authority to conduct lighting surveys and begin the process on contacting residents with problem lighting. The Turtle Friendly Beach program received additional grant funding from the U.S. Fish and Wildlife Service to help pay for retrofitting lights on Perdido Key. Diller also assisted with turtle nest monitoring and taught more than 50 people about sea turtles at a hatchling release on Pensacola Beach. Diller and Verlinde coordinated a sea lighting workshop on Navarre Beach for 28 property owners.
- 6.15 Diller served as a contact for the public and assisted with advertising the annual Coastal Cleanup. He was a guest on WEAR-ABC Dayside Garden television segment discussing marine debris and the problems it causes. Diller and Verlinde partnered to work toward replacing monofilament recycling bins lost to Hurricanes Ivan and Dennis.
- 6.16 Fletcher worked with the South Florida Water Management District to sponsor a workshop for restoration administrators and researchers in order to develop a common language on Hydrologic Data Systems (HDS) and to discuss how HDS relates to Everglades restoration. She and Mike Spranger submitted a proposal to conduct a follow-up HDS workshop at a Greater Everglades Ecosystem Restoration conference.
- 6.17 Fletcher worked with Yuncong Li and Katie Magglicio, UF/IFAS Tropical Research and Extension Center to develop a training program on water quality for researchers, educators and managers. A program will be conducted that will include a marine component.
- 6.18 Fletcher coordinated and attended a number of meetings related to South Florida restoration activities. She worked with the NOAA Coastal Services Center to coordinate and host a Program Design and Evaluation Workshop at the University of Miami-RSMAS campus on 20-22 January, 2007. She was member of the teaching team. Eighteen individuals from various agencies attended, including UF/IFAS Extension, NOAA AOML, National Florida Keys Marine Sanctuary, Biscayne Bay Aquatic Preserve, Florida Department of Environmental Protection, South Florida Water Management District, Broward County and several local NGOs.

The UF School of Natural Resources and Environment awarded Greg Kiker and FSG a planning grant for the development of a participatory decision support system tool that will be a part of a Decision Theater. The final product will contribute to supporting HDS, ecosystem based management (EBM) projects, and improved communications and engagement with target audiences in the south Florida region.

- 6.19 Fletcher assisted the FDEP with two South Florida Coral Reef Initiatives and Awareness and Appreciation teacher workshops that were held in Miami and Ft. Pierce. She coordinated the local logistical arrangements and developed a PowerPoint presentation that discussed the watershed and human dimension science issues associated with coral reefs.
- 6.20 Fletcher continued working with the FDEP and Broward Community College to develop a “water academy” that will have participants make the land-sea connection and understand that what they do upstream will likely impact our coasts. State and county budget issues prevented the academy from being held in 2007.
- 6.21 Fletcher developed PowerPoint programs and written materials dealing with South Florida restoration activities. She provided 11 formal presentations at state, regional and national workshops and events.

- 6.22 A luncheon roundtable session was held at the fall GCFI annual meeting to identify if a Sea Grant-styled program is needed in the Latin America and Caribbean (LAC) region and if so, what type of a pilot project could be carried out over the next 12-18 months to illustrate the value of such programming. A LAC Work Action Group was formed to establish better communications among Latin America and Caribbean researchers and managers. Fletcher also participated in regional meetings on behalf of NOAA/AOML, FSG and NOAA Office of International Programs to provide information on the connectivity of the marine ecosystem and science communications in order to foster information exchanges.
- 6.23 Fletcher is coordinating the design and development of a synthesis book of Florida Bay research. The Environmental Protection Agency (EPA) and the SFMEOP are coordinating this project. Bill Kruczynski (EPA) and Fletcher are serving as editors of the book that will contain entries from more than 100 authors. A number of focus group meetings were held to outline book chapters and assign page authors.
- 6.24 Fluech provided Fletcher with local contacts and coordinated a meeting for her to discuss the South Florida Ecosystem Project with water management district and Rookery Bay Reserve staff.
- 6.25 Fluech was a site coordinator for the International Clean Up and recruited 4-H youth and other local volunteers to assist in clean up efforts. He provided state Ocean Conservancy staff with local contacts for determining the feasibility of conducting a derelict crab trap removal clean up. He also assisted the City of Naples with their annual Naples Pier clean up to remove abandoned fishing gear from under the pier.
- 6.26 Fluech conducted a number of activities related to his role as project manager for the Marine Resource Conservation Partnership (MRCP) of Collier County.
- He worked with local and state agencies to get the MRCP/Team Ocean program up and running in Collier County by hiring a full-time coordinator to handle the on-water outreach program. Funds were leveraged from FWC and FDEP.
- He assisted the Team Ocean Coordinator in developing curriculum materials to support the Team Ocean program training program. Specifically he developed a PowerPoint presentation on sustainable fishing techniques, as well as a resource sheet that included links to important fishing and boating stewardship links. He consulted with the coordinator to ensure that the developed materials were easy to use and appropriate for the program.
- With funds from an FWC boating stewardship grant, he helped develop a portable exhibit (with the help of UF/IFAS Communications) that focuses on sustainable boating practices. The display has been used at various locations around the county including the North Collier Regional Park Exhibit Hall and City of Naples city hall.
- 6.27 Fluech conducted a teacher workshop that focused on SW Florida coastal ecosystems. A total of 12 teachers participated in the workshop and pre/post test scores increased by 26%. 86% said they increased their confidence in teaching about SW Florida's coastal ecosystems.
- 6.28 Fluech developed a presentation on safe boating in seagrasses at the Naples Boat Show.
- 6.29 Scott Jackson presented a professional paper on education and had outreach activities associated with coastal restoration efforts related to the 2004-2005 hurricanes at the AFS annual meeting.

- 6.30 Jacoby worked with agents in the Panhandle region to adjust and implement projects related to stormwater using the materials from the national program, Non-point Education for Municipal Officials (NEMO), as a base.
- 6.31 Jacoby worked with partners throughout the state and beyond to develop and improve volunteer water quality monitoring programs.
- 6.32 Mahan continued to work with Cameron and Jacoby in promoting and educating local officials and the general public about non-point pollution and the principles of NEMO. As part of this effort, a session on NEMO principles was part of the Regional Low Impact Development workshop taught that targeted Gulf, Franklin, Wakulla and Jefferson counties.
- 6.33 Jacoby, Cameron and Mahan coordinated the NEMO program in Franklin County.
- 6.34 Mahan provided 380 one-on-one/small group consultations on a wide range of homeowner, landscape and gardening issues. Many of the homeowners now request for the most environmentally friendly way of controlling the problem because they now realize that some pesticides are more selective and less environmentally harmful.
- 6.35 Mahan researched and wrote two columns educating homeowners about things they can do to minimize their environmental impacts. One column was on a new low-maintenance, slow-growing turfgrass being developed for Florida lawns; the other dealt with smart growth practices including how planning regulations can lower the environmental impact of construction practices.
- 6.36 Mahan worked with other members of the Clean Marina Partnership to teach a Clean Marina workshop in Carrabelle. The City had requested the workshop because it wants a new marina that the city is building to comply with Clean Marina guidelines. Marina owners from as far away as Cedar Key attended the workshop.
- 6.37 Mahan worked with the other Panhandle Sea Grant agents in planning a new Living Shorelines Program.
- 6.38 McGuire worked with Georgia marine extension faculty to develop outreach materials targeting transient boaters. These materials will help educate boaters about the risk of hull transport of non-native marine species from one location to another. The materials include floating keychains that contain a printed insert and a Web site (address printed both on the keychains and the inserts) with information about marine invasives in the SW Atlantic region. These species are not profiled on most other invasive Web sites because of their limited distribution in the U.S.; however their ranges are expanding quickly. McGuire also coordinated a regional marine invasive working group that met twice. Members of the group included researchers from Jacksonville University, University of North Florida and University of Georgia, staff from the FWRI, The Nature Conservancy, the US Army Corps of Engineers, USGS and members of the Jacksonville Shell Club.
- 6.39 Staugler implemented a Florida Master Naturalist Program for Charlotte County.
- 6.40 Staugler provided the following educational training and assistance.
- She continued to chair the Charlotte Harbor NEP Hydrologic Alterations Subcommittee. She participated as a member of the Water Quality Quantifiable Objectives Sub-committee and Habitat Conservation Sub-committee of the Charlotte Harbor National Estuary Program.
- She worked with boating user groups, master gardeners and civic groups to promote BMPs for improved coastal water quality.

She provided educational programs to boating and fishing groups, master gardeners, civic groups and citizens on coastal habitats and invasive species.

She assisted with local mangrove transect monitoring effort to document the recovery of mangroves in the aftermath of hurricane Charley.

She received funding from the Fish America Foundation to conduct a community-based restoration project. The restoration covered approximately 5 miles of shoreline. More than 100 volunteers participated in the project.

- 6.41 Staugler worked with the Charlotte Harbor NEP to produce a seagrass video/DVD that will be used to educate SW Florida boaters through public broadcast and government television, educational programs and events. A two-minute video on “Sea Grasses: Good Boater Practices” and a 7-minute video, “Sea Grass and Boaters”, was developed and will be shown at all U.S. Power Squadron and U.S. Coast Guard Auxiliary safe boaters classes in Charlotte County.
- 6.42 Stevely trained 37 extension Master Gardeners in Manatee and Sarasota County in coastal plant ecology and identification.
- 6.43 Stevely conducted two mangrove management programs for property managers and landscape maintenance professionals in Manatee and Sarasota County. A total of 87 property managers, landscape maintenance professionals and waterfront property owners increased their knowledge of mangrove pruning regulations and increased their ability to help properly manage waterfront property.
- 6.44 Eighteen extension agents increased their knowledge of relationships between red tides at the Florida Extension Summit (Stevely).
- 6.45 Stevely presented the paper Red Tide: Public Perceptions, Informational Needs, Future Actions at the AFS annual meeting. It will be published as a peer-reviewed article in a special AFS publication.
- 6.46 Stevely chaired 6 Sarasota Bay Estuary Program Technical Advisory Committee meetings. The Committee successfully developed a SBEP 2008 work plan.
- 6.47 Stevely completed activities to enhance the sustainability of the commercial fishing heritage of Cortez.
- He organized the 26th Annual Cortez Commercial Fishing Festival. This festival reaches 15,000 citizens with information on environmental issues. Approximately \$70,000 was raised to purchase environmentally sensitive land and develop the Florida West Coast Maritime Museum in Cortez.
- He assisted the Florida Institute for Saltwater Heritage (FISH) in conducting educational programming to support acquisition and management of the FISH Preserve, development of the Florida West Coast Maritime Museum at Cortez, and restoration of the 1912 Cortez School House.
- 6.48-9 Verlinde continued to support various activities that promote increased water quality, such as providing stormwater information to planning and zoning departments, working with county departments to develop a habitat restoration project, coordinating the LAKEWATCH program in Santa Rosa County and providing watershed information to various schools groups.

- 6.50 Verlinde coordinated and led the 3rd Pensacola Watershed Tour. The objective was to educate participants on watershed impacts and successes involving water quality issues and continue collaborative efforts of watershed management for officials in Florida and Alabama. Sites were selected based on the new publication Naturally Esc-Rosa, an agri-eco-based tourism driving guide. Participants responded with excellent reviews and many have traveled the route with their families.
- 6.51 Verlinde provided aquatic nuisance species materials to 27 participants at the Environmental Education Institute.
- 6.52 Verlinde coordinated the oyster reef restoration project in East Bay. The FDACS, Division of Shellfish deposited 1250 cubic yards of fossilized shell in East Bay. Site selection and project planning have begun for an additional project located in East Bay.
- 6.53 Dune restoration projects were deferred to 2008 (Verlinde).
- 6.54 Verlinde worked with the FDEP ecosystem restoration group to coordinate an oyster shell pick-up and to promote the second phase of Project Greenshores project within the community. Verlinde continues to serve on the Project Greenshores steering committee.

Goal 7: Coastal Hazards: Respond to shoreline change and coastal hazards.

Florida’s coastline is home to 80 percent of the state’s residents and it is at risk from winds, waves, and floods generated from tropical storms. These coastal processes and hazards can result in loss of life and billions of dollars in property damage. This priority area seeks to improve coastal community resiliency by identifying risks and reducing human, property and habitat impacts from storms and other natural hazards.

Extension activities in this goal area focused on: beach safety – including rip currents, sharks and sun safety programming; and hurricane preparedness information and education for boaters and marina operators. This included participation in Florida Sea Grant’s Specialized Marine Action Response Teams (SMART) and SEACOOS programs.

Coastal Hazard Research Projects

- 7.1 **Modeling Hurricane Generated Waves.** Damage from hurricane waves can be far more disastrous than wind damage. However, the quantity of wave data near the coast is not adequate to improve predictions and thus planning and construction. Also lacking are collocated wind and wave measurements which could help to improve turbulence predictions and thus gust loading on houses. The goal is to quantify and improve descriptions of hurricane wave transformation near the coast and its effects, and to evaluate the accuracy and suitability of common existing wave transformation models during hurricane conditions (Kennedy/Gurley/Sheremet: R/C-S-46).

The lack of land falling hurricanes during the 2006-2007 hurricane seasons has required a shift to measuring tropical storms and offshore hurricanes. Notwithstanding, the project has provided rapid-response data for nearshore waves and surge that is useful for planners and decision makers. This project has been extended to include the 2008 hurricane season.

- 7.2 **Improving Storm Surge Estimates.** Considerable hurricane damage is associated with storm surges and coastal flooding. This study will validate the new storm surge and coastal flooding modeling system CH3D-SSMS, which will be coupled with the SBEACH model for shoreline erosion, with extensive data obtained in 2004. This research will significantly advance our predictive ability of coastal hazards (flooding, erosion, and rip current) to

mitigate damages to coastal communities. Outcomes of the research will directly benefit NOAA's effort to improve its storm surge models (Sheng: R/C-S-47).

The research has validated several NOAA wind models and led to an improved storm surge modeling system CH3D-SSMS, which can be used for the forecasting of hurricane storm surge and coastal inundation.

Impacts: The forecasting system has been used to enhance Florida's ability to prepare for hurricane and flooding, as was demonstrated in a Florida Hurricane Exercise. Presentations and publications resulting from the research have improved public awareness of the hazard associated with storm surge and coastal inundation. The successful completion of the project has resulted in new extramural funding from FSG and NOAA to further develop and apply the forecasting model.

Coastal Hazard Extension Activities

- 7.3 Cameron organized and participated in a number of community-based programs dealing with beach safety. A success story was the 105 youth from Merritt Brown Middle School that were able to identify 10 ways to reduce their risk of being attacked by a shark after the Shark Awareness presentation.
- 7.4 Cameron led 13 events at schools throughout Bay County, resulting in the increased awareness among 1,062 K-12 students of the environmental benefits of mangroves, seagrass meadows and salt marshes in reducing hurricane impacts.
- 7.5 Diller continued assisting Escambia County Marine Resource Division and other groups in planning responses to tropical storms, developing Specialized Marine Action Response Teams (SMART), and producing and distributing educational information. He completed three on-line training courses regarding the National Incident Management System for personnel who have an operational role in emergency response for the county. He also distributed hurricane preparedness information for boaters.
- 7.6 Fluech delivered a presentation on boat preparation for hurricanes to 32 residents in June. The local Coast Guard Auxiliary was not able to do their boat demonstrations due to scheduling conflicts.
- 7.7 A comprehensive digital video guide on hurricane preparedness for marinas and boat owners was completed in September in cooperation with Progress Energy, Inc. (Fluech, Fletcher, Simoniello, Verlinde, Diller).
- 7.8 Mahan provided one-on-one consultations to 25 people/small groups on red tide related questions and topics. As a result, they all increased their knowledge about red tide.
- 7.9 Mahan, with the unanimous approval for the Board of County Commissioners, worked with the county's parks and recreation department and the county's road department to install/post approximately 20 rip current education signs at county beach access points.
- 7.10 Mahan wrote two newspaper columns this year to educate readers about red tides and rip currents. These columns were published in the Apalachicola and Carrabelle Times newspapers which have a circulation of 6,000.
- 7.11 The Southwest Marine Weather Portal is being developed. New servers have been purchased and two meetings with the Tampa WFO representative Charlie Paxton and SEACOOS IT personnel have been held. A demonstration project was presented in Washington, D.C. using sample Web pages for the Miami WFO area. While funding for the O&E component of the project has been reclaimed due to budget cuts, progress continues on work with the IT and

DMAC. Simoniello will remain engaged in O&E efforts through her new GCOOS O&E position working with Spranger, specifically helping to evaluate and launch the site, and promote use of the information by the general public.

- 7.12 Spranger participated as a member of the planning committee of the AFS Sea Grant Special Symposium on Mitigating Impacts on Natural Hazards on Fishery Ecosystems. This symposium was held in conjunction with the AFS annual meeting in San Francisco Sept. 4-6. As a member of the committee, he helped to develop the agenda, solicited presentations, reviewed manuscripts and handled conference logistics. The two-day symposium ranged between 40-80 participants per session. Spranger wrote a peer-reviewed paper on Developing a Specialist Marine Action Assessment Response Team (SMART) for Post-Hurricane Recovery. In addition to presenting, Spranger chaired an afternoon session, and was part of the final summary panel. The papers will be produced into an AFS Book, and available sometime in mid-2008. Papers were also presented at this national conference by Chuck Adams and John Stevely on work they conducted with red tide and by Scott Jackson on work he did on dune restoration. Spranger helped to secure travel funds from NOAA and AFS for their participation at this national conference.
- 7.13 Spranger attended the annual meeting of the Gulf of Mexico Alliance (GOMA), and attended a GOMA workshop on community resiliency. Due to funding and time constraints, he was unable to continue in this effort. He did invite other members of UF faculty to become involved.
- 7.14 Verlinde provided hurricane preparedness and water safety information at various events and programs. Santa Rosa County emergency management staff participated in events such as the Seagrass Awareness Festival and Coastal Encounters. A total of 584 students that participated in Bay Day activities played the water safety question game. Categories included beach, water and boating safety.

Goal 8: Graduate Education: Produce a highly trained workforce in marine and coastal-related sciences.

The objective of this over-arching goal area is to produce highly competent graduates who can make major contributions to coastal ecosystem science and management – working in academia, resource management agencies, government, NGOs and the private sector. Accomplishments recorded under this goal area are related to FSG’s role in supporting graduate and advanced education opportunities.

- 8.1 Enhanced graduate education in disciplines related to the coast and ocean is supported by active participation in public and privately funded graduate programs.

Three candidates were submitted for national competition for the Sea Grant John A. Knauss Marine Policy Fellowship and one of those candidates was selected as a 2008 Knauss Fellow.

There were no Sea Grant Industrial Fellows from Florida.

Approximately 30% of the FSG federal core program research budget was used to support graduate students.

Three graduate students received scholarship funding through private funds in cooperation with the Aylesworth Foundation for the Advancement of Marine Science and the Old Salt Fishing Club.

One high school student received a college scholarship through the Chuck Skoch Florida Sea Grant Scholarship.

There were no NOAA Coastal Services Center fellows from Florida.

- 8.2 In addition to the National Sea Grant CORE program funding, a total of \$688,000 in extramural funding was obtained by FSG (Director).
- 8.3 Florida Sea Grant successfully participated in national competitions with a total of \$319,000 of federal funding (included in the total provided in item 8.2) (Director).
- 8.4 Seven different academic disciplines and seven different Florida universities and research laboratories received FSG funding in the most recent proposal cycle. This was achieved through the encouragement of competitive proposals from many participants and rigorous peer review determined actual funding. Six institutions participating in FSG were visited by the Director and/or Associate Director, and meeting occurred with faculty and students to keep a high level of participation in FSG. Bi-monthly internal newsletters were distributed to 800 faculty statewide to inform them of Sea Grant activities and opportunities (Director).
- 8.5 Five FSG supported seminars were funded as a way to increase the skills of faculty and students in ocean and coastal related academic disciplines (Director: PD-07-1).
- 8.6 Conferences, workshops and travel to conferences and workshops were supported for FSG researchers and potential researchers and FSG Extension and Communications faculty. The activity was supported where it was consistent with priorities in the 2006-09 FSG Strategic Plan (Director: PD-07-2).
- 8.7 Sea Grant Extension faculty improved their content and process skills by attending in-service training workshops or conferences that supported their individual educational programs (all agents).

Professional Development and in-service training included:

- Natural Resources Leadership Institute training
 - Seafood Safety in-service
 - Sea Grant planning in-service
 - Gulf of Mexico Alliance and Gulf of Mexico Coastal Observation Systems Outreach and Education committee meetings
 - Extension Professionals of Florida annual meeting
 - Southern Association of Marine Educators Annual meeting
- 8.8 Annual in-service training and coordination for extension faculty and marine agents was conducted during a two-day retreat in Cedar Key. Status reports on-going research and extension projects were provided, as well as updates on administrative and budget issues. Extension program plans for 2008 were discussed and the participants took part in hands-on training regarding use of dehooking devices and other tools / procedures for catch-and-release fishing developed by FSG researchers and extension specialists.
 - 8.9 Fluech completed an ichthyology course at Florida Gulf Coast University in Fall 2007 and will apply the new knowledge, skills and competencies in his marine extension program.
 - 8.10 Staugler continues to work towards her master's degree.
 - 8.11 Verlinde was awarded a M.S. degree from UF.

Goal 9: Marine Education: Create scientifically and environmentally informed citizens.

The objective of this over-arching goal is to increase the knowledge of citizens of all ages about coastal and marine issues and increase the use of science in coastal and ocean decision making by providing formal and informal learning and training opportunities.

Marine education and training included activities that targeted citizens, industry, scientists at universities, institutes and agencies, resource managers, college students and K-12 youth.

- 9.1.1 A number of educational activities were implemented, spanning many thematic goal areas. Communications staff produced high quality publications and productions that effectively communicated results of FSG activities to both general and specialized audiences. Productions included Sea Grant Reports, Sea Grant Extension Fact Sheets and brochures, Sea Grant Technical Papers, books, book chapters, staff papers, conference proceedings, newsletters, posters signage and electronic formats including CD-ROMs and videos. (Kearl/Zimmerman).
- 9.1.2 Print and broadcast news releases were produced (Kearl/Zimmerman).
- 9.1.3 The FSG Internet home page and Web site were upgraded and maintained (Zimmerman/Whitehouse/Damron/Wagner).
- 9.2 A total of 41 Bay County teachers received their FWC/Florida Marine Science Educators Association Aquatic Species Collecting Certificate to allow them to collect marine flora and fauna for classroom activities. 26 felt the program was excellent, 13 good and 4 OK. The things they liked best were the hands-on activities that “Project Wet” curriculum provided. They also appreciated how the program facilitators commented on how to change activities to meet specific needs (Cameron).
- 9.3-4 Over 1,200 middle and high school students in St. Lucie and Indian River counties increased their knowledge of the Indian River Lagoon and marine science through the Ecosystem Explorer program, Lagoon Days, classroom instruction, and summer camp (Creswell).
- 9.5 Nine half-hour radio programs, “At Home in St. Lucie,” were conducted on WPSL, a local station with a listening audience of 150,000 people along the Treasure Coast. Topics included nutrients and the Indian River Lagoon, oyster restoration, artificial reefs and mangroves and seagrasses (Creswell).
- 9.6 Over 400 high school students in Port St. Lucie received instruction on marine invasive species and the importance of public education to reduce human impacts resulting from the release of unwanted aquarium species. The students also gave team presentations describing marine invasive species. Four adult seminars were also conducted on this topic (Creswell).
- 9.7 Diller updated the Escambia County Marine Extension Web site with locations of sea turtle nests and current marine activities. More than 700 hits were recorded for the year. The Web site is being updated using UF/IFAS “Solutions for Your Life” templates.
- 9.8 Diller taught nearly 600 youth about a variety of costal resource issues at State 4-H Marine Camp, Escambia County 4-H Agriculture Awareness and Escambia County 4-H Fall Harvest Days. Pre and post tests indicated at least 30% increase in marine and coastal literacy among participants.
- 9.9 As Chairman of the Environmental Education Coordination Team (EECT), Diller assisted writing and filming the Resource Rangers: Pollution Prevention video and instructed 848 students at Bay Day. Information about the Resource Rangers program was requested by educators in more than a dozen states. Diller conducted classroom enrichment programs

which included symposiums, workshops, and field trips for more than 600 K-12 students and teachers. Teachers indicated more than 80% were able to identify at least one way to adjust behaviors to sustain coastal resources.

- 9.10 As President of the Florida Association of Natural Resource Extension Professionals (FANREP), Diller wrote columns for the FANREP newsletter. New content was added to the Escambia County Marine Extension Web site. Diller also co-wrote three fact sheets introducing aquaculture, aquaponics, and hydroponics to Escambia County citizens.
- 9.11 Diller and Verlinde instructed 16 people in the Master Naturalist Program wetlands module. All students increased knowledge by greater than 50%. Several graduates volunteered in other Extension activities.
- 9.12 Fluech helped teach two coastal modules of the Master Naturalist Program with Rookery Bay Reserve. 29 people completed the class. He also assisted the Charlotte County Sea Grant program assistant with teaching a session for one of his coastal module classes.
- 9.13 Fluech instructed 11 Master Gardeners on coast plant ecology and Identification. There was an average 43% increase in their pre/post test scores.
- 9.14 Fluech conducted public education programs for youth and adult audiences to increase community awareness and protection of coastal and marine environmental resources in Collier County, with the following outcomes:
- Over 300 lbs of monofilament fishing line was removed and cleaned from monofilament bins and clean up events attended by over 25 youth and adult volunteers. Four new monofilament bins were given out to local agencies to install.
- New information was added to the county's Sea Grant Web page pertaining to marine fisheries and stewardship.
- Over 200 4-H youth learned about plankton, coastal ecology and sport fishing through field trips, seining demonstrations, lab activities and camps. Fluech also coordinated with the state marine 4-H coordinator to help judge the 4-H Marine Ecology Event.
- Members of local clubs and civic organization members were informed about aquaculture, barrier island ecology, sea turtles, and seagrasses. He also set up education booths at events such as local boat shows, Dive Into Oceans Days, Community Conservation Celebration Day, and Estuaries Day.
- Local educators were provided with fact sheets, posters, advice and field equipment to assist them with their education programs.
- Nine newspaper articles were written for the Marco Island Eagle dealing with coastal and ocean issues.
- 9.15 Fluech continued to serve on the Gulf of Mexico Environmental Education Network (EEN) Steering Committee and helped to organize their EEN meeting in Alabama.
- 9.16 Fluech served on the GOMA EEN's Underserved Populations working group, and helped to gather speakers related to this topic at the EEN meeting in Alabama.
- 9.17 Fluech helped to arrange a field trip and transportation at the FMSEA conference and presented a session on sea turtle survival activities for educators. 31 people attended his session.

- 9.18 Leonard developed a short course on vessel maintenance and mechanical system troubleshooting for Brevard County boaters. He now is exploring the use of a Podcast to generate more interest in the course.
- 9.19 Leonard attended the “Stem to Stern” boating conference held at Cocoa Beach. The conference highlighted local and statewide efforts to plan for and manage Florida’s waterways.
- 9.20 Mahan researched and authored 32 newspaper columns.
- 9.21 Mahan continued his partnership with the Invasives Group, which half-way through the year decided to join forces with the Apalachicola Area Stewardship Alliance to combine meetings, since many of the people were members of both groups. As a result, both groups still meet to discuss invasive plant and animal issues in the watershed.
- 9.22 The Apalachicola National Estuarine Research Reserve (ANERR) Environmental Education staff decided not to have a Seagrass Awareness Program this year so a planned program was not implemented.
- 9.23 Mahan collaborated with ANERR Environmental Education staff to plan, organize and teach the Estuaries Day program at the reserve. Approximately 350 people attended the 4-hour program.
- 9.24 Mahan taught one program on beneficial insects and use of low-toxicity pesticides around the home to the members of the Carrabelle Sea Oats Garden Club. As a result, all 12 attendees stated that they had increased their knowledge about beneficial insects and using more selective/less toxic pesticides.
- 9.25 Mahan worked with Florida State University Marine Lab staff and faculty to advertise a series of coastal workshops/programs that were conducted at the Marine Lab’s auditorium.
- 9.26 McGuire conducted 35 youth programs focusing on marine topics. Total attendance at these programs was 2,132.
- 9.27 McGuire conducted a walk and held a mock marine ecology event for 4-H youth preparing for the Marine Ecology Event statewide competition. 4-H youth from three counties participated in these practice sessions.
- 9.28 McGuire conducted six teacher workshops. A total of 153 teachers attended. Topics focused on field studies that included beach, estuary and salt marsh ecosystems.
- 9.29 McGuire coordinated two Kids’ Days for the First Coast Birding and Nature Festival in St. Augustine. This included recruiting schools to participate, meeting with teachers at those schools, recruiting informal educators to provide interactive stations for the event, creating the rotation schedule and physical layout for the event and teaching one station each day of the event. Four schools (298 students) participated in the Kids’ Days.
- 9.30 McGuire wrote 12 (monthly) articles for the Flagler News Tribune on topics including red tides (the region experienced its first red tide in 8 years), reclassification of manatee status, and plastics in the ocean.
- 9.31 McGuire judged science fair projects at one school in St Johns County, and at regional science fairs in St Johns and Duval counties.
- 9.32 Until the formal working groups were disbanded, McGuire represented FSG on the US Fish and Wildlife Service’s manatee entanglement and education working groups. The Manatee Entanglement Group continues to meet as an informal working group, and McGuire is a member of that group.

- 9.33 McGuire continues to monitor and maintain monofilament recycling bins in NE Florida. She assisted the St. Johns County Habitat Conservation Coordinator to establish additional monofilament recycling bins along St Augustine beaches.
- 9.34 McGuire led field trips for two coastal Master Naturalist Program classes (Duval and Volusia counties). A total of 32 students were in the classes. Field trips discussed focused on invasive species and marine debris.
- 9.35 McGuire was unable to investigate expansion of the Georgia Adopt a Wetland program into Florida. This is an opportunity that could be explored by a state specialist.
- 9.36 Spranger used the annual conference of the Florida Association of Marine Science Educators (FMSEA) as a vehicle for the informal educator COSEE Institute. He provided opening remarks and gave a presentation on Gulf of Mexico COSEE: Bridging Science in Formal and Informal Education Settings. Sea Grant also had a static exhibit where he handed out a variety of FSG educational materials. There were approximately 100 educators in attendance. The event was held April 26-29 in Naples. Spranger also participated in a fall meeting of the GCOM-COSEE Management Team, and the fall meeting of the GCOM-COSEE Science Advisory Committee.
- 9.37 Staugler conducted public education programs in Charlotte County with the following outcomes:
- The Charlotte County Marine Extension Web site was updated every 6 months.
- Eleven columns were written for the WaterLIFE Magazine covering a variety of marine related topics.
- An aquatics test was developed and used at the Lee County Sea Grant Envirothon competition for high school students.
- Thirty two monofilament recycling bins were assembled and maintained at marinas, ramps and fishing piers within the County. This work was done in cooperation with 4-H, CCA and the US Coast Guard Auxiliary.
- Coastal information was provided to citizens at the Charlotte Harbor Nature Festival, National Marina Day and other events throughout the year.
- She provided 11 marine related speaker programs to community organizations.
- Boating and Angling Guides continue to be very popular. Almost 20,000 guides were distributed.
- 9.38 Verlinde conducted public education programs in Santa Rosa County with the following outcomes:
- She coordinated and taught at the Environmental Education Institute for 4-H leaders, volunteers and program assistants. 27 participants received curriculum such as Project Aquatic Wild and Project Learning Tree. Surveys reveled that 97% of participants were pleased with the training and look forward to advanced opportunities.
- She conducted a FWC/FMSEA Aquatic Species Collecting permit workshop, two Project Learning Tree workshops, and an EEI to a total of 77 teachers, 4-H leaders and volunteers.

Verlinde provided press releases for various events and coastal information and upcoming events to the 4-H newsletter, Bay Area Resource Council newsletter and through two (>350 recipients) large e-mail distribution lists.

The Resource Ranger program produced two RR videos (Pollution Prevention and Forest in Your Backyard), and provided hands-on field activities for more than 1500 students in Escambia and Santa Rosa counties.

More than 840 local residents and visitors attended the Seagrass Awareness Celebration and the Coastal Encounters event. Activities included: kayaking, fishing tips and ethical angling, Eat a Seagrass Bed, Know your Limit fishing game, a marine themed Easter egg hunt, arts and crafts, touch tanks and fish ID, natural resource displays and information from the county's Emergency Management, FWC, US Fish and Wildlife Service, the Florida Keys Marine Sanctuary, National Park Service, Navarre HS 4-H marine club and Santa Rosa 4-H.

Sixteen adults participated in the wetlands module of the Florida Master Naturalists program. Pre and post tests indicated an 18% increase in knowledge from participants. Five program graduates now volunteer on a regular basis with the Santa Rosa County Sea Grant Program. Eleven Master Naturalists from the Panhandle region participated in a field trip to Navarre Beach to film a promotional film for IFAS. The film was shown at the EPAF annual meeting in Jacksonville.

Approximately 300 volunteers participated in the 22nd annual Northwest Florida Rivers clean up, which Verlinde coordinated. More than 25 pickup trucks of debris were removed from area rivers and creeks.

Verlinde developed educational programs for 4-H, teachers, boaters and interested citizens on marine debris, safe boating and monofilament recycling.

Verlinde provided Sea Grant materials and display for the Pensacola Junior Colleges' Forestry Conclave. More than 500 people attended this event. Provided hands on activities for Seagrass Awareness Celebration, Resource Ranger field trips, Coastal Encounters and beach ecology field trips.

Talks concerning invasive species (see above), Living Shorelines and deepwater sea creatures were attended by 68 participants.

Verlinde attended the combined annual meeting of the GCOOS Education and Outreach working group and the Gulf of Mexico Alliance Environmental Education Network.

Verlinde successfully completed the Natural Resource Leadership Institute training. A practicum was done on the coordination of the Living Shorelines Initiative in the Northern Gulf Coast Region.

Verlinde provided snorkeling field trips for the Santa Rosa / Bay county 4-H camps. A total of 84 youths participated. She also helped coordinate and plan the program, and provided materials and activities for the state 4-H marine camp. A total of 112 youths participated. She provided hands-on activities for 4-H beach ecology field trips for 207 participants. She helped to develop the Beach Buddy Cloverbud curriculum with the 4-H marine education team work action group.

Verlinde served as secretary for the National Sea Grant Education Network. Four tele-conferences were conducted.

- 9.39 Verlinde and Diller promoted the Sea Turtle Friendly beach on Navarre Beach. They coordinated and taught at a Sea Turtle friendly beach program for 17 participants. Participants indicated that the program was helpful and 2 participants (that were local and lived on the beach) would change their fixtures to “wildlife friendly.”
- 9.40 The Living Shorelines Initiative was established by Panhandle Sea Grant agents, with participation from Mississippi and Alabama. A workshop was held in Spanish Fort, AL. A total of 102 resource managers, agency employees, coastal landowners and consultants from the three-state area attended the workshop. Surveys and evaluations revealed a need for this type of information, permitting information and methods. This is a regional continuing effort.

3.0 PROGRAM FUNDING FROM ALL SOURCES

Funding History

Level federal funding during the 1980s and early 1990s for the National Sea Grant College Program has clearly impacted Florida Sea Grant core programs. While a slight increase in funding did occur in 2006, the level of effort or “buying power” of core program funds is still woefully short of early 1980 levels. When inflation is taken into account, the peak buying power year was 1973. Significant core program increases began in 1995, but buying power for 2007 was still 43 percent below the peak year. With 2007 core program funds at \$2,013K, and adding funds awarded to Florida due to national competitions of \$514K, the overall 2007 buying power of the program was 29 percent below the peak year, as noted in Table 3.1.

The number of full time equivalents (FTEs) budgeted for the core program from 1986 through 1988 ranged from 55 to 58. This is a level much lower than that of the late 1970’s and early 1980’s. For the last decade, FTEs supported with core program funds has ranged from 39 to 46 as shown in Table 3.2.

While FTEs have declined, the cost of operating research, education and Extension programs per FTE has increased. In terms of current dollars, the cost per FTE has increased from a low of \$13,000 in 1976 to a high of about \$49,000. Clearly, level or slowly growing budgets and a higher cost per FTE have driven downward the number of FTEs the program is able to purchase. On a real dollar basis (accounting for inflation), the cost per FTE has risen from a low of \$29,000 in 1984 to \$45,950 in 2003 as shown in Figure 3.1. The last several years have seen a continuing decline in the cost for FTE (i.e., salaries) to a present figure of \$37,200 (adjusted for inflation).

Florida Sea Grant historically matched federal funds on an approximate 1:1 basis. During 1989 and 1990 this ratio was reduced and since 1991, our core program proposal has been matched on a 2:1 basis as required by federal law. University policy now mandates that matching funds may only be included at the rate prescribed by the granting agency.

Florida Sea Grant’s recent funding history indicates an increased reliance on funding other than federal Sea Grant dollars. A comparative analysis of all Sea Grant funding sources for 2005-2006 to 2007-2008 indicates that the federal NOAA Sea Grant core program funds represented from 38 to 43 percent of total Florida Sea Grant program effort as shown in Table 3.3. Florida Sea Grant’s use of federal Sea Grant program funds has consistently met national guidelines that at least 50 percent be used to fund research as shown in Table 3.4. For example, a total of 53.7% of total federal funds was allocated to research during the 2007-2008 fiscal period. A listing of all funding sources for the Florida Sea Grant College Program funds for the last three years is shown in Table 3.5, 3.6 and 3.7.

Sea Grant federal funds plus all extramural grants generated 6.7 times the amount of state appropriations received through the Education and General budget of the University of Florida for 2007-08. Including faculty salaries dedicated to the program by UF/IFAS, 2.9 grant dollars were generated per state dollar of 2007-08 appropriations as shown in Table 3.8.

Table 3.1. Federal Sea Grant funding (\$1,000's) for Florida Sea Grant College Program, 1972-2007.

Current				Real ^a		Percent Below Peak Year	
Year	Core Funding	Nat'l Competitions	Total	Core	Total	Core	Total
1972	378			1253		58	
1973	600			1884		37	
1974	740			2132		29	
1975	900			2368		21	
1976	975			2425		19	
1977	1125			2635		12	
1978	1260			2757		8	
1979	1450			2929		3	
1980	1627			3007		0	
1981	1575			2665		11	
1982	1575			2520		17	
1983	1428			2190		27	
1984	1458			2157		28	
1985	1458			2092		31	
1986	1506 ^b			2115		30	
1987	1506			2057		32	
1988	1386 ^c			1831		39	
1989	1489			1894		37	
1990	1530			1875		38	
1991	1652			1937		35	
1992	1652			1912		37	
1993	1500	86	1586	1697	1794 ^d	44	41
1994	1500	127	1827	1661	2023	45	33
1995	1620	626	2246	1759	2439	42	20
1996	1620	455	2075	1727	2212	43	27
1997	1880	194	2074	1970	2174	35	28
1998	1780	322	2102	1846	2178	40	28
1999	1846	444	2290	1886	2339	38	23
2000	1907	1125	3032	1907	3032	37	0
2001	1965	463	2428	1919	2371	36	22
2002	1990	535	2525	1912	2426	37	20
2003	1990	504	2494	1872	2353	34	22
2004	1990	874	2864	1824	2647	39	13
2005	1990	893	2883	1775	2570	41	15
2006	2013	663	2676	1734	2306	42	24
2007	2013	514	2527	1713	2150	43	29

^a Deflated using Gross Domestic Product Price deflator, 2000=100.

^b Includes MAREP add-on and GRH reduction.

^c After NOAA overall budget cut of 7% from base of \$1,489K.

^d Beginning in 1993, total Sea Grant federal funding includes various initiatives and other funds provided through special national competitions.

Table 3.2. Individuals and full-time equivalents (FTEs) supported by federal Sea Grant core program funding 1972-2007.

Year	Research Number				Education		Advisory		Total	
	Faculty	Students	Total	FTE	Number	FTE	Number	FTE	Number	FTE
1972	14	25	47	13	0	0	6	1	59	15
1973	29	39	93	32	0	0	10	8	103	40
1974	32	34	17	36	0	0	29	10	136	46
1975	44	55	151	49	8	NA	4	13	204	62
1976	38	50	109	40	17	12	26	22	152	74
1977	32	54	108	40	24	14	74	27	206	81
1978	28	37	115	42	23	4	59	26	197	77
1979	34	41	99	49	31	2	115	32	245	83
1980	46	38	128	48	7	1	111	28	246	77
1981	53	39	153	46	4	1	120	31	277	78
1982	39	35	91	44	12	3	108	34	211	81
1983	29	30	75	33	1	1	102	32	178	65
1984	48	44	108	39	5	2	102	29	216	70
1985	48	48	118	37	2	NA	89	26	209	64
1986	39	35	83	30	0	0	90	26	173	55
1987	44	23	86	30	4	4	79	27	181	58
1988	53	30	96	31	0	0	79	27	181	57
1989	48	24	87	28	9	2	37	15	133	44
1990	45	23	81	28	7	1	36	15	133	44
1991	44	26	85	26	0	0	29	22	114	48
1992	43	25	80	25	0	0	29	22	109	47
1993	29	20	61	19	0	0	29	22	90	41
1994	25	14	48	18	0	0	32	22	80	40
1995	38	16	54	19	4	6	22	22	96	45
1996	39	14	53	19	0	0	22	22	97	45
1997	54	24	101	24	0	0	23	19	124	43
1998	46	21	70	20	0	0	34	24	104	44
1999	44	21	68	21	0	0	33	23	101	44
2000	55	24	82	20	0	0	29	19	111	39
2001	65	31	99	26	0	0	28	19	127	45
2002	39	30	71	20	0	0	34	25	105	45
2003	36	27	64	20	0	0	34	25	98	44
2004	37	21	58	15	0	0	35	26	93	41
2005	37	22	59	16	0	0	35	26	94	42
2006	47	21	71	21	0	0	35	25	106	46
2007	49	18	68	21	0	0	26	17	106	46

Table 3.3. Florida Sea Grant funding effort by source for fiscal years (1 July - 30 June) 2005-2006 to 2007-2008. (Source: Calculated from data in Tables 3.5, 3.6 and 3.7)

Source	2005-06		2006-07		2007-08	
	\$000	%	\$000	%	\$000	%
Federal NOAA Sea Grant Core Program	2,013	39.8	1,982	42.1	2,013	43.9
Federal NOAA Sea Grant National Competitions	482	9.5	363	7.7	400	8.5
Faculty Match (Core + National) ^a	706	14.0	664	14.1	594	12.6
Other Federal Grants ^b	271	5.4	79	1.7	115	2.4
Non-federal Grants ^b	252	5.0	311	6.6	274	5.8
State Appropriations ^c	998	19.7	1,059	22.5	974	20.7
Florida Counties	282	5.6	191	4.0	260	5.5
Foundations/Endowments	51	1.0	63	1.3	67	1.5
Total Program Effort	5,055	100.0	4,712	100.0	4,697	100.0

^a This includes all match except state university system appropriations used as match.

^b This includes only grants that were administered by the Florida Sea Grant College Program office. Sea Grant faculty also use their academic departments to administer grants.

^c This includes state appropriations to Florida Sea Grant via the Education and General budget of the University of Florida and via the UF/Institute of Food and Agricultural Sciences used as match in extension, communications and management.

Table 3.4. Percentage of Florida Sea Grant core and total Sea Grant federal funds used for research, extension, communications and management, 2005-06 to 2007-08. (Source: Calculated from data in Tables 3.5, 3.6 and 3.7)

Program Function	2005-06	2006-07	2007-08
		*Federal Core (%)	
Research	50.9	51.3	45.4
Extension	30.8	30.8	32.3
Communications	8.2	8.2	9.7
Management	10.1	9.7	12.6
TOTAL	100.0	100.0	100.0
	**Federal Total %		
Research	58.2	50.0	53.7
Extension	27.1	34.7	27.4
Communications	6.6	7.0	8.2
Management	8.1	8.3	10.7
TOTAL	100.0	100.0	100.0

* Federal "Core" refers to Florida Sea Grant core NOAA program funding (omnibus grant).

** Federal Total refers to all federal funds, including core, pass-through funds, and awards received by the FSG program.

Table 3.5. Sea Grant funding July 1, 2005 to June 30, 2006.

FEDERAL SEA GRANT CORE:		FEDERAL	MATCH
RESEARCH		1,024,800	533,483
EXTENSION		620,000	310,003
COMMUNICATIONS		165,000	85,000
MANAGEMENT		203,000	101,500
Other		0	0
TOTAL SEA GRANT CORE		2,012,800	1,029,986
FEDERAL SEA GRANT NATL COMP:			
E/INDST-4	INDUSTRY FELLOW Y-2	30,000	15,000
E/ST-33	KNAUSS FELLOWSHIP-C. Barrientos	41,500	0
R/MI-12		55,000	0
R/LR-A-42	Y-2	70,000	36,542
R/LR-Q-29		100,000	50,000
R/LR-Q-28A&B		100,000	50,528
M/PD-11 Supplemental		30,700	15,350
E/T-16		25,000	0
E/T-17		15,000	5,000
SGEP-13-FE-A		105,319	53,319
SGEP-13-FE-C		89,981	47,474
TOTAL FEDERAL SEA GRANT NATL COMP		662,500	273,213
OTHER FEDERAL GRANTS:			
SEA-COOS Y-4	University of North Carolina	145,640	0
E/T-18	University of Connecticut	14,689	0
COSEE-GOM-2	University of So. Mississippi	110,231	0
TOTAL OTHER FEDERAL GRANTS		270,560	0
TOTAL FEDERAL GRANTS		2,945,860	1,303,199
MATCH COVERED BY STATE APPROPRIATIONS			(496,503)
NET MATCH			806,696
NON-FEDERAL GRANTS:			
EX-FCC-6	Boat Regs	26,850	0
EX-FCC-7	Boating Regs.	120,000	0
EX-FCC-8	Seasonal Boating Patterns	80,000	0
EX-JID-1	Boater Ed Guide	24,725	0
TOTAL NON-FEDERAL GRANTS		251,575	0
TOTAL GRANT FUNDING		3,197,435	806,696
FOUNDATIONS/ENDOWMENT REVENUES		51,145	0
COUNTIES		282,448	0
STATE APPROPRIATIONS:			
E&G 07/01/05--06/30/06		412,686	0
IFAS 07/01/05--06/30/06		585,571	0
TOTAL SEA GRANT FUNDING		4,529,285	806,696

Table 3.6. Sea Grant funding July 1, 2006 to June 30, 2007

FEDERAL SEA GRANT CORE:		FEDERAL	MATCH
RESEARCH		1,055,660	534,983
EXTENSION		588,400	310,003
COMMUNICATIONS		152,000	85,000
MANAGEMENT		185,600	100,000
OTHER		0	0
TOTAL SEA GRANT CORE		1,981,660	1,029,986
FEDERAL SEA GRANT NATL COMP:			
E/ST-34	KNAUSS FELLOWSHIP-Halter	41,500	0
E/ST-35	KNAUSS FELLOWSHIP-Morris	41,500	0
E/ST-36	KNAUSS FELLOWSHIP-Uyeda	41,500	0
SGEP-13-FE-A	Fish Extension-Spranger	100,581	53,319
SGEP-13-FE-C	Fish Extension-Spranger	85,931	46,091
PD-07-03	Int. Capacity Building-Spranger	22,000	11,000
RRP-SA-1	SA-Planning	23,554	11,560
RRP-GOM-1	GOM-Planning	6,333	5,202
TOTAL FEDERAL SEA GRANT NATL COMP		362,899	127,172
OTHER FEDERAL GRANTS:			
SEA-COOS Y-5	University of North Carolina	65,000	0
E/T-18	UCONN-Aquatic Nuisance	14,003	1,325
COSEE-GOM-2	Y2 University of So. Mississippi	0	0
TOTAL OTHER FEDERAL GRANTS		79,003	1,325
TOTAL FEDERAL GRANTS		2,423,562	1,158,483
MATCH COVERED BY STATE APPROPRIATIONS			(495,003)
NET MATCH			663,480
NON-FEDERAL GRANTS:			
EX-FCC-7	Boating Regs.	92,000	0
EX-FCC-8	Seasonal Boating Patterns	84,190	0
EX-FWCC-9	Bay County Boating	106,203	0
EX-FFRA-A	Pelican DVD	10,000	0
EX-FDEP-2	Reef Workshop-1	2,895	0
EX-MCG-1	Manatee County Admin Support Prj	13,000	0
TOTAL NON-FEDERAL GRANTS		311,183	0
TOTAL GRANT FUNDING		2,734,745	663,480
FOUNDATIONS/ENDOWMENT REVENUES		62,526	0
COUNTIES		191,333	0
STATE APPROPRIATIONS:			
E&G 07/01/06--06/30/07		432,261	0
IFAS 07/01/06--06/30/07		626,622	0
TOTAL SEA GRANT FUNDING		4,047,487	663,480

Table 3.7. Sea Grant funding July 1, 2007 to June 30, 2008.

FEDERAL SEA GRANT CORE:		FEDERAL	MATCH
RESEARCH		925,427	468,810
EXTENSION		660,000	330,000
COMMUNICATIONS		198,161	101,690
MANAGEMENT		257,412	131,254
OTHER		0	0
TOTAL SEA GRANT CORE		2,041,000	1,031,754
FEDERAL SEA GRANT NATL COMP:			
E/ST-34	KNAUSS FELLOWSHIP-Halter	41,500	0
E/ST-35	KNAUSS FELLOWSHIP-Morris	41,500	0
E/ST-36	KNAUSS FELLOWSHIP-Uyeda	41,500	0
SGEP-13-FE-A	Fish Extension-Spranger	105,319	52,660
SGEP-13-FE-C	Fish Extension-Spranger	89,981	44,990
RRP-SA-1	SA-Planning	23,554	11,560
RRP-GOM-1	GOM-Planning	6,333	5,202
PD-07-03	INT CAPASITY BUILDING	22,000	0
TOTAL FEDERAL SEA GRANT NATL COMP		371,687	114,412
OTHER FEDERAL GRANTS:			
E/T-9	So. FI Marine Eco System	50,000	10,000
E/T-18	UCONN-Aquatic Nuisance	14,003	1,325
COSEE-GOM-2	Y2 University of So. Mississippi	50,521	0
TOTAL OTHER FEDERAL GRANTS		114,524	11,325
TOTAL FEDERAL GRANTS		2,527,211	1,157,491
MATCH COVERED BY STATE APPROPRIATIONS			(562,944)
NET MATCH			594,547
NON-FEDERAL GRANTS:			
EX-BAY-1	Bay County Mapping	39,777	0
EX-FCC-9	Bay County Boating	126,203	0
EX-FFRA-1	Pelican DVD Production	10,000	0
EX-MCG-2	Admin Support Project	13,000	0
EX-WCIND-5	Charlotte County	16,307	0
EX-WCIND-6	2008 Strategic plan	17,000	0
EX-WCIND-7	Charlotte County Boating	51,428	0
TOTAL NON-FEDERAL GRANTS		273,715	0
TOTAL GRANT FUNDING		2,800,926	594,547
FOUNDATIONS/ENDOWMENT REVENUES		67,196	0
COUNTIES		259,914	0
STATE APPROPRIATIONS:			
E&G 07/01/07--06/30/08		418,391	0
IFAS 07/01/07--06/30/08		555,162	0
TOTAL SEA GRANT FUNDING		4,101,589	594,547

Table 3.8. Florida Sea Grant total grants generated per dollar of state appropriations, 2007-08 program year. (Source: Calculated from Table 6)

	UF Appropriations Through Education And General Budget (\$418,391)	UF/IFAS Faculty Dedicated to Sea Grant (\$555,162)	Total (\$973,553)
Sea Grant Federal Funds (\$2,412,687)	5.8	4.4	2.5
All Other Extramural Grants (\$388,239)	0.9	0.7	0.4
TOTAL (\$2,800,926)	6.7	5.1	2.9

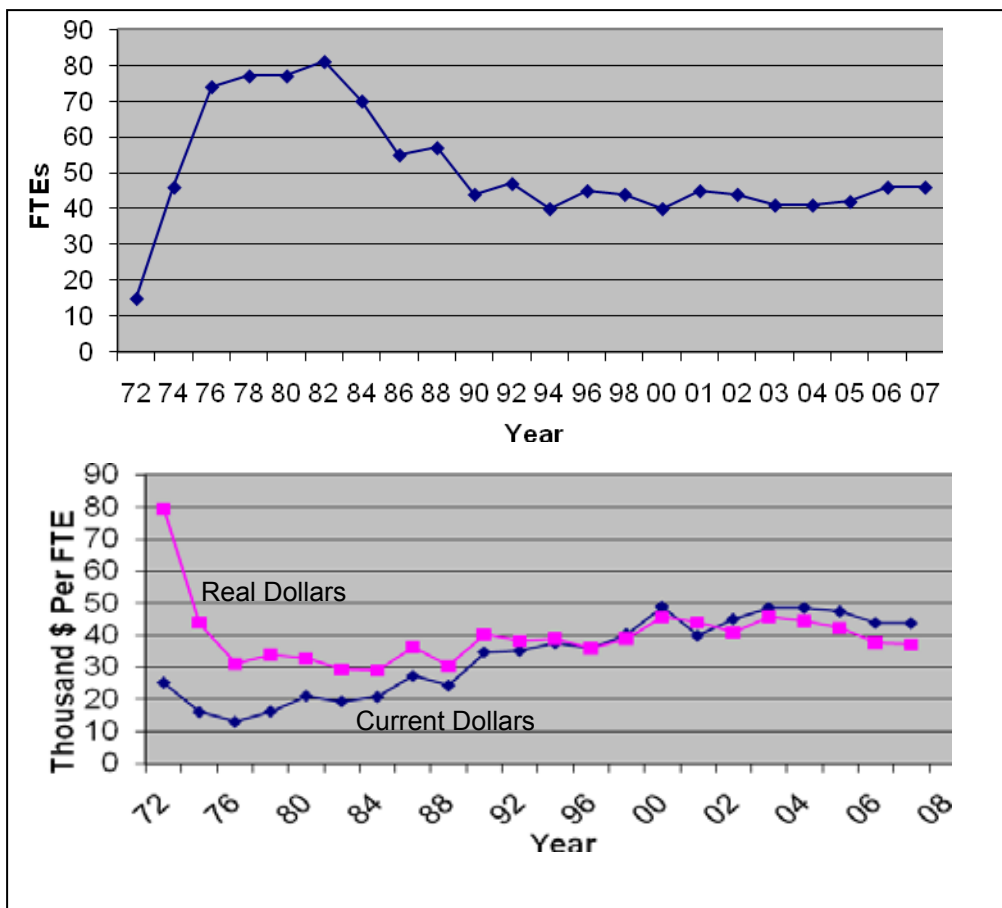


Figure 3.1. A comparison of Florida Sea Grant core program FTEs and current and real funding per FTE, 1972-2007.

4.0 INSTITUTIONS INVOLVED

Florida has a unique network of public and private marine academic institutions that are responding to the challenge of providing national leadership in addressing the pressing needs facing Florida and the nation (see Figure 4.1). For 2007, 8 of 16 institutions (both public and private) participated through the receipt of Sea Grant core funding for annual projects. In addition, one state agency, two companies and 38 counties participated. A complete listing is in Table 4.1.

Table 4.1. Florida Sea Grant program participants in NOAA funded core projects, 2007.

ACADEMIC/RESEARCH	INDUSTRY																																										
<p>Florida Institutions Florida Atlantic University Florida Institute of Technology Nova Southeastern University University of Florida University of South Florida University of West Florida</p> <p>Cooperating Institutions Smithsonian Institution University of Georgia</p> <p style="text-align: center;">GOVERNMENT</p> <p>State Florida Fish & Wildlife Conservation Commission, Fish and Wildlife Research Institute</p> <p>Foundations and Non-governmental Organizations Harbor Branch Oceanographic Institution</p>	<p>SymBio Co. Tequesta Marine BioSciences, Inc.</p> <p style="text-align: center;">COASTAL COUNTY</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">Bay</td> <td style="width: 33%;">Hernando</td> <td style="width: 33%;">Pinellas</td> </tr> <tr> <td>Brevard</td> <td>Hillsborough</td> <td>**Putnam</td> </tr> <tr> <td>*Broward</td> <td>*Indian River</td> <td>St. Johns</td> </tr> <tr> <td>Charlotte</td> <td>*Jefferson</td> <td>St. Lucie</td> </tr> <tr> <td>Citrus</td> <td>Lee</td> <td>Santa Rosa</td> </tr> <tr> <td>**Clay</td> <td>Leon</td> <td>Sarasota</td> </tr> <tr> <td>Collier</td> <td>Levy</td> <td>*Taylor</td> </tr> <tr> <td>*Dade</td> <td>Manatee</td> <td>*Volusia</td> </tr> <tr> <td>Dixie</td> <td>*Martin</td> <td>Walton</td> </tr> <tr> <td>Duval</td> <td>Monroe</td> <td>***Wakulla</td> </tr> <tr> <td>Escambia</td> <td>Nassau</td> <td></td> </tr> <tr> <td>Flagler</td> <td>Okaloosa</td> <td></td> </tr> <tr> <td>Franklin</td> <td>*Palm Beach</td> <td></td> </tr> <tr> <td>*Gulf</td> <td>Pasco</td> <td></td> </tr> </table> <p>*All listed coastal counties participate via the Florida Cooperative Extension Service. However, eleven lack specific Sea Grant agent coverage.</p> <p>** Clay and Putnam Counties are interior but contain the St. Johns River.</p> <p>***The IFAS Extension Director is involved in Coastal-related activities in Walton County, but there is no dedicated agent.</p>	Bay	Hernando	Pinellas	Brevard	Hillsborough	**Putnam	*Broward	*Indian River	St. Johns	Charlotte	*Jefferson	St. Lucie	Citrus	Lee	Santa Rosa	**Clay	Leon	Sarasota	Collier	Levy	*Taylor	*Dade	Manatee	*Volusia	Dixie	*Martin	Walton	Duval	Monroe	***Wakulla	Escambia	Nassau		Flagler	Okaloosa		Franklin	*Palm Beach		*Gulf	Pasco	
Bay	Hernando	Pinellas																																									
Brevard	Hillsborough	**Putnam																																									
*Broward	*Indian River	St. Johns																																									
Charlotte	*Jefferson	St. Lucie																																									
Citrus	Lee	Santa Rosa																																									
**Clay	Leon	Sarasota																																									
Collier	Levy	*Taylor																																									
*Dade	Manatee	*Volusia																																									
Dixie	*Martin	Walton																																									
Duval	Monroe	***Wakulla																																									
Escambia	Nassau																																										
Flagler	Okaloosa																																										
Franklin	*Palm Beach																																										
*Gulf	Pasco																																										

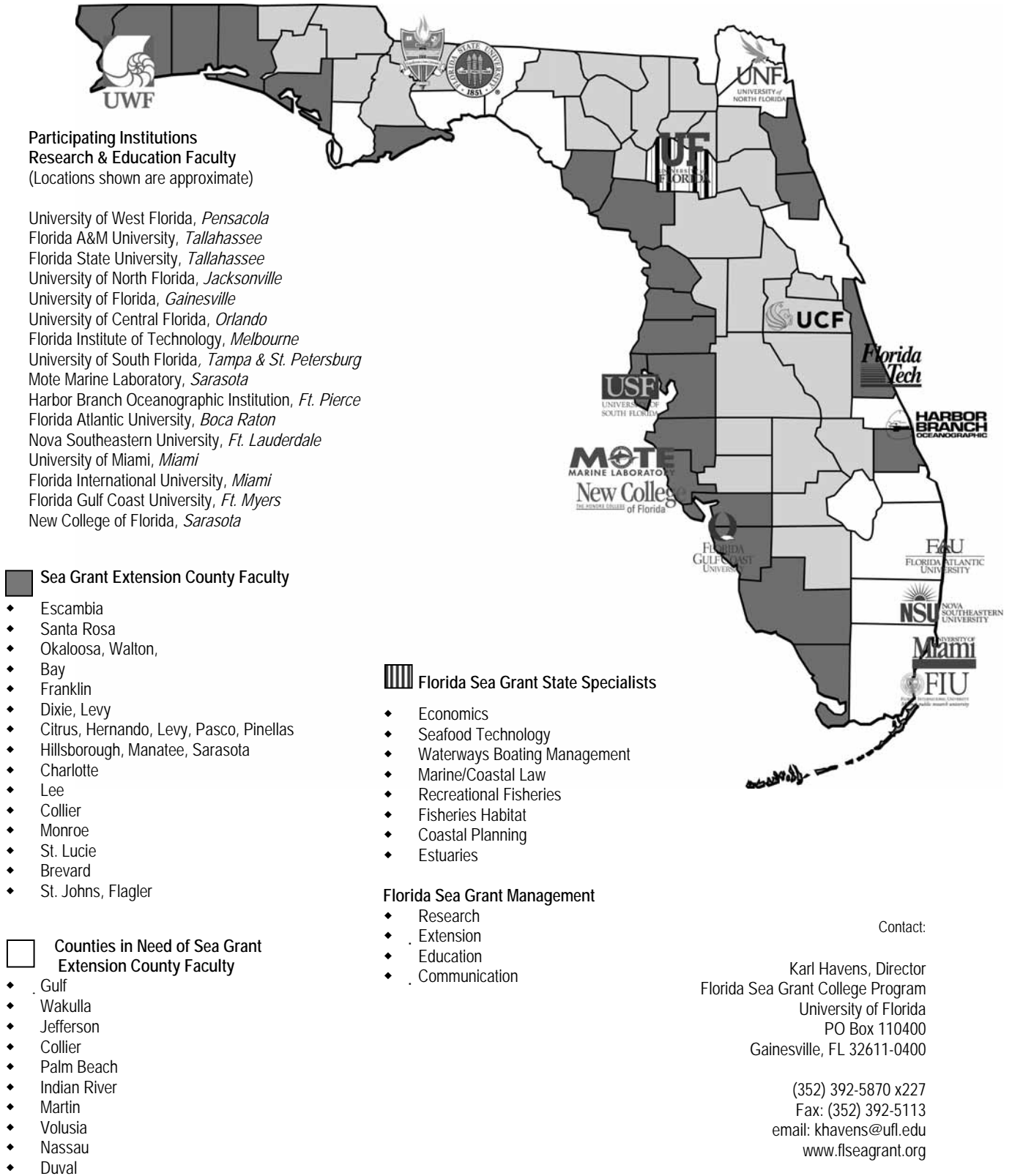


Figure 4.1. Florida Sea Grant’s academic community of marine research, education and extension.

5.0 PROJECTS FUNDED

Florida Sea Grant Funded Projects That Were Active During 2007 In Three Major Categories According to Sponsorship

Core Sea Grant Program Projects

(This listing includes projects that were completing or in process in 2006)

Research (For complementary projects see Extension, p. 5.6)

Biotechnology

R/LR-MB-20, Design and Development of New Anti-Fouling Paint Additives Based on Marine Pyridyl – Sponges produce pyridyl alkaloids that affect barnacle larvae. The goal of this project is to develop single analogs of pyridyls that can be economically synthesized and could be practical anti-fouling additives for marine paints that are less harmful to the marine environment than currently used paint additives.

R/LR-MB-22, Chemical Variations in Marine Cyanobacteria for Drug Discovery – Marine cyanobacteria produce a great diversity of compounds, mostly non-ribosomal peptides and lipopeptides, with over 200 natural products reported. Marine cyanobacteria provide an exceptional resource for new natural products because of their tremendous biodiversity and chemical diversity. This research project is identifying new natural products from Florida benthic marine cyanobacteria that may be useful as drugs in the treatment of human disease. This will be the first systematic approach to studying benthic cyanobacteria from Florida coastal waters for biotechnological applications

R/LR-MB-23, Profiling the Marine Sponge (*Discodermia*) Transcriptome Enriched for Secondary Metabolite-coding Messages – There is a need for information on the genome of marine organisms that produce potentially beneficial marine bio-compounds. This research project will develop a novel approach to recombinant production of potent bioactive compounds produced by the marine sponge genus *Discodermia*. The resulting molecular sequence data will serve as a novel genetic resource (e.g. toolkit) for research and industry, enabling downstream experiments and sustainable production of unique bioactive marine natural products

R/LR-MB-24, Cloning of the Terpene Synthase Involved in Eleutherobin Biosynthesis – Lack of supply has hampered the development of many marine natural products. This research project aims to purify the native terpene synthase leading to eleutherobin, and cloning of the corresponding gene. The long-term goal is to develop a commercially relevant production method of eleutherobin combining recombinant technology with chemical synthesis

Fisheries

R/LR-B-58, Passive Acoustic Measurement of Black Drum Spawning Output – Many fisheries scientists throughout the southeast U.S. have been using passive acoustics to identify spawning habitat of sound-producing fishes. The purpose of this project is to determine whether sound analysis can yield quantitative data on the number of eggs spawned. This study will serve as a test case that can be used as a model for future studies of other important species, such as red drum and spotted seatrout, where issues such as egg transport and egg identification may be more difficult.

R/LR-B-59, Recruitment Dynamics and Population Connectivity of Gray Snapper, *Lutjanus griseus*, Among West Florida Estuarine Systems – The Sustainable Fisheries Act (1996) mandated the

protection of essential fish habitat, yet provided little guidance as to what constitutes essential habitat. This proposal aims to develop an approach to evaluate the essential nature of fish nursery habitat by linking nursery-specific juvenile production with eventual recruitment to adult habitat. Gray snapper, *Lutjanus griseus* will be used as a model estuarine-dependent reef fish to develop such an approach.

R/LR-B-60, Developing a Multiple Genetic Marker Approach to Assess Global Scale Population Structure and Mating Systems in High Fin-market Demand Shark Species – The goal of the project is to make possible shark conservation, management, and trade monitoring on a species and population-specific basis by providing a comprehensive, multi-genetic marker assessment of global population structure in fin-trade sharks, determining the population of origin of market derived shark fins, and elucidating shark mating systems.

Aquaculture

R/LR-A-39, Enhancing Stress Resistance of Cultured Hard Clams in Florida by Triploidy – Florida has approximately 350 active clam growers producing a crop worth of \$18.2 million in 2001. Recently, the need for a hardier clam strain has become evident as clam culturists in Florida report below average survivals or total losses during the prolonged hot summers. Triploid clams may be a solution to this problem as they are virtually sterile, spawning does not occur, and energy may be available during this stressful period for basic metabolism.

R/LR-A-41-PD, Development of Feeding Mechanics, Performance and Prey Selectivity in Marine-fish Larvae: A Novel Approach to Understanding Food Requirements of Marine Ornamental Fish – High mortality during larviculture remains a major obstacle to successful rearing of a large number of marine ornamental fish species. In particular, catastrophic mortality is associated with first-feeding or the “critical period” during which larvae switch from endogenous to exogenous feeding. This research is aimed at determining the causes of mass mortality during the early stages of exogenous feeding in hatchery-reared marine ornamental fish larvae.

R/LR-A-43, Developing Improved Hatchery Technology for Marine Ornamental Fish Using Stage-specific Feeding Management Regimes – The main goal of this study is to develop effective and sustainable hatchery technology for the difficult to raise marine ornamental fish species *Centropyge flavissimus* (lemonpeel angelfish) and *Liopropoma carmabi* (candy basslet). These species demand a high price in the aquarium trade and have been successfully spawned in captivity. A novel approach will be developed that integrates the development of feeding kinematics, feeding mechanisms and feeding performance in the development of stage-specific feeding regimes that will enhance survivorship during the larval rearing of these species.

R/LR-A-44, Sunray Venus Clam: A New Species to Diversify the Florida Aquaculture Hard Clam Industry – Over the past two decades, Florida has seen a dramatic increase in aquacultured shellfish production. The clam industry grew from \$0.4 million (13 farmers) in 1987 to \$18 million (336 farmers) in 2001. However, the industry is built on a single species whose value fell to just under \$13 million in 2003 as hard clam dock-side prices plummeted from 13¢ to 9¢ per clam during the 2001-2004 economic downturn. This was not reflected in other bivalve species, such as oysters. Diversifying the shellfish culture industry by developing farming technology and markets for other bivalve species will increase economic stability and growth of the industry.

Seafood Technology and Seafood Safety

R/LR-Q-28, Gulf Oyster Industry Program: Product Characterization to Advance the Use of Post Harvest Treatments (PHT) for Raw Oysters – A historical change is occurring in the production and

marketing of oyster products due to federal mandates for alternative processing methods and changes in public perceptions and preferences. Specifically, the mandate for PHT will influence the sensory attributes of the traditional oyster products. Concurrently, public confidence is growing weaker concerning the safety of raw oysters and buyers are using more scrutiny in selection of raw oysters. Four university Sea Grant programs (UF, LSU, MSU, OSU) will collaborate in the development of a non-biased, scientific based sensory description analysis (DA) or profile description of raw oysters that provides the necessary product descriptors (lexicons), reference standards, vocabulary and intensity scales for a complete product characterization (PC) program.

R/LR-Q-29, Consumer Market Research of Value Added Product (VAP) and Post Harvest Processed (PHP) Oyster Products to Increase Gulf Oyster Consumption and Reduce *V. vulnificus* Related Illnesses – In 2003, the Gulf of Mexico region produced 72 percent of the national oyster harvest (29.2 million pounds of meat), totaling \$74.16 million. One factor negatively affecting the Gulf oyster industry is the pathogen *Vibrio vulnificus*. This project will conduct market segmentation studies to determine oyster consumer groupings and their demographic and oyster eating preferences to better direct educational and marketing efforts to reach the general and at-risk oyster consuming population; 2) utilize the results of the consumer segmentation research in complementary educational campaign targeting the general oyster consumer to increase awareness of value added product (VAP) and post harvest processed (PHP) oyster products that reduce the risk of *V. vulnificus*.

R/LR-Q-30, Evaluation of QPCR Methods for Detection of *Vibrio vulnificus* – FDA recently mandated (Post Harvest Treatment) PHP of oysters, which requires validation and verification protocols that enumerate *V. vulnificus* before and after treatment. However, standard assays are time-consuming, labor intensive, expensive and unreliable. Direct comparison of QPCR assays to standard methods is needed to establish the most effective approach for the seafood industry to address the validation and verification of PHP for reduction of *V. vulnificus* in oysters. The goal of QPCR development is to provide more efficient and cost effective methodology for industry assessment of validation and verification procedures.

R/LR-Q-31, Objective Quantification of the Extent of Aquatic Food Product Enhancement with Carbon Monoxide – The possibility, extent and quantification of “color enhancement” data using CO is non-existing. This type of data is needed to give regulatory agencies a scientific basis for decision-making, and to guide the industry to develop effective CO treatment methodologies without the potential pitfalls and disadvantages of this technology. Computer machine vision, electronic nose, microbial analysis, and sensory panel tests will be conducted to generate a complete data set regarding possible “color enhancement” of various fish with lateral dark red sections.

R/LR-E-19PD, Oyster Demand Adjustments to Alternative Consumer Education and Post Harvest Treatments in Response to *Vibrio vulnificus* – The goal is to provide timely science-based direction that supports and augments current research directed at developing and implementing educational and outreach programs to better inform consumers of the potential risks associated with *V. vulnificus*. The work will provide economic losses due to existing perceived oyster consumption risks, the effects of various market promotion campaigns and attitudes of consumers of oysters.

Waterfront Communities

R/C-P-28CC, Smart Growth Planning for Coastal Communities and Waterways – In coastal communities across the nation, there is a growing concern that current development patterns, dominated by what some call “sprawl,” are contributing to water quality and environmental degradation. Though supportive of growth, communities are increasingly seeking solutions to balance growth with community

and environmental values. Projects will be developed on “smart growth” activities that address the land/water interface, in consultation with agencies and local decision-makers.

R/C-P-29, Planning for Sustainable Coastal Communities and Waterways – Florida faces a critical challenge: how to balance the use and protection of its coastal resources. Currently, Florida’s 35 coastal counties (of 67) account for 79% of the state’s population and over 80% of its economic activity. Nearly one million boats are registered in Florida (about one per 17 residents). This research builds upon R/C-P-28CC in supporting the activities of a Coastal Planning Specialist to broaden the scope of the existing Florida Sea Grant Boating and Waterway Management Program (BWMP), which includes a multidisciplinary team of geographers, biologists, legal specialists, and marine extension agents that carry out activities statewide.

R/C-P-30, Promoting Policy Planning for Coastal Communities, Coastal Access and Coastal Hazards Mitigation – Local waterfront governments often lack the time, funds or expertise to pursue coastal policy innovation and secure this within their comprehensive planning structure. They will benefit from a comprehensive legal analysis of their coastal policymaking authority, especially in the confusing nearshore jurisdictional environment, and from a systematic assessment of the planning tools at their disposal that is packaged in a useable format. This project will be an applied legal and policy research and model code development-project, coupled with legal and planning extension to disseminate results. Working with selected communities, it will marshal information and develop locally applicable policy plans adapted to individual community needs.

Ecosystem Health

R/C-E-52, A Portable Enterococcus Sensor for Monitoring Coastal Water Quality – The coastal ocean is an important economic and recreational resource that is constantly influenced by human activities. In 2003, there were more than 18,000 days of beach closings throughout the US due to high concentrations of fecal bacteria. This was an increase of more than 51% over the previous year. Health related management of recreational coastal sites is currently undertaken by monitoring fecal coliform and enterococci by membrane filtration. The proposed method will be completely field based and linked to a preexisting (in house designed and produced) handheld detector that will use remote networking to send actual data plots back to a mainframe computer. This will allow public health managers to make regulatory decisions based on near real-time data as it becomes available.

R/C-E-53-PD, Assessing the Importance of Substrate Composition and Novel Marine By-products in Enhancing Mitigation of Essential Fish Habitats – A keystone contributor to biological diversity along the Florida coast is the polychaete *Phragmatopoma lapidosa*. The worms construct nearshore reefs that provide shelter for many species. However, they can be impacted by sediment transported offshore from both natural beaches and beach restoration projects. Laboratory research suggests that a chemical in the worm’s tubes may be applied to deployed structures to enhance worm recruitment. A determination of the circumstances that the chemical may enhance recruitment, combined with data on local recruitment rates, would allow coastal managers to modify artificial reefs to include those preferred features, and thereby maximize larval settlement and formation of “natural” habitats.

Coastal Hazards

R/C-S-46, Field Measurements of Hurricane Wave Processes – The overall goal of this project is to quantify and improve descriptions of hurricane wave transformation near the coast and its effects. The population of the US coast, and Florida in particular, is increasing rapidly. With this comes an increased probability of hurricane damage from waves and storm surge. However, the quantity of wave data near the coast to improve predictions and thus planning and construction is not adequate. Also lacking are

collocated wind and wave measurements which could help to improve turbulence predictions and thus gust loading on houses.

R/C-S-47, Integrated Prediction of Hurricane Induced Inundation and Shoreline Change –

Hurricanes are the most devastating and damaging natural hazards impacting the U.S., accounting for 65% of insured losses from natural hazards in the past 50 years. The 2004 hurricanes caused \$42 billion damage and 59 deaths in the U.S. Florida was the hardest hit by four major hurricanes. This research will significantly advance our predictive ability of coastal hazards (flooding, erosion, and rip current) to mitigate damages to coastal communities. Outcome of the research will directly benefit NOAA's effort to improve its storm surge models.

Extension and Communications

SGEP-13, Florida Sea Grant Extension Program – This work will continue to provide effective and responsible extension education programming that promotes the wise use of coastal and marine resources in Florida, with impacts that extend to the Southeast and the nation. Currently, Extension has 18 agents and 4 full-time specialists that serve the 80% of Florida's population that live in the 35 coastal counties of the state. In cooperation with industry Florida Sea Grant has made a significant impact on improving seafood quality and seafood safety, for example through state, regional and national leadership in development of the Hazard Analysis and Critical Control Point seafood inspection program. This effort has been recognized by the "Hammer Award" of the Vice President of the U.S. for achievement by partnerships. Other efforts include guidance to local government in developing artificial reefs, development of shellfish mariculture, assisting fishers and their families deal with the impacts of the net ban in Florida, and use of rural tourism as an economic development tool.

COMM-5, Florida Sea Grant Communications Program – The production of high-quality publications and other research, extension and education support materials continues through the communications program to effectively communicate results of Florida Sea Grant activities to both general and specialized audiences. Productions have included Florida Sea Grant Reports, Florida Sea Grant Technical Papers, books and book chapters, extension publications, brochures, maps and posters. Productions have also included educational videos, news releases and features for Florida Sea Grant's Web site. The Communications Program oversees the Florida Sea Grant Web site, which contains nearly all of the Florida Sea Grant productions, as they are routinely posted there as part of the production process and policy. Communications activities and accomplishments are highlighted in sections 2.0 (Accomplishments and Benefits) and 6.0 (Publications).

Program Management and Development

M/PM-13, Florida Sea Grant Management – To meet the programmatic goal of Florida Sea Grant, i.e., the use and conservation of the marine resources of Florida and the nation in a way that leads to a sustainable economy and environment, this project works to coordinate and administer the State University System of Florida Sea Grant College Program. Management activities have been judged against quantitative and qualitative performance goals as mandated by the University of Florida and the National Sea Grant College Program Office. The latest Federal program review evaluated FSG as "Excellent" for all criteria, tops in the nation.

M/PD-11, Coastal Science and Technology Innovation with Limited Funds: The Florida Sea Grant Program Development Portfolio –

This project continues to give Florida's universities and academic laboratories, through Sea Grant, the unique capability to respond even in the middle of a fiscal year to timely marine issues and demonstrations essential to coastal user groups. Projects are low budget with limited objectives. All proposals are reviewed to insure technical merit and relevance. Projects are

conducted if they demonstrate a likelihood of rapid success and meet at least one of six criteria: 1) offer solution to clearly defined timely problem; 2) address problem in opportunistic research area; 3) pilot study to see if longer project justified; 4) provide information to attract support elsewhere; 5) extension demonstration project; 6) timely exchange of scientific information.

Additional Projects From Sea Grant Special Initiatives And National Opportunities (Either in process or started in 2007)

Extension

E/T-9, NOAA South Florida Marine Ecosystem Outreach Project – Restoration and long-term sustained water quality of the South Florida Ecosystem is a priority among federal, state and local agencies, with billions of dollars being expended on a variety of projects over the next 25 years. The ultimate success of these projects will depend on the awareness, knowledge and decisions of citizens, business owners, and community leaders that are based on sound science. This project will serve as the link between science-based information developed by NOAA agencies and Sea Grant-supported research and the citizenry of South Florida.

E/T-12, SEACOOS Regional Outreach Coordinator – After a national search, Christina Simoniello was hired by Florida Sea Grant as SEACOOS Regional Outreach Coordinator. She will be based at the University of South Florida in St. Petersburg, Florida. She will work assist in the design, development, implementation and evaluation of regional education and outreach programs. She will assist the individual Sea Grant Program staff and researchers in North Carolina, South Carolina, Georgia and Florida in the identification of constituent needs and in the development of a various useful and relevant coastal ocean observation products and services

SGEP-13-FE-A & C [2 modules], Florida Sea Grant Fish Extension Project – Florida's recreational fisheries utilize 110+ species along the state's 1,350 mile shoreline. A project was established in 2004 to provide Extension service to this sector. During 2007 the project will be modified due to the resignations of some of the key personnel in the original project. (Spranger: SGEP-13-FE-C). The project and work elements were adjusted in 2007 to focus on recreational fishing mortality reduction, artificial reef enhancement, educational materials for ethnic groups, and fostering industry input to regulatory matters.

Fellowships

E/ST- 34, 35, 36 Knauss Fellowship – Three graduate students from Florida universities received Knauss fellowships in 2007 to spent one year in Washington, D.C. working in Federal programs related to coastal and ocean science and management.

Program Development Projects

PD-05-4, Tracking the Movements of Bull Sharks in the Gulf of Mexico Using Pop-Up Satellite Archival Transmitters – Knowledge of shark migration routes and local movement patterns could contribute to beach safety management. Recent advances in electronic tagging technology make it possible to gather and store detailed information on swimming depth, water temperature, and a daily record of location that is uploadable to ARGOS satellites. This research identified and characterized the seasonal migratory patterns of a juvenile and adult bull shark in the northern and eastern Gulf of Mexico off of Florida. The study provided some of the first evidence of long and short migratory movements of the bull shark within the southern portion of Florida and the Gulf of Mexico. The data were provided to

both federal and state management agencies and will help to define the essential fish habitat of the bull shark.

Major Extramural (Non-Sea Grant-Funded) Projects

A number of other projects indicate the reliance of other organizations upon Florida Sea Grant, and are in addition to the partnerships reflected in the projects listed above. Certain projects supplement salary requirements for Extension. These are projects that are funded from the agency to Florida Sea Grant, but are not funded through NOAA. A brief listing of those projects active during 2007 is:

E/T-12, Southeast Atlantic Coastal Ocean Observing System – Florida Sea Grant Extension will continue outreach as a component of the Southeast Atlantic Coastal Ocean Observing System (SEA-COOS). The four Sea Grant programs (North Carolina to Georgia) are cooperating in this regional project. The goal is to establish a dialog with non-scientific users, identify their information needs and the preferred formats and methods of information delivery. Florida will train its extension faculty, focus on regional groups (e.g., ports, hazards) and local sectors (e.g., fishers and emerging response offices), host sector workshops and convene instate meetings with user groups. Portions of this project (also listed above in II.B) were funded externally.

COSEE-GOM, (Florida Portion), Regional Center for Ocean Sciences Education Excellence (COSEE) – Gulf of Mexico – This program is designed to strengthen ocean sciences education through interpretation of research results. The audience is the general public, pre-college teachers and students, informal educators and university and community college faculty and students.

E/T-17, The Gulf in Peril: Strategies for Restoring and Preserving Coastal Ecosystems of the Gulf of Mexico – The Conservancy of Southwest Florida and the Florida Sea Grant College Program are convening a conference in response to the recommendations of the Pew Ocean Commission and the U.S. Commission on Ocean Policy, and the observations of the Gulf in Peril series. The conference will bring together public and private sector stakeholders for the purpose of addressing the key issues and outline actions.

6.0 PUBLICATIONS

Florida Sea Grant issues *Publication and Communication Support Guidelines* to all Sea Grant project collaborators, and has an organized process for printing and tracking publications. Documents published “in-house” include Sea Grant Reports, Sea Grant Extension Publications, Sea Grant Technical Papers, thesis or dissertation abstracts, staff papers and other items such as Extension newsletters. Each is numbered and tracked in an appropriate series. Books and journal articles are published elsewhere, but tracked for completion and credit by Communications staff. All publications are distributed to the Pell Library at the University of Rhode Island and through the UF/IFAS Electronic Data Information Source (EDIS).

An effort is made to compare Florida Sea Grant publications and communications activity and productivity with that of peer Sea Grant programs. Florida Sea Grant ranks 7th in funding among the “top 10” programs (Table 6.1). During 2007, FSG produced 16% of the publications submitted to the Pell Library by the top 10 funded programs. FSG ranked second among top 10 programs with 8 theses / dissertations published. Notably, of the top 10 funded programs, 60% (or 144,748) of the .pdf downloads from the Pell Library were FSG produced materials. The top 10 Florida Sea Grant publications downloaded from the Pell Library are listed in Table 6.2.

Florida Sea Grant also contributes to the database of online information maintained by the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida. EDIS (www.edis.ifas.ufl.edu) is the Electronic Data Information Source of IFAS Extension, and provides a collection of information on topics relevant to agriculture, the environment and natural resources, 4-H, Florida-friendly landscapes, and Florida communities.

The EDIS system is a publication management system providing a comprehensive, single-source repository of all current UF/IFAS numbered peer-reviewed publications. Using the EDIS system, UF/IFAS academic departments develop and maintain a collection of publications available for universal free distribution online and through the Florida Cooperative Extension Service County Offices and Research and Education Centers statewide. From the EDIS Web site, more than 10 million educational print and electronic products are disseminated each year from some 7,000 publication titles. Together, the streamlined publication process, universal access, and print as needed services not only reduce the cost but also expand the impact of UF/IFAS publications.

Florida Sea Grant uses the EDIS system primarily for Extension-related materials. During 2007, a total of 68,953 electronic downloads of FSG-related materials were made, an increase of 108% over 2006. The five most popular 2007 titles and number of downloads appear in Table 6.3.

Florida Sea Grant also maintains a running five-year list of publications sponsored by its research, education extension, communications and management efforts. For the current year (2007) it categorizes items as either submitted, in press, or published (Table 4). For each of the past five years the table identifies publications according to the categories of Florida Sea Grant Report; Florida Sea Grant Technical Paper; Books and Book Chapters; Journal Articles; Graduate Theses and Dissertations; Florida Sea Grant Extension Publications; Extension Newsletters; Miscellaneous Papers, Articles and Conference Proceedings; and Web sites. The project from which each publication originated is indicated by the code number in parentheses at the right side of the last line of each entry. A listing of each publication organized by type follows Table 6.4.

Table 6.1. Core funding and selected National Sea Grant Library data for top 10 (in core funding) Sea Grant Programs, 2007. (Source: Funding data from National Sea Grant Office and publication data from Pell Library)

	2007 Core Funding (\$1000)	Journal Reprints	Theses, Dissertations Abstracts	All Other Documents	Total Documents	Documents Produced/ 100K of Core Funding	# of Electronic Documents Submitted	# of PDFs Downloads from Pell Library Server	Downloads/ Per 100K of Core Funding
CA	3877	30	3	19	52	1.3	52	13,623	351
WA	2630	2	0	6	8	0.3	4	12,937	492
NY	2459	30	17	10	57	2.3	29	5,604	228
OR	2327	23	4	20	47	2.0	47	13,075	562
RI	2070	15	2	37	54	2.6	54	14,457	698
MIT	2051	6	0	8	14	0.7	9	5,898	288
FL	2035	32	8	22	56	2.8	56	144,748	7113
HI	1985	63	0	6	69	3.5	69	15,543	783
WI	1949	41	2	20	63	3.2	40	1,749	90
TX	1906	0	0	1	1	0.1	1	15,207	798
TOTAL	23,289	242	36	149	421	N/A	361	242841	1043
Florida as % of Total									
% Total	9	13	22	15	13	N/A	16	60	N/A

Table 6.2. Top 10 Florida Sea Grant publication downloads from the Pell Library, 2007. (Source: Pell Library, University of Rhode Island)

FLSGP-G-02-003	Common sharks of Florida
FLSGP-Q-03-002	"Performance Counts": annual progress report for 2003
FLSGP-Q-05-003	Annual Progress Report for 2005 (Performance Counts)
FLSGP-H-04-002	HACCP: programa de capacitacion en analisis de peligros y puntos criticos de control
FLSGP-G-00-006	Fish facts for Florida consumers--blue crab
FLSGP-H-97-002	Model HACCP program for soft shell blue crab
FLSGP-Q-05-002	Florida Sea Grant College Program year 2005 work plan
FLSGP-G-04-004	Recreational harvesting of the Florida bay scallop
FLSGP-Q-04-001	Florida Sea Grant College Program 2004-2005
FLSGP-W-95-001	Tropical and Subtropical Seafood Science and Technology Society of the Americas: papers and abstracts

Table 6.3. Top 5 Florida Sea Grant EDIS publications for 2007. (Source: EDIS online statistics)

Publication #	Title	Author	Downloads
SGEF108	Circle Hooks	Florida Sea Grant	8757
SGEF146	Common Sharks of Florida	Florida Sea Grant	7755
SGEB55	Nutrients and Florida's Coastal Waters: The Links Between People, Increased Nutrients and Changes to Coastal Aquatic Systems	Jennifer Hauxwell, Charles Jacoby, Thomas K. Frazer, John Stevely	6690
SGEF119	The Biology and Fishery of Florida's Commercial Sponges	John Stevely and Don Sweat	6225
FA123	The Utilization of a Fish Pump for Harvesting Shrimp from Tanks and Ponds	Cortney L. Ohs, Scott W. Grabe, R. LeRoy Creswell	3055

Table 6.4. Summary of Florida Sea Grant publications and other educational products, 2003 to 2007.

	Published				
	2007 ^a	2006	2005	2004	2003
Sea Grant Reports	0	0	0	1	0
Sea Grant Extension Publications	3	4	6	8	4
Sea Grant Technical Papers	5	7	10	9	5
Books	0	0	1	0	2
Book Chapters	2	0	2	1	6
Scientific Journal Articles	7	11	18	21	20
In Press	10				
Submitted	60				
Graduate Thesis or Dissertation Completed	8	12	11	20	14
Graduate Thesis or Dissertation In Process ^b	34				
Staff Papers/Conference Proceedings	2	9	9	7	25
Extension Newsletters ^c	3	6	6	5	7
WWW Pages Maintained	10	9	10	10	10

^a Number reflects totals prior to processing all 2007 project final reports.

^b Number in process reflects the number of graduate students receiving partial or full Sea Grant funding during 2007

^c Each newsletter has multiple volumes.

Publications of the Florida Sea Grant College Program

CALENDAR YEAR 2007 (January - December)

I. Florida Sea Grant Reports

None Published.

II. Florida Sea Grant Technical Papers

Florida Sea Grant. **Florida Sea Grant College Program Year 2007 Work Plan**. TP-158. (M/PM-14)

Florida Sea Grant. **Annual progress report for 2006**. TP-159. (M/PM-14)

Marcus, N. H. and J.A. Wilcox. 1-2007. **A guide to the meso-scale production of the Copepod *Acartia tonsa***. TP-156. (R/LR-A-36)

Sidman, C., T. Fik, R. Swett, B. Sargent, J. Fletcher, S. Fann, D. Fann, and A. Coffin. 9-2007. **A recreational boating characterization of Brevard County**. TP-160. (ex-FWCC-3)

Sidman, C., R. Swett, T. Fik, S. Fann, and B. Sargent. 1-2007. **A recreational boating characterization for Sarasota County**. TP-152-Revised. (ex-WCIND-3)

III. Books and Book Chapters

Cato, J. and S. Subasinge. 2007. **Bangladesh shrimp industry with emphasis on safety and quality of exported products: An overview**. *In: Agricultural Diversification and Smallholders in South Asia*, P. Joshi, A. Gulati and R. Cummings, Jr., eds. Academic Foundation Press, New Delhi, India. Pp. 479-524. (M/PM-14)

Deyle, R.E., Chapin, T.S., and Baker, E.J. 2007. **Are we any safer? An evaluation of Florida's hurricane hazard mitigation planning mandates**. *In: Growth Management in Florida: Planning for Paradise*. Eds. Connerly, Chapin, and Higgins. Ashgate Publishing, Aldershot, UK. Pp. 169-189. (R/C-P-26)

IV. Journal Articles

Magnussen, J.E., E.K. Pikitch, S.C. Clarke, C. Nicholson, A.R. Hoelzel, and M.S. Shivji. 2007. **Genetic tracking of basking shark products in international trade**. *Animal Conservation* 10:199-207. (R/LR-B-56)

Casper, E.T., S. S. Patterson, P. Bhanushali, A. Farmer, M. Smith, D. Fries, and J. H. Paul. 1-2007. **A handheld NASBA analyzer for the field detection and quantification of *Karenia brevis***. *Harmful Algae*; 6(1):112-118. (R/C-E-52)

Dillon, K.S., J.P. Chanton, and L.K. Smith. 2007. **Nitrogen sources and sinks in a wastewater impacted saline aquifer beneath the Florida Keys, USA**. *Estuarine, Coastal and Shelf Science* 73:148-164. (R/C-E-44)

Heithaus, M. R., D. Burkholder, R. E. Hueter, L. I. Heithaus, H. W. Pratt, Jr., and J. C. Carrier. 10-2007. **Spatial and temporal variation in shark communities of the lower Florida Keys and evidence for historical population declines**. *Canadian Journal of Fish and Aquatic Science*, 64: 1302-1313. (R/MI-12)

Matthew, S., C. Ross, J. R. Rocca, V. J. Paul, and H. Luesch. 1-2007. **Lyngbyastatin 4, a Dolastatin 13 Analogue with Elastase and Chymotrypsin Inhibitory Activity from the Marine Cyanobacterium *Lyngbya confervoides***. *Journal of Natural Products*, 70(1):124-127. Web Only; (Note) DOI: 10.1021/np060471k. (R/LR-MB-22)

Seaman, W. 2007. **Artificial habitats and the restoration of degraded marine ecosystems and fisheries.** *Hydrobiologia* 580:143-155. (M/PM-13)

Valero-Aracama, C., S.B. Wilson, M.E. Kane, and N.L. Philman. 5-2007. **Influence of in vitro growth conditions on in vitro and ex vitro photosynthetic rates of easy- and difficult-to-acclimate sea oats (*Uniola paniculata* L.) genotypes.** *In Vitro Cellular and Developmental Biology - Plant*, 43(3):237-246. (R/C-S-41)

V. Graduate Thesis and Dissertations

Goldstein, J. 2007. **Behavioral enhancement of onshore transport by postlarval Caribbean spiny lobster (*Panulirus argus*).** Thesis. Department of Biology, Old Dominion University. R/LR-B-50

Chapman, D. 2007. **From microsatellites to satellite tagging: Integrating behavioral ecology into shark conservation.** Dissertation. Oceanographic Center, Nova Southeastern University. R/LR-B-60

Feeley, M. 2007. Bioenergetics of juvenile cobia and billfish. Dissertation. Rosenstiel School of Atmospheric and Marine Sciences, University of Miami. R/LR-A-35

Hoover, E. 2007. **Effects of temperature, salinity and dissolved oxygen on survival of triploid and diploid hard clams, *Mercenaria mercenaria*.** Thesis. Department of Fisheries and Aquatic Science, University of Florida.

Bogan, D. 2007. **Sensory assessment of shrimp exposed to phosphate treatments for moisture control.** Thesis. Department of Food Science and Human Nutrition, University of Florida. R/LR-Q-28

Srivastava, M. 2007. **Uptake and survival of *Vibrio vulnificus* in oysters.** Thesis. Department of Food Science and Human Nutrition, University of Florida. R/LR-Q-30

Delius, B. 2007. **Distribution and foraging ecology of bull sharks in an oligotrophic estuary.** Thesis. Department of Biological Sciences, Florida International University. R/MI-12

Matos, J. 2007. Magnitude of the oxidative stress response influences species distribution. Dissertation. Department of Zoology, University of Florida. PD-04-05 and E/INDST-4

VI. Florida Sea Grant Extension Publications

Florida Sea Grant College Program. 2-2007. **Panic preventer file: Generic model for marinas, 4th ed.** SGEB-45. (SGEP-13)

Sweat, D.E. 5-2007. **Preparing Blue Crab: A seafood delicacy.** SGEF-120-revised. (SGEP-13)

Verlinde, C. 10-2007. **Boating and angling guide to Escambia and Santa Rosa Counties.** SGEB-62. (SGEP-13)

VII. Extension Newsletters

Bradway, M. Miami-Dade County. (SGEP-13)
At the Waters Edge. 4 p.
February - March 6(1)

McGuire, M.P. Nassau, Duval, St. John's, and Flagler County Extension Service. (SGEP-13)
Aqua-Notes, the Northeast Florida Sea Grant Newsletter. 4 p.
February (#7-1)--Portuguese man-o-war and other jellyfish; First Coast Birding & Nature Festival
May (#7-2)--Manatees, Summer camps, Master Naturalist Program

August (#7-3)--St Johns Co Home & Garden Show, International Year of the Reef poster contest,
"Reading" fish
November (#7-4)--Red tide, plastics in the ocean, NOAA Teacher at Sea program

Stevely, J.M. Manatee County Extension Services (SGEP-13)
The Marine Scene. Six Editions-Bimonthly. 6 p.
January - February 48(1)
March - April 48(2)
May - June 48(3)
July - August 48(4)
September - October 48(5)

VIII. Miscellaneous Papers, Articles and Conference Proceeding

Adams, C., B. Staugler, and A. Hodges. 2007. The contribution of the water LIFE kids cup fishing tournament to the Charlotte County, Florida economy. University of Florida IFAS Extension, EDIS, FE700:1-9. (SGEP-13)
Baker, S. M., E. Hoover, and L.N. Sturmer. 2007. The role of salinity in hard clam aquaculture. University of Florida IFAS Extension, EDIS, CIR1500/FA128:1-10. (SGEP-13)

IX. Web sites

Florida Sea Grant Home Page
www.flseagrant.org
Florida Bay
www.flseagrant.org
Seafood Science and Technology
<http://sst.ifas.ufl.edu/>
Anchorage Inventory
http://flseagrant.ifas.ufl.edu/anchorage/anchorage_inventory.php
Non-Native Invasive Aquatic and Wetland Plants in the United States
<http://plants.ifas.ufl.edu/seagrant/aquinv.html>
Escambia County Marine Extension. Andrew P. Diller
<http://escambia.ifas.ufl.edu/marine>
The Miami-Dade County Sea Grant Extension Program. Marella Crane Bradway.
<http://miami-dade.ifas.ufl.edu/programs/seagrant.htm>
REDstart Fisheries Enhancement Project Bryan Fluech.
<http://lee.ifas.ufl.edu/marinewnew.htm>
UF/Monroe County Extension Service. Doug Gregory.
<http://monroe.ifas.ufl.edu/marine/marine.htm>
St. Johns County - Northeast Marine Extension. Maia P McGuire.
<http://stjohns.ifas.ufl.edu/sea/seagrant.htm>

7.0 STUDENTS

An Investment in Florida's Future Through Sea Grant Supported Graduate Education

Introduction

At the heart of Florida Sea Grant's program are the scientific investigations that it supports. On an annual basis, at least 50 percent of Florida Sea Grant's core federal funding is used to support research. An annual goal is that at least 25 percent of research funds are used to support graduate student assistantships and other direct student involvement in research activity.

Investment in the future of Florida's coastal resources requires both capital and labor. It is critical that the labor force be highly trained and skilled. As a university- and issue-based research and education program, Florida Sea Grant draws upon its partnership of people, universities, governments and businesses to ensure that Florida has a technically trained work force and scientifically and environmentally informed citizens.

Through support of graduate education, Florida Sea Grant produces highly trained scientists, social scientists, engineers and other professionals that increase Florida's economic competitiveness both nationally and internationally, and who devise and lead creative management concepts to keep Florida's coastal environment sustainable for future generations.

The opening of new viewpoints and perspectives is one of the most important challenges to higher education. In addition to gaining scientific knowledge and research skills, students need exposure to interdisciplinary and multidisciplinary perspectives, use multiple contexts in solving problems, and communicate complex ideas well in work group settings.

Fostering these important skills requires a diversification of learning opportunities at the college or university level. Florida Sea Grant participates in various fellowship and scholarship programs and traditional research assistantships that serve to broaden the experiences of graduate students, and in some cases, undergraduates. Florida Sea Grant has provided substantial support to educating Florida's future marine scientists and environmental professionals by giving selected graduate students the opportunity to develop their research and analytical skills by assisting scientists with Sea Grant projects. These graduate students are then prepared to assume prominent positions where they can impact directly on the continued wise use, sustainable development, and conservation of marine and coastal resources. Florida Sea Grant will also continue to invest in its faculty and staff so they have the necessary skills and training to meet the long-term needs of the organization. For example, Florida Sea Grant has and will continue to provide training opportunities for extension faculty to hone their public facilitation and consensus building skills through ongoing support and participation in the University of Florida's Natural Resource Leadership Institute.

Florida Sea Grant funded graduate students apply their skills and training from over 30 disciplines in research on:

- *Biotechnology*
- *Aquaculture*
- *Fisheries*
- *Seafood Safety and Quality*
- *Water Dependent Businesses*
- *Coastal Water Quality*
- *Coastal Habitats*
- *Coastal Storms and Hazards*

Florida Sea Grant Student Programs

Florida Sea Grant does not "teach" or "graduate" students in the tradition of an academic department. However, funding and support for graduate students in many academic departments statewide is provided through Florida Sea Grant research projects and with other

student fellowship and scholarship programs. Students receive Florida Sea Grant support through both public and private sources of funds (Table 7.1).

Table 7.1. Florida Sea Grant student program funding sources.

Public Funds	Private Funds
<ul style="list-style-type: none"> • Research Assistantships • Dean John A. Knauss Marine Policy Fellowships • Sea Grant Industrial Fellowships • National Marine Fisheries Service/Sea Grant Fellows in Marine Economics and Populations Dynamics • NOAA Coastal Service Center Coastal Management Fellowship 	<ul style="list-style-type: none"> • Aylesworth Foundation for the Advancement of Marine Sciences • Old Salt Fishing Club Scholarship • Charles Skoch Sea Grant Scholarship

Beginning in the mid-1980s, a decline occurred in the number of students supported by federal Florida Sea Grant funds. This decline began and continued during the “tough” federal budget years for Sea Grant when overall federal Sea Grant appropriations were cut (1981), with improvements not beginning until the mid-1980s with the addition of the Aylesworth private funding scholarship. University funding in Florida also suffered during the mid-1980’s and faculty writing Sea Grant (and other granting agency) proposals included summer salaries to protect employment, at the expense of funding that was formerly used for graduate students. Because of the high priority within Florida Sea Grant for student support, corrective action was taken to reverse the decline in student support.

Beginning in 1993, Florida Sea Grant adopted the policy that, at minimum, 25 percent of the Florida Sea Grant federal research budget would be used to support graduate students. Beginning in 1998, Florida Sea Grant research project funding guidelines indicated that the inclusion of graduate students in proposals would give the proposal a competitive edge, assuming all other review criteria were satisfactory. This policy has been followed since (see Table 7.2).

Table 7.2. Florida Sea Grant core federal funds used for graduate student support, 1993-2007.

Graduate Student Funding	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
As Percent of Research Funds	40	31	31	24	27	36	30	30	27	40	43	38	39	30	37
As Percent of All Funds	19	13	13	12	13	17	15	14	14	21	22	20	17	15	14

Beginning in 1986, Florida Sea Grant also initiated private support for Sea Grant sponsored students. The Aylesworth Foundation for the Advancement of Marine Sciences was formed with a major portion of its funding devoted to Florida Sea Grant scholarships. The Old Salt Fishing Club also created a scholarship program for students with both scholarship programs conducted in partnership with the Florida Sea Grant Program. The Charles Skoch Sea Grant Scholarship Program was created in 1997.

FSG assisted the Aylesworth family, St. Petersburg, Florida, in the establishment of this private foundation in 1986. An annual FSG competition is held statewide to select scholarship recipients. As of January 2008, 87 students in 12 Florida universities have received scholarships averaging \$5,436 for a total of \$472,974 in support. Eighty-two completed scholarships by 2007.

FSG and the Aylesworth Foundation also administer a scholarship program using funds generated by the Old Salt Fishing Club of St. Petersburg, Florida, for students at the University of South Florida. Since 1993, 16 students have received scholarships totaling \$39,350, or \$2,460 per student.

In 1997, the Charles Skoch Family of Boynton Beach, Florida, created a Florida Sea Grant endowment at the University of Florida that funds a \$1,000 per year scholarship to a high school senior that is selected through competition in the Florida Annual State Science and Engineering Fair. Ten annual scholarships have been awarded through 2007.

The overall impact of these efforts has been the moderation of a general decline in the total number of graduate students fully supported since 2002. During 2007, 54 graduate students received Sea Grant research support; five graduate students received Aylesworth or Old Salt scholarships. A total of 23 graduate students received full support via Sea Grant funding or scholarships. The graph in Figure 1 tracks graduate students who either received Sea Grant support or a scholarship from 1972–2007.

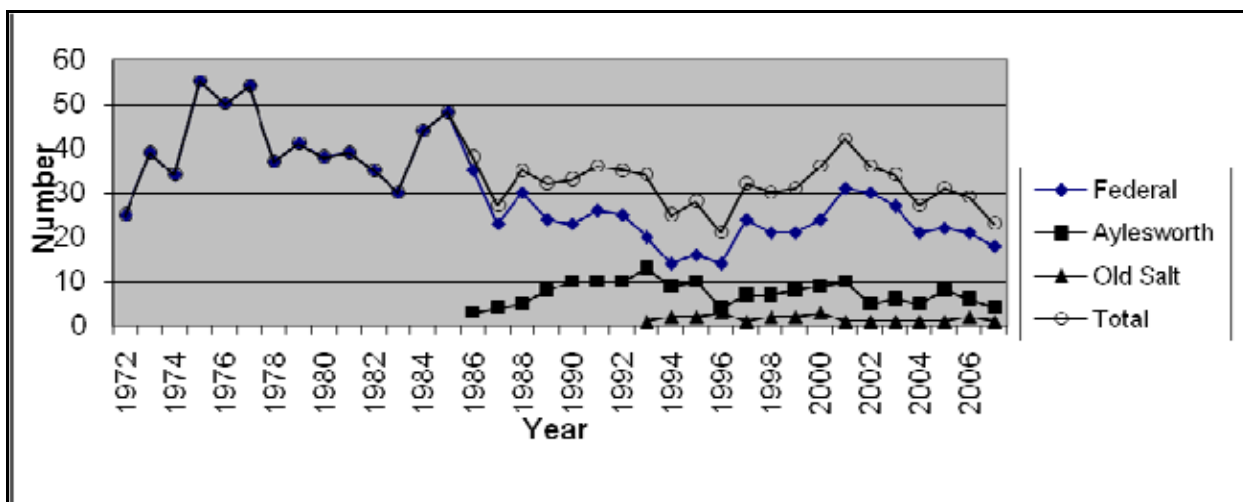


Figure 7.1. Students receiving Sea Grant support through research assistantships and scholarships.

Student Program Analysis

An exhaustive tracking and analysis of Florida Sea Grant student sponsorship began in early 2001 and continues today. The tracking analysis results were published in November 2002. That report was updated in 2004 in Sea Grant Technical Paper 140, “An investment in Florida’s future: Sea Grant sponsored graduate education, 2004.”

8.0 PROGRAM AWARDS

The following awards and recognitions were presented to various Florida Sea Grant extension and education faculty during 2007.

Local Awards

- Doug Gregory Appointed to the Monroe County Marine and Port Advisory Committee by the Board of County Commissioners
- Betty Staugler 2007 Individual Excellence Award, Charlotte County Board of County Commissioners
2007 Richest Redfish Angel Award, Redfish Tournament Organization

Statewide

- Maia McGuire Member of the IFAS Goal 7 focus team which won the Jim App award from IFAS Administration at the September 2007 EPAF conference
2007 Achievement Award, Florida Association of County Agricultural Agents
- Steve Kearnl 2007 Superior Accomplishment Award, University of Florida
2007 Horace Carter Award, Florida Outdoor Writers Association
- Betty Staugler 2007 Distinguished Service Award for Early Career Leadership, Florida Association of Natural Resource Extension Professionals (FANREP)
2007 Communications Award, FANREP
2007 Most Innovative Program Award (Abandoned Vessel Program), FANREP
2007 Watkins Award for professional enhancement, UF/IFAS
- Bryan Fluech 2007 Bronze award, Institutional Marketing Award for Gaining Excellence (IMAGE) (sustainable boating exhibit), UF/IFAS
2007 Bronze IMAGE (sustainable boating exhibit), UF/IFAS
2007 Gold Communications Award, Video ("Pelican's Point of View), FANREP
2007 Silver Communications Award (newspaper articles on marine environmental topics), FANREP

Regional and National

- Maia McGuire 2007 Achievement Award, National Association of County Agricultural Agents
- Chris Verlinde 2007 Award of Appreciation, United States Fish and Wildlife Service
- Bryan Fluech 2007 Silver Communications Award (newspaper articles on marine environmental topics), Association of Natural Resource Extension Professionals (ANREP)
2007 Bronze Communications Award, promotional items, (Quick Reference for Unhooking Pelicans), Association of Natural Resource Extension Professionals (ANREP)
Member of the ICS team which won the 2007 Bronze award (Sustainable Boating Exhibit), ACE

Other Achievement Awards

- Steve Otwell International Fellow Award, UF/IFAS
- Bill Lindberg Graduate Teacher/Advisor of the Year Award, UF College of Liberal Arts and Sciences

9.0 OUTREACH ACTIVITIES

This section contains a brief description of outreach activities organized into five areas: 1) major program activities, 2) major program plans of work, 3) workshops, conferences, displays and signage, 4) Web-based technologies and 5) meetings and monthly summaries. The reader should note that this section reports activities, not impacts. Impacts are reported in another section of this document as are responses to performance measures. This section contains only summary information to highlight major areas of outreach activity.

Major Program Activities

Many of the most successful outreach activities represent “programs” of work. That is, they are much more than one major workshop or conference. The program may utilize research faculty or research findings, may involve several methods of outreach technology or may represent a series of workshops. All these elements are reflected during major activities ongoing during 2007. Several examples follow.

Florida Ocean Alliance

The Florida Ocean Alliance is now into its eighth year. This is a non-partisan organization dedicated to bringing together government, academia and private sectors in Florida to protect and embrace Florida’s ocean and coastal resources for continued social and economic benefits. Members of the Florida Ocean Alliance in 2007 were:

Audubon of Florida	Lewis, Longman & Walker, P.A.
Carnival Cruise Lines	Marine Industries Association of South Florida
FAU/Catanese Center for Urban and Environmental Problems	Maritime Communications Services
Florida Institute of Oceanography	Organized Fishermen of Florida
Florida Institute of Technology	IGFA, Fishing Hall of Fame and Museum
Florida Ports Council	Mote Marine Laboratory
Florida Sea Grant	Royal Caribbean International Cruises
Harbor Branch Oceanographic	The Nature Conservancy
Hubbs-Sea World Research Institute	University of Miami/RSMAS

The Alliance assists with the annual Ocean’s Day in Tallahassee and provides other educational services throughout the year.

Florida Ocean and Coastal Council (FOCC)

The FOCC was created during 2005 by the Florida Legislature. It is an 18-member council and is co-chaired by the Secretary of the Florida Department of Environmental Regulation, the Executive Director of the Florida Fish and Wildlife Conservation Commission and the Commissioner of the Florida Department of Agriculture and Consumer Services. The responsibilities of the Council are to conduct a statewide marine and ocean research review, complete an annual scientific research plan that will be used by the Legislature in making funding decisions on needed projects and conduct a resource assessment that shall serve as a baseline of information to assist in the research plan. The 2007 Research Plan was funded by the Legislature at \$3M, however due to state budget cuts additional funds were not provided in 2008. The FOCC members currently are focusing on development of a user-friendly document on effects of climate change on coastal marine ecosystems, with a target audience consisting of legislators, other decision makers and a state climate policy task force. Florida Sea Grant is directly involved in this statewide effort since Karl Havens, Director, is appointed to the FOCC for a four-year term.

Ocean Observing Systems

Florida Sea Grant has been a member of the Southeast Atlantic Coastal Ocean Observing System (SEACOOS) project since 2002. This is an integrated research, extension and education effort with the Sea Grant programs of North Carolina, South Carolina and Georgia. It also includes a host of universities, businesses and other organizations involved in ocean observing systems activity in the Atlantic. The University of North Carolina was the overall contract lead for this project that has been sponsored by the Office of Naval Research. A SEACOOS Extension and Education Work Group coordinated outreach activities. Mike Spranger served as FSG representative to this work group. Chris Simoniello served as SEACOOS regional extension coordinator, based at the University of South Florida. She worked with the eleven partner university scientists, educators and extension professionals in the region in the development of educational materials, products and services.

Florida Sea Grant is involved in the Gulf of Mexico Coastal Ocean Observing System (GCOOS). FSG is a signed party to the GCOOS Memorandum of Agreement. Mike Spranger is an elected member of GCOOS Board of Directors, representing the extension and education community. In 2007, he was elected chair of the GCOOS Education and Outreach Council (EOC) and serves on the GCOOS executive committee. Chris Verlinde, Extension Agent for Santa Rosa County is also a member of the EOC. During 2007, presentations on GCOOS were made to a number of Florida organizations that included the Clean Boating Partnership, Florida Marine Science Educator Association, the Extension Professional Association of Florida, and the Florida Caucus on Ocean Observing Systems.

Finally, Florida Sea Grant has been involved in the Florida Coastal Ocean Observing System (FL COOS) Caucus. This group was formed in the fall of 2005 through convening efforts of the Deans of the University of Miami's Rosenstiel School of Marine and Atmospheric Science; Nova Southeastern University's Oceanographic Center; and University of South Florida's College of Marine Science. FL COOS Caucus meetings provide a mechanism to bring together Florida's scientific, management, regulatory and private sector provider and user groups interested in ocean observing systems. Mike Spranger is a member of the education and outreach subcommittee. FL COOS Caucus meetings provide a mechanism to discuss the latest issues related to ocean observing systems, and to have a dialogue that looks at options and policy parameters consistent with Florida's diverse ocean resource and ecosystem needs.

Marinas and Boatyards

Florida has more than 2,000 marinas and boatyards and more than 1 million registered boats. This is the largest number of marine facilities and registered boats for any state in the nation. The industry generates over \$18 billion annually. To assist this industry, Florida Sea Grant is a member of the Florida Clean Boating Partnership (CBP), the sponsor of the first clean marina program in the nation. Major partners include the Florida Department of Environmental Protection (FDEP), Marine Industries of Florida, and the U.S. Coast Guard. In recent years, the CBP has also created a Clean Boatyard Program.

FSG contributes to the CBP in several ways. Mike Spranger serves on the CBP Board of Directors. FSG County Agents participate in local workshop presentations and are involved in the onsite "designation" inspections with FDEP and marine industries representatives. Currently there are 167 clean marinas and 31 clean boatyards in the state; these represent over 25% of all the "wet slips" in Florida. Ten other states are now involved in clean marina programs, and a number of states are contemplating initiating a program. Most of these programs have used elements of the Florida Clean Marina model in designing their programs.

Gulf of Mexico Center for Ocean Science Education Excellence (GOM-COSEE)

Florida Sea Grant is part of a unique, thematic collaboration among the five states (Alabama, Florida, Louisiana, Mississippi, Texas) that border the Gulf of Mexico. The primary goal of GOM-

COSEE is to strengthen ocean sciences education through the interpretation of research results for interested public, pre-college teachers and their students, informal educators and university faculty and their students concerning the relevance of the oceans to our daily lives. This project links educators, researchers, and interested publics both regionally and thematically, focusing on the Gulf of Mexico as the vehicle to teach ocean sciences education. FSG collaborators include the Florida Museum of Natural History and the University of Florida Seahorse Key Marine Lab.

In 2007, an informal educator's workshop was held in conjunction with the annual meeting of the Florida Marine Science Education Association (FMSEA). More than 100 educators attended this meeting held in Naples April 27-29. GOM-COSEE and FSG were sponsors of the 2007 State 4-H Youth Marine Ecology Contest that was held at the Osceola County Extension office complex in Kissimmee, Florida.

Waterfront Communities

Due to the rapid increase in population in our coastal areas, there is increased pressure along the land/water interface resulting in the loss of public access for water users, as well as a loss of recreational and working waterfronts. As such, planning for the management of waterways and for the protection of working waterfronts have become major policy initiatives in the state of Florida. The Florida legislature has passed important legislation requiring local governments to address these issues in their comprehensive plans, the basic instrument that regulates growth in Florida. To assist local government, Florida Sea Grant, under the direction of Tom Ankersen and Richard Hamann and students and faculty associated with the University of Florida Law Conservation Clinic continue to update an online resource titled "Waterways and Waterfronts: A Community Guide and Policy Tools." This Web site addresses the legal and policy issues facing Florida waterways and waterfronts and offers a variety of tools for state and local entities to consider in planning for the sustainable management of Florida's waterways and the preservation of its working waterfronts. For more information on this project, see <http://www.law.ufl.edu/conservation/waterways>

During 2007, Bob Swett, director of the Florida Sea Grant Boating and Waterway Management Program, continued to facilitate meetings with Lee County resource managers, the West Coast Inland Navigation District, and the Florida Department of Environmental protection, toward the development of a Regional Waterway Management Plan for waterway maintenance.

Major Program Plans of Work

Long range planning for the FSG Extension Program is carried out under the auspices of the University of Florida IFAS Extension's four-year plan of work and strategic plan. Every four years, Extension develops a planning process that is used to define their future needs and work activities. The work activities are updated annually through the annual plans of work that are developed by all extension faculty. Extension faculty concentrated their activities through Goal Teams, Focus Teams and Work Action Groups. Goal areas identified for 2004-2007 are:

1. To enhance and maintain agriculture and food systems.
2. To maintain and enhance Florida's environment.
3. To develop responsible and productive youth through 4-H and other youth programs.
4. To create and maintain Florida friendly landscapes
5. To assist individuals and families achieve economic well-being and life quality
6. To achieve economic prosperity and community vitality in Florida's urban and rural communities
7. To promote professional development designed to enhance organizational efficiency and effectiveness.

The goal teams and focus teams (sub areas) consist of interested faculty in specific areas of common interest. Specific task-oriented work action groups (WAGs) are then formed among interested specialists

and agents to develop materials and educational activities for local, county, state and regional audiences. Project leads reviewed activities and future plans for each of the WAGs at the annual FSG Extension meeting that was held in October in Cedar Key. The Extension faculty utilized these updates to refine their 2007 plans of work. These WAGs focus on the topics of artificial reefs, sustainable angling, clean marinas/boatyards, invasive species, boating and waterway management, seafood technology and safety, water quality, and marine education.

To develop their major extension program activities and annual plan of work (POW), FSG extension faculty rely on advisory committees to assist in identifying program needs, strategic planning and priority setting. These POWs correspond to one of the seven extension goal areas cited above. These individual POWs are integrated into the statewide goal and focus team areas that are reported through the University of Florida Faculty Extension Accountability System.

This annual planning process accounts for approximately 70 percent of a FSG Extension faculty's work activities. The goals and tasks related to extension activities found in Section 2.0 result from the planning efforts described above. The remaining 30 percent of a FSG extension faculty member's time is used for emerging issues, responding to stakeholder questions and dealing with important marine issues that may arise outside of the seven identified goal areas. Annually, the planned activities undertaken in these POWs are documented through a report of accomplishment (ROA). The ROAs are used for individual staff evaluation, as well as used to develop new FSG work activities at the annual FSG extension meeting that is generally held in the fall.

FSG extension program proposals are also developed as a part of the overall Florida Sea Grant College omnibus proposal. Two, three or four-year proposals are developed, as appropriate. Much of the material for the FSG extension omnibus proposal is taken from the UF/IFAS Extension planning process that has been previously discussed. FSG Extension faculty POWs are also integrated into the overall Florida Sea Grant College Program's long range planning process, which helps link identified research and extension program priorities and program areas.

Workshops, Conferences, Displays and Signage

Workshops and Conferences

During 2007, a total of 795 educational events were conducted by Florida Sea Grant Extension faculty. These events represent data through January 31, 2008. Some research reports are still pending, with due dates after this report is due. These range across the following examples of activities.

- scientific presentations by funded research faculty at scientific conferences
- community workshops organized by Sea Grant Extension faculty
- marine 4-H camps
- K-12 teacher education events
- state and national conferences organized
- media articles and large attendance events

The number of examples is quite varied, but the activity has been organized by Florida Sea Grant goal area as shown in Figure 9.1. The three leading areas are marine education (41.0%), ecosystem health (19.6%) and fisheries (12.6%). Audience type has also been documented as shown in Figure 9.2. Community and general education is the leading audience type (29.7%), with agencies/organizations at 20.3%. Finally, Figure 9.3 shows that 91.8% of all activity has occurred within Florida. Complete details are listed in Table 9.1.

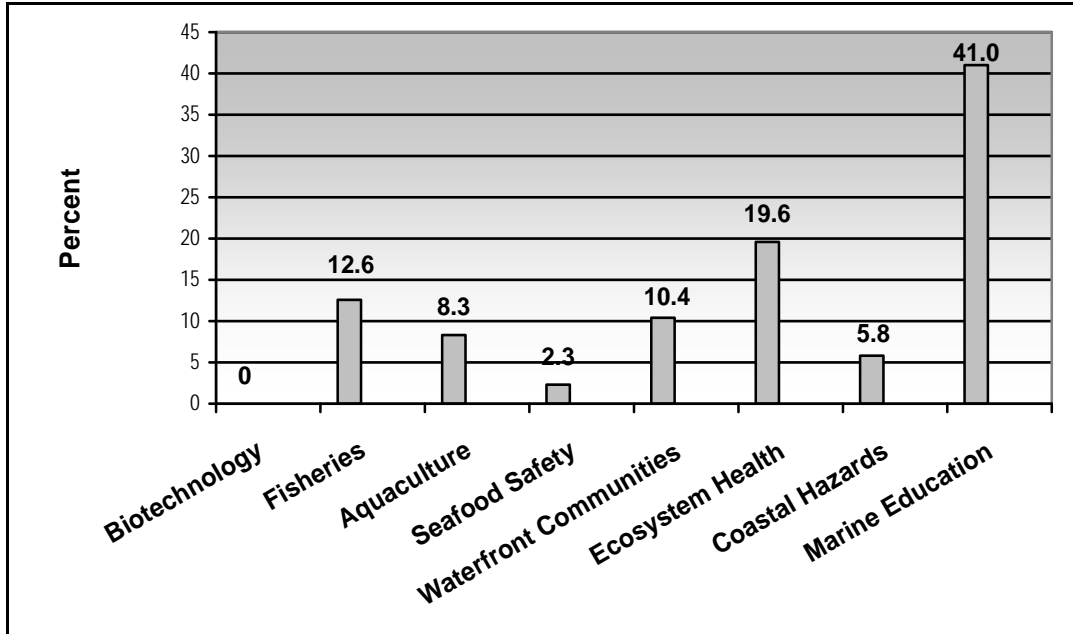


Figure 9.1. Percent of educational events by Florida Sea Grant goal area, 2007.

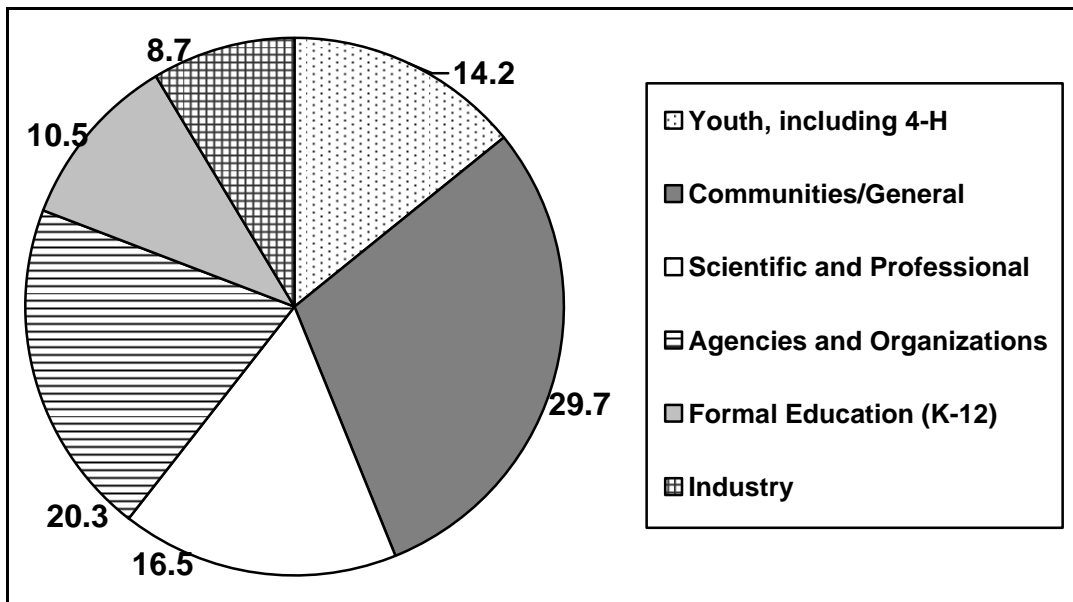


Figure 9.2. Percent of educational events by Florida Sea Grant audience type, 2007.

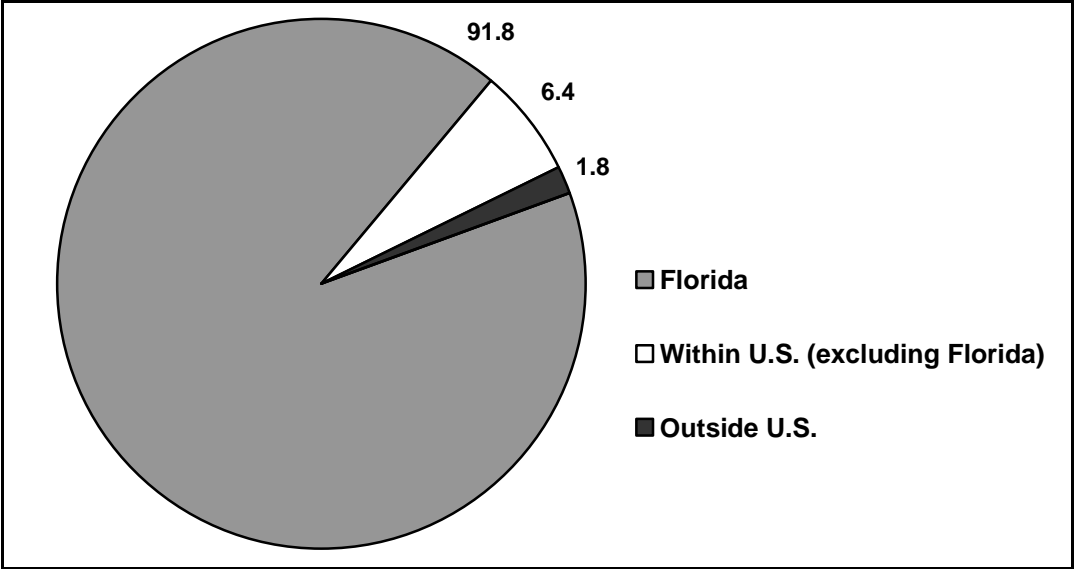


Figure 9.3. Percent of educational events by Florida Sea Grant geographic area of delivery, 2007.

Table 9.1. Total number of Florida Sea Grant extension events by audience type, geographic location and strategic goal area, 2007^a.

Audience Type/Strategic Goal Area	Biotechnology	Fisheries	Aquaculture	Seafood Safety	Waterfront Communities	Ecosystem Health	Coastal Hazards	Marine Education	Total	Percent
Agencies/Organizations	0	10	5	3	58	44	8	34	162	20.3
Communities/General	0	38	24	3	8	56	14	93	236	29.7
Formal Education	0	1	2	0	0	3	3	75	84	10.6
Industry	0	16	22	9	9	12	1	0	69	8.7
Scientific/Professional	0	19	11	3	8	39	20	31	131	16.5
Youth, including 4-H	0	16	2	0	0	2	0	93	113	14.2
Total	0	100	66	18	83	156	46	326	795	100.0
Percent	0	12.6	8.3	2.3	10.4	19.6	5.8	41.0	100.0	
Within Florida	0	83	55	11	79	148	38	316	730	91.8
Within US (outside of Florida)	0	14	9	5	3	4	8	8	51	6.4
Outside US	0	3	2	2	1	4	0	12	14	1.8
Total	0	100	66	18	83	156	76	326	795	100.0

^a There are no extension events planned for the Graduate Education goal area.

Publications and Production

Communications professionals routinely participate in Florida Sea Grant research project monitoring and evaluation and in annual extension program planning to align and complement communications program planning. Accomplishments include production of technical papers and reports on panic prevention and emergency preparation for marina operations; anchoring regulation and the rights of navigation in Florida; Florida Sea Grant's delivery of marine education; and a practical guide to assembling and using a fish resuscitation system for Florida catch-and-release fishing tournaments. Working with the major program area for seafood safety and through the HACCP Alliance (Hazard Analysis and Critical Control Point), the communications program has consolidated all of the national and federal seafood training publications on the University of Florida campus and continues to make these available internationally through the IFAS Extension Bookstore. Communications support was provided for a series of technical assistance efforts in the major goal area of waterfront communities, resulting in the production of recreational boating characterizations of both Sarasota County and the greater Charlotte Harbor area, in addition to a large format map providing navigational, historical and environmental perspectives of Jupiter Inlet and the Loxahatchee River.

More than a dozen posters and displays were produced to showcase Florida Sea Grant program efforts ranging from hurricane preparedness to fish resuscitation to marine education. Sea Grant faculty employed these in program delivery for the annual Oceans Days in the capital, at meetings of the Florida Outdoor Writers Association (FOWA), Association of Natural Resource Extension Professionals (ANREP), and the Association for Communication Excellence (ACE).

Web-based Efforts

The Florida Sea Grant Web site continued to evolve, after ten major program goal areas were consolidated into nine. It serves as the standard archive and reference for program documentation and as a public educational and informational resource to connect people, projects and information in the state, around the nation and around the globe. Through an interactive program developed specifically for that purpose, Florida Sea Grant's biannual research grant proposals were issued and received online, streamlining the process. The efficiency of this program has interested other Sea Grant programs around the country. The Web site is fully searchable, and links to all other Sea Grant program Web sites, and to those of numerous marine and coastal research and educational organizations including many state and federal agencies. An Internet directory of marine education and research organizations in Florida – previously published in hard copy by Florida Sea Grant – continues to serve as a resource on the Florida Sea Grant Web site. In addition, a Web-based small business manual on Cultivating Copepods for Rearing Larval Fish was developed in conjunction with a Florida Sea Grant project principal investigator as an offshoot to previous Sea Grant- funded research.

Following several successive years of monitoring Florida Sea Grant in the news, subscribing to three successive clipping services, and providing county-based faculty, extension specialists and campus coordinators with hard copies of news stories, Florida Sea Grant supplanted the process through automated Internet service. Using a Google search engine with key words, Florida Sea Grant is now alerted automatically whenever it makes the news, and the information is routinely forwarded via e-mail to notify Sea Grant faculty and collaborators.

Technological Enhancement

Florida Sea Grant's Web site (www.FLSeaGrant.org) serves as a principal contact point, reference and archive for Sea Grant information serving Sea Grant personnel, collaborators and

outside users. It has become a valuable and dependable resource for transmitting and receiving information with target audiences.

Web enhancement is a scheduled and concerted effort to create new content and delivery techniques that give users greater utility than was previously available. Page maintenance is a continual effort that requires daily attention, especially focused on writing and uploading new content. During 2007, maintenance and enhancement of the Florida Sea Grant Web site included the collapsing of ten strategic program areas into nine, and the conversion of existing pages to CSS style-sheet regulated pages for enhanced consistency and faster download times.

New feature stories and links have been added to Sea Grant programmatic areas. All numbered Florida Sea Grant publications for 2007 have been added. New staff listings to accommodate the expanding network of county extension faculty have been incorporated; others have been updated.

The need to stay abreast of “interactive” aspects of Web-based technologies continues. The Web-based Request for Proposal and Review, constructed in 2003 to streamline Florida Sea Grant’s biennial RFP process, was revised and made ready for the RFP cycle that began in early 2007. This electronic proposal format has made the research proposal process faster and less expensive for researchers, reviewers, and Sea Grant administrative staff alike. Researchers are able to submit brief pre-proposals for research grants to the Florida Sea Grant office, which in turn has those pre-proposals reviewed by impartial reviewers for research merit. Reviewers can not only review the full text of pre-proposals through a Web browser, but submit their comments and project scores as well. Sea Grant administrative staff members monitor the submission and review process from a series of user-friendly, admin-interface screens.

Interactive Web sites have been developed in support of Florida Sea Grant goal areas. The Charlotte County marine extension agent developed a high-tech Internet site that allows junior anglers to participate with researchers to learn more about the behavior of fish caught and released during the annual Kids Cup Redfish Fishing Tournament. A select number of fish caught at the tournament were marked with dart tags or surgically implanted with a sonic tag. For a brief period after the tournaments, the movements of the fish were monitored, either by recapture reports phoned in to the tagged fish hotline, or through an array of underwater listening devices stationed throughout Charlotte Harbor. Data from the fish were then posted to a Web site, allowing the young fishermen to follow the movements of their unique fish.

The boating and waterways extension team continues to be a leader in the adaptation of content to a worldwide boating audience. The Southwest Florida anchorage inventory successfully transitioned from a static to an interactive Web site, using database-driven technology to enhance the content and improve the inventory’s usability. The boating and waterways team, in cooperation with the Jupiter Inlet District, also adapted its Navigational and Historical Guide to the Jupiter Inlet and Loxahatchee River to an interactive boater’s guide Web site using Flash technology that, with a few clicks, allows boaters to zoom in on a detailed aerial map of the Jupiter Inlet area, and bring up detailed information about points of interest.

The SEACOOS Regional Education and Extension workgroup also unveiled a novel use of ocean observation data that will enable South Florida fishermen to find better fishing grounds. Using real-time or near-real-time surface currents, water temperatures, bathymetry and other sea conditions, fishermen and divers can use the Internet to create maps of their anticipated destination in just minutes. Having this ability can save time and money, especially if sea conditions are unfavorable. Though the system is in its infancy and limited geographically, it indicates that precise ocean observation data previously used only by high-end users like the U.S. Navy can be put to practical use by everyday citizens.

10.0 SELF EVALUATION

Florida Sea Grant annually conducts a self-evaluation that includes both programmatic and administrative performance measures. The following information summarizes results for 2007.

Programmatic Measures of Performance

1. Conduct a competitive grants process that is open and transparent, resulting in funding rigorous science in areas that will significantly impact Florida's coastal communities and natural resources.

During 2007 a Call for Statements of Interest for 2008-09 research funding was advertised statewide and over 800 faculty at 16 academic institutions in Florida received the advertisement. In response to this advertisement, 180 faculty from 15 institutions submitted 3-page preliminary proposals. The 88 preliminary proposals that were received were reviewed by researchers, natural resource managers, industry representatives and other persons inside and out of Florida. All of their comments were considered in deliberations by an out-of-state peer-review panel whose members are nationally recognized for their science and program management competencies. Each PI subsequently received the written panel summary, individual peer reviews and a worksheet on which Florida Sea Grant managers provided summary statements regarding strengths, weaknesses and recommendations for the proposal. A total of 23 pre-proposals were selected to the second round, where a full research proposal was subjected to at least four independent peer reviews, followed by discussion and evaluation by an independent panel of technical experts from the disciplines represented in the Call for Statements of Interest. In 2008, this process resulted in the funding of 14 projects with PIs at Florida Atlantic University (1), Florida International University (3), Mote Marine Laboratory (1), Harbor Branch Oceanographic (3), University of Florida (5) and University of West Florida (1). All of the projects address critical issues identified in the 2006-2009 Florida Sea Grant Strategic Plan.

2. Actively engage Florida graduate students in national fellowship competitions.

Florida Sea Grant works with its 16 academic institutions to identify students who will be highly competitive for national fellowships and has a strong track record of success in this area. In 2007, three applicants were submitted for competition for the Knauss Fellowship program and there was one finalist.

3. Develop Florida's position of leadership in ocean and coastal subject areas to promote the flow of information for marine resource development and management and expand the funding base to build a responsive marine academic resource capability.

Florida Sea Grant continued during 2007 to build academic capability and initiate broader working relations with industry and allied interests. Efforts included:

- Membership of the Associate Director for Research on the board of directors for BioFlorida (the statewide trade association), as the invited representative of the UF Institute of Food and Agricultural Sciences.
- Continuation of the Florida marine biotechnologies ListServ mailing list to facilitate communication among 77 members.
- Appointment of the Director to four-year term on the legislatively mandated Florida Ocean and Coastal Council.
- Member of the Director on the Board of the Florida Ocean Alliance.

4. Fully engage in regional and national projects.

During 2007, Florida Sea Grant was an active participant in at least eight different regional research or extension projects or activities in which each participant was investing funds (Table 10.1).

Table 10.1. Regional Sea Grant projects or activities in which Florida Sea Grant research, extension and communications faculty are involved during 2007.

	Project	Sea Grant Partner/Agency Partner/Industry Partner
1	SEACOOS: Southeast Atlantic Coastal Ocean Observing System	University of North Carolina (UNC), University of South Carolina (USC), University of South Florida (USF), University of Miami (UM), Skidaway Institute of Oceanography (SIO), Sea Grant (Florida, Georgia, South Carolina, North Carolina), South Carolina Department of Natural Resources
2	GCOOS: Gulf of Mexico Coastal Ocean Observing System Regional Association	Over 40 organizations, including Florida Sea Grant have signed the memorandum of agreement to participate in GCOOS.
3	Fish Extension Programs for the Gulf of Mexico	Texas, Mississippi/Alabama, Louisiana and Florida Sea Grant
4	Fish Extension Program for the South Atlantic	Florida, Georgia, South Carolina, North Carolina Sea Grant
5	Regional Center for Ocean Science Education Excellence (COSEE) - Gulf of Mexico	University of Southern Mississippi, Dauphin Island Marine Laboratory, University of Texas Marine Science Institute, Louisiana Marine Science Consortium, Mississippi State University, University of Florida (SG)
6	Seafood HACCP Alliance (Florida leadership)	Association of Food and Drug Officials; FDA; Office of Seafood; National Marine Fisheries Service; National Fisheries Institute; National Food Processors Association; Interstate Shellfish Sanitation Conference; USDA Cooperative Research; Education and Extension Service; Sea Grant Programs in Alaska, California, Florida, Louisiana, North Carolina, Oregon and Virginia
7	Gulf of Mexico Regional Research Plan	Texas, Louisiana, Mississippi/Alabama and Florida Sea Grant
8	South Atlantic Regional Research Plan	North Carolina, South Carolina, Georgia and Florida Sea Grant

Measures of Accountability: Administrative

Florida Sea Grant has a demonstrated record of success in designing the best possible approach to solving the problems resulting from human interactions with the state’s coastal environment. The role of administration is to help determine the highest priority needs, keep the correct balance of research, education, extension and communication focused on solving the problem or creating the opportunity, recruiting the best talent to work on the issue, securing funds to support the work and tracking progress against performance measures. The following performance measures and associated administrative outcomes in 2007 support this role.

- 1. Long range planning documents in both research and extension are maintained and updated as appropriate to enable the development of highly competitive proposals and insure that Sea Grant programs do not duplicate other academic programs.**

- A. The goals and objectives of the 2006-09 Florida Sea Grant Strategic Plan and the associated 4-year Program Implementation Plan were used to guide FSG research, extension and communications programs within each of nine goal areas.
 - B. Florida Sea Grant also continued its annual work plan for 2007. This is the eighth year of this process. The program accomplishments and benefits section of this 2007 Annual Progress Report is based on research, extension, and communications activities set forth in the 2007 work plan. Specific objectives scheduled for completion in 2007 are contained in section 2.0, where accomplishments and benefits under each goal are reported.
- 2. The visibility of Sea Grant and the University of Florida are enhanced and services are provided statewide, regionally and nationally by participation of Directors and faculty on boards of both academic and non-academic interests.**

The following are selected activities completed by the Director, Associate Director for Research, Associate Director for Extension and statewide extension faculty.

A. International

- Member, Advisory Board, International Association of Aquaculture Economics and Management. (Adams)
- Technical Advisor, USA Delegation for Codex Alimentarius, S. Africa. (Otwell)
- Executive Board and U.S. Representative, International Association of Fish Inspectors. (Otwell)
- Team Member, Project FISHPORT, World Health Organization/UN Food and Agriculture Organization. (Otwell)
- Executive Director, Seafood Science and Technology Society of the Americas. (Otwell)
- Member, Expert Group, for organizing Design and Management of Artificial Reefs for Fisheries course, International Center for Advanced Mediterranean Agronomic Studies. (Seaman)
- Member, External Advisory Board for Seafood PLUS (Europe). (Otwell)
- Editorial Committee of the International Journal of Aquaculture Economics and Management
- Member, Indonesian Marine Education Team. (Spranger)
- Member, Sino-American Invasive Species Site Team (Spranger)

B. National

- Member, External Relations Committee, Sea Grant Association. (Cato)
- Member, Sea Grant National Theme Team: Biotechnology (Seaman)
- Member, Sea Grant National Theme Team: Coastal Communities and Economies (Spranger)
- Member, Sea Grant National Theme Team: Ensuring Competitiveness of the U.S. Seafood Industry. (Otwell)
- Member, Sea Grant National Theme Team: Fisheries. (Adams)
- Member, Advisory Committee to National Plan for Algal Toxins and Harmful Algal Blooms. (Adams)
- Member, Sea Grant National Theme Team: Coastal Communities and Economics. (Swett)
- Member, Sea Grant National Theme Team, Ecosystems and Habitats. (Jacoby)

- Fellow, American Institute of Fishery Research Biologists. (Seaman)
- Member, Seafood Education Committee, Association of Food and Drug Officials. (Otwell)
- Member, Technical Advisory Committee, National Fisheries Institute. (Otwell)
- Member, Technical Advisory Committee, National Shrimp Processors Association. (Otwell)
- Coordinator, Seafood HACCP Alliance. (Otwell)
- Member, National Academy of Science panel to study the balance of risks and benefits in consuming seafood (Otwell)
- Member, Advisory Committee for the National Sea Grant Ports and Harbors Specialist. (Swett)
- Member, Sea Grant National Theme Team: Marine and Aquatic Science Literacy. (Spranger)
- Member, Advisory Committee for Working Waterways and Waterfronts 2007: A National Symposium on Water Access (Swett)
- Member, Advisory Committee for the National Sea Grant Ports and Harbors Specialist (Swett)
- Member, NOAA National Estuarine Eutrophication Assessment (Jacoby)

C. Regional

- Member, Scientific and Statistical Committee, Gulf of Mexico (GOM) Regional Fishery Management Council. (Adams)
- Member, Early Detection and Rapid Response Work Group for the GOM and South Atlantic Panel of the ANS Task Force. (Jacoby)
- Chair, Education and Outreach Work Group for the GOM and South Atlantic Regional Panel of the ANS Task Force. (Jacoby)
- Member, SEACOOS Extension and Education Work Group. (Spranger)
- Member, GCOOS Board of Directors and Executive Committee. (Spranger)
- Chair, GCOOS Education and Outreach Council. (Spranger)
- Member, COSEE Extension and Education Steering Committee. (Spranger)
- Member, Aquaculture Interagency Coordinating Committee, FDACS (Adams)
- Member, Aquaculture Subcommittee, Florida Oceans and Coastal Resources Council (Adams)
- Member, Proposal Review Committee, Southern Regional Aquaculture Committee (Adams)
- Member, Organizing Committee, Southeast Atlantic Regional Research Project (Havens)
- Member, Organizing Committee, GOM Regional Research Project (Havens)
- Member, Organizing Committee, GOM Extension, Education and Outreach Project (Havens)

D. State

- Member, Board of Directors, Florida Institute of Oceanography, USF. (Cato)
- Member, Board of Directors and Treasurer, Florida Ocean Alliance. (Cato, Havens)
- Member, Board of Directors, Aylesworth Foundation for the Advancement of Marine Sciences. (Cato)
- Member, Board of Directors, BioFlorida. (Seaman)
- Member, Florida Clean Marina Partnership Board. (Spranger)

- Member, Education Advisory Committee, The Florida Aquarium (Spranger)
- Technical Advisor, Apalachicola Oyster Dealers Association. (Otwell)
- Member, Florida Ocean and Coastal Resources Council (Cato, Havens)
- Member, Florida COOS (Spranger, Havens)

3. FSG provides faculty and cooperators with an efficient, understandable and streamlined administrative structure in order to expedite research, education, and extension programs.

A Faculty Progress Report was written bi-monthly and distributed via campus coordinators at 16 institutes to over 800 faculty members. The report is also available on the FSG Web site and covers funding opportunities and other items of information for faculty and students. For several years, all national and Florida Sea Grant funding opportunities have been advertised via the Web site and all proposal guidelines and forms are available there for faculty use and downloading. For the last four funding cycles, FSG has accepted pre-proposals and interim and final reports via email. Since 2004 the Statement of Interest submission and review has been conducted through a Web-based electronic submission process.

4. FSG works closely with the National Sea Grant Office, NOAA, to insure that Florida's program is competitive and responsive to national priorities.

Florida Sea Grant continues to evaluate NSGO drafts of program evaluation guidelines and other documents. Constructive comments are always provided. During proposal preparation, Florida Sea Grant develops a detailed proposal notebook for our NSGO program monitor and reviews that information with the monitor on an ongoing basis, both by telephone and through personal visits to Washington, D.C.

5. FSG directors maintain their professional knowledge, skills and competencies by publishing in peer-reviewed literature, authoring books, making presentations or organizing academic activities.

A. Director – Jim Cato (through October 2007)

- Attended six two-day meetings of the Florida Ocean and Coastal Council.
- Served as liaison between the Florida Ocean and Coastal Resources Council/Florida Department of Environmental Regulation and the National Ocean Economics Program on a contract to provide an analysis and publication on Florida's Ocean and Coastal Economy.
- Participated with the Gulf of Mexico Sea Grant Directors to create a regional request for projects in the area of coastal hazards for the Gulf of Mexico. Proposals are currently being submitted.
- Cato, J. and S. Subasinge. 2007. Bangladesh Shrimp Industry with Emphasis on safety and Quality of Exported Products: An Overview. In *Agricultural Diversification and Smallholders in South Asia*, P. Joshi, A Gulati and R. Cummings, Jr., eds. Academic Foundation Press, New Delhi, India. Pp. 479-524.

B. Director – Karl Havens (after October 2007)

- Havens, K.E. 2007. Cyanobacteria blooms: effects on aquatic ecosystems. *Advances in Experimental Medicine and Biology* 619: 745-759.

- Havens, K.E., J.R. Beaver and T.L. East. 2007. Plankton biomass partitioning in a eutrophic subtropical lake: comparison with results from temperate lake ecosystems. *Journal of Plankton Research* 29: 1087-1097.
- Havens, K.E., T.L. East and J.R. Beaver. 2007. Zooplankton response to extreme drought in a large subtropical lake. *Hydrobiologia* 589: 187-198.
- Havens, K.E., K.R. Jin, N. Iricanin, and R.T. James. 2007. Phosphorus dynamics at multiple time scales in the pelagic zone of a large shallow lake in Florida, USA. *Hydrobiologia* 581: 25-42.
- Ibelings, B.W. and K.E. Havens. 2007. Cyanobacterial toxins: a qualitative meta-analysis of concentrations, dosage and effects in freshwater, estuarine and marine biota. *Advances in Experimental Medicine and Biology* 619: 685-744.
- Johnson, S.G., M.S. Allen and K.E. Havens. 2007. A review of littoral vegetation, fisheries and wildlife responses to hydrologic variation at Lake Okeechobee. *Wetlands* 27: 110-126.
- Quin, B., Z. Liu and K.E. Havens. 2007. *Eutrophication of Shallow Lakes with Special Reference to Lake Taihu, China*. Springer, The Netherlands.
- Havens, K.E. 2007. Long-term changes in the zooplankton of a subtropical lake: evidence of an altered predation regime. Florida Lake Management Society, Naples (contributed talk).
- Havens, K.E. 2007. Ecological effects of cyanobacteria blooms. US-China Workshop on Harmful Cyanobacteria Blooms. University of North Carolina, Morehead City, N.C. (invited plenary talk)
- Actively participated as a member of the Florida Oceans and Coastal Council, Florida Ocean Alliance and Florida COOS
- Participated in the peer-review process by reviewing proposals for NSF, Sea Grant, and US-Israel Bi-National Science Foundation
- Continued to conduct collaborative research with aquatic scientists in Italy, China, Denmark, Brazil
- Continued to serve as Editorial Board member for Environmental Pollution and Freshwater Systems (Founding Editor) and Scientific Advisory Board member for Korean Journal of Limnology
- Reviewed manuscripts for Ecosystems, Ecological Monographs, Ecological Applications and Science

C. Associate Director for Research – Bill Seaman

- Seaman, W. 2007. Artificial habitats and the restoration of degraded marine ecosystems and fisheries. *Hydrobiologia* 580:143-155.
- Seaman, W.U and M. Miller. 2007. Fisheries conservation and habitat improvement in marine ecosystems. In: J. Nielsen, editor. *Proceedings of Fourth World Fisheries Congress*, American Fisheries Society, Bethesda, Maryland.
- Seaman, W. and W. Lindberg. 2007. *Artificial reefs*. *Encyclopedia of Ocean Sciences*. Elsevier.

D. Associate Director for Extension – Mike Spranger

- Spranger, M., and Jackson, D. 2007. Developing a Specialist Marine Action Assessment Response Team (SMART) for Post-Hurricane Recovery. In *Mitigating Impacts on Natural Hazards on Fishery Ecosystems*, American Fisheries Society, Washington DC.

- Spector, B., Blyler, K., and Spranger, M. 2007. Ocean Sciences and STEM Education: Rethinking Science Teaching Currents, *The Journal of Marine Education*. Volume 23, Number 2, Summer, 2007. Ocean Springs, MS.
- Spranger, M. 2007. Ocean Report Card...Found Wanting, *NMEA News*. Volume 23, Issue 1, Spring 2007. Newsletter of the National Marine Educators Association. Ocean Springs, MS.
- Fletcher, P., and Spranger, M. 2007. Making the land-sea connection in South Florida Restoration: designing an effective education campaign to promote the application of marine science in South Florida Restoration. Poster. 2007. National Conference on Ecosystem Restoration. April 23-27, 2007. Kansas City, MO.
- Spranger, M. 2007. Opportunities for Research and Education with Florida Sea Grant. FAMU Environmental Science Symposium Series, February 2, 2007. Tallahassee.
- Spranger, M. 2007. GCOOS Education and Role for the Sea Grant Network. Gulf of Mexico Regional Sea Grant Network Meeting. March 12, 2007. Biloxi, MS.
- Spranger, M. 2007. Bridging the Gap Between Science and Education. Florida Marine Science Educator Association, Annual Meeting. April 28, 2007. Naples.
- Spranger, M. 2007. Building Partnerships to Manage Invasive Species. Sino-American Coastal Wetland Workshop. May 23, 2007. Fuzhou, China.
- Spranger, M. 2007. The GCOOS and EOC Educational Work Plan. Annual GCOOS Education and Outreach Council Meeting. June 19, 2007. Spanish Fort, AL.
- Spranger, M. 2007. The FL COSEE Summer Institutes. National Marine Educator Association, Annual Meeting. July 24, 2007. Portland, ME.
- Spranger, M. 2007. Formal Educational Opportunities in the USA. NOAA-DKP Capacity Building Workshop. August 28, 2007. Denpasar, Indonesia.
- Spranger, Michael. (Workshop Facilitator and Trainer) Program Design and Evaluation Workshop. February 21-23, 2007. Miami.
- Spranger, Michael. Gulf of Mexico Coastal Ocean Observing System: Opportunities for the Sea Grant Extension Network. Gulf of Mexico Sea Grant Extension Biennial Conference. March 12, 2007. Biloxi, MS.
- Spranger, Michael. Coastal Development: How Florida Sea Grant Extension is Addressing the Issue. Gulf of Mexico Sea Grant Extension Network Meeting. March 12, 2007. Biloxi, MS.
- Spranger, Michael. The Importance of Marine Education. 4H State Marine Ecology Event. November 3, 2007, Kissimmee.
- Spranger, Michael. Report on FL COSEE Educational Projects. Gulf of Mexico COSEE Steering Committee Meeting. November 30, 2007. Pensacola.

11.0 ADVISORY PROCESS

The Florida Sea Grant College Program uses a multi-layered advisory process involving a number of advisory committees. These committees, both permanent and ad-hoc, provide valuable advice on both programmatic direction and administrative function and processes. Each committee will be described along with a list of the members of each committee.

Overall Strategic Planning/Priority Setting

Every four years Florida Sea Grant engages in an in-depth strategic planning process. This provides overall programmatic guidance to Florida Sea Grant research, communications and extension priorities and ultimately results in the Florida Sea Grant strategic plan.

The 2006-09 Strategic Plan was developed during summer/fall 2004 and built upon the structure and process that began with FSG's first strategic plan in 1996. The plan is FSG's third four-year strategic plan. Strategic planning developed issues in nine goal areas. The process involved over 300 individuals from universities, agencies, companies and the public. A number of planning techniques were used including Web-based surveys, mail surveys, workshops, position papers and analysis of existing programs and their impacts. The goals and objectives in the plan directly guide FSG's research, extension and communications programs within each of nine goal areas. FSG's plan considered both the National Sea Grant Plan for 2003-08 and the NOAA plan for 2005-10. In fact, the plan demonstrates how FSG's nine goal areas directly link with the other two national plans, and applies those priorities to Florida. The plan contains the key elements of a strategic plan: setting (partners, institutional framework, strengths, weaknesses, opportunities, threats); values; implementation (including how FSG will respond to priorities, the role of management and products, programs and markets); strategic goal areas; and, additional resources needed to carry out the plan. Each strategic goal is described, the overall measurable goal is defined, the audience and products and activities that will be developed for the audience are identified, performance indicators are outlined, the process used to develop the objectives within the goal area is summarized, and specific resources needed within the goal area are enumerated.

Advisory Board/Campus Coordinators

The Florida Sea Grant College Program is established as a statewide Center of the Florida Board of Education. Statewide Centers are created when at least two of the 11 public universities under the Board of Education are involved in an academic program with statewide coverage. Each Center is managed by a host campus on behalf of the participating universities in the Center. The Director of each Center reports to the Vice President for Academic Affairs of the host campus. Each Center has an advisory board with a member from each university appointed to the board by the President of each institution. For Sea Grant, several private universities and non-profit laboratories participate in the program. Thus, at the invitation of Florida Sea Grant, each private university also nominates a member to the advisory board.

Florida Sea Grant calls this group its "Campus Coordinators." The Campus Coordinators provide programmatic direction as well as administrative direction regarding the way the Sea Grant program is operated. Florida Sea Grant management requests their input on such major issues as whether to do annual or biennial proposals, how the review process is organized, and on operational issues including how best to communicate with 700-800 faculty statewide interested in conducting research within Sea Grant priority areas. All maintain on-campus e-mail or mailing address lists for communicating with faculty regarding calls for proposals and distributing Florida Sea Grant's bi-monthly Faculty Progress Report. The membership at the end of 2007 consists of:

- Florida A&M University - Larry Robinson
- Florida Gulf Coast University - Greg Tolley
- Florida Institute of Technology - Junda Lin
- Florida International University - James Fourqurean
- Florida State University - Felicia Coleman
- Harbor Branch Oceanographic Inst. - Dennis Hanisak
- Mote Marine Laboratory - Ken Leber
- New College of Florida - Sandra Gilchrist
- Nova Southeastern University - Mahmood Shivji
- University of Central Florida - Linda Walters
- University of Florida - Karl Havens
- University of Miami - Nelson Ehrhardt
- University of North Florida - Kelly Smith
- University of South Florida - David Mann
- University of West Florida - William Huth

Advisory Committees

Statewide stakeholder advisory committees include stakeholders for aquatic food products and an advisory committee at the county or regional level for each off-campus extension faculty member. Committees meet based on a schedule or as needed basis.

Sea Grant Subject Matter Advisory Committee (State Level)

Aquatic Food Products

Jim Obrien/Carlos Sanchez - Beaver Street Fisheries, Jacksonville
 Tommy Ward -Buddy Ward and Sons Seafood, Apalachicola
 Bill Herzig - Darden's Restaurants, Orlando
 Gary Graves - Key's Fisheries, Marathon
 Grady Levins - Levins' Seafood, Apalachicola
 Lisa Weddig - National Fisheries Institute (VA)
 Ted Suor/Randy Graham/RobertNotovny - Outback Restaurants, Tampa
 Guy Pizzuti - Publix Supermarkets, Lakeland
 Gib Migliano/Rick Hazelwood - Save On Seafood, St. Petersburg
 Howard Shaw/Bubba Shaw - Shaw's Southern Belle Frozen Foods, Jacksonville
 Nina Burt - Singleton Seafood, Tampa
 Bob Jones - Southeastern Fisheries Assn., Tallahassee
 Tony Downs/Ed Keisel/Frank Russo/Paul Schwartz - Sysco (FL)
 Terry Levee - Winn-Dixie Stores, Jacksonville

Sea Grant Extension Advisory Committees (County Level)

Each Sea Grant Extension off-campus faculty member at the county level has an advisory committee. These committees usually meet at least twice each year. They provide direct input into the faculty members annual work plan and program direction. They also provide guidance in assisting the faculty members in evaluating the success or impact of the educational effort for the previous year. Each faculty member's plan of work then provides input for the on-campus Sea Grant specialists who coordinate statewide extension programs. These state major programs then become the priority educational themes of the Sea Grant Extension Proposal as part of the overall Florida Sea Grant College Program. While a major proposal for Sea Grant Extension is developed

every four years, the plan within Florida is revised every year to take advantage of the advisory committee input. The off-campus faculty and their advisory committees are listed below.

Brian Cameron (Bay County)

Tom Putnum, Half Hitch Tackle, Panama City Beach
Bob Zales, Charter Captain and National Association of Charterboat Operators, Panama City Beach
Tova Spector, DEP Florida Park Service District 1, Panama City Beach
Melody Ray-Culp, U.S. Fish and Wildlife Service, Panama City
Jeff Ackiss, Panama City Anglers Club, Panama City
Tita Sokoloff, Bay County Planning and Zoning, Panama City
Mike Brim, Friends of St. Andrew Bay, Panama City
Gary Fitzhugh, NOAA Fisheries, Panama City Beach

LeRoy Creswell (St. Lucie County)

John Holt, Harbor Branch Oceanographic Institute, Ft. Pierce
Laura Diedrick, Smithsonian Institution/St. Lucie County Marine Education Center
Dean Kubatchik, Fort Pierce City Marina, Ft. Pierce
Sabine Alshuth, Indian River Community College, Ft. Pierce
Jim Oppenborn, St. Lucie County Marine Resource Coordinator, Ft. Pierce
Mark Tamblin, Florida Inland Navigational District, Stuart
Pat Gostel, South Florida Water Management District, West Palm Beach
Mary Gregory, St. Lucie County Public School District, Ft. Pierce
Jerry Corsaut, Diver, Aquaculture Consultant, Ft. Pierce
John Tucker, SLC Mosquito Control, Ft. Pierce

Andrew Diller (Escambia County)

Eilene Beard, Florida Artificial Reef Advisory Board, Pensacola
Gene Ferguson, Scuba Shack/Wet Dream Charters, Inc., Pensacola
Eleanor Godwin, West Florida Regional Planning Council, Pensacola
Amanda Carrigan-Grissom, Gulf Islands National Seashore, Gulf Breeze
Mary Gutierrez, Florida Department of Environmental Protection, Pensacola
Richie Anne Marple, Pensacola Beach Leaseholders Association, Gulf Breeze
Linda Hartmann, Retired, Teacher and Wildlife Sanctuary of NW FL, Gulf Breeze
Earl Rader, Pensacola Recreational Fisherman's Association, Pensacola
Paul Redman, Snapper Trapper Charters and Reef Fish Restoration Association, Pensacola
Neil Richards, American Building Components, Inc, Pensacola

Pam Fletcher (South Florida Ecosystem Coordinator)

No advisory committee.

Bryan Fluech (Collier County)

Gregory Tolley, Coastal Watershed Institute, Florida Gulf Coast University, Ft. Myers
Tabitha Stadler, Rookery Bay National Estuarine Research Reserve, Naples
Capt. Matt Finn, Huckleberry Environmental Services, Inc., Goodland
Scott Hopkins, Cedar Bay Yacht Club, Marco Island
Louise Taylor, Everglades City School, Everglades City
Mike Baur, City of Naples, Naples
Capt. Will Geraghty Grand Slam Charters, Naples

Doug Gregory (Monroe County)

John Clarke, Mote Marine Laboratory, Ramrod Key
Jeff Cramer, Organized Fishermen of Florida, Conch Key
Humberto Garrido, Jr., Key West
Richard Grathwohl, Marathon
Debra Harrison, World Wildlife Fund, Marathon
Richard Hanson, Islamorada
Bob Holston, CeCe Roycraft, Key West Pro Dive Shop, Key West
Karl Lessard, Gulf of Mexico Fishery Management Council, Marathon
John Magursky, Islamorada Charter Boat Association, Key Largo
Martin Moe, Islamorada
Ken Nedimyer, Tavernier
George Niles, Summerland Key
Bruce Popham, Marathon Boatyard, Marathon
Capt. Jim Sharpe, Summerland Key
Simon Stafford, Lower Keys OFF Chapter, Key West
Scott Zimmerman, FKCF, Marathon

Joy Hazel (Lee County)

Justin McBride, Lee County Natural Resources Department, Ft. Myers
Trisha Fancher, Keep Lee County Beautiful, Inc, Ft. Myers
Ken Stead, Director, SWFL Marine Industries Association, Ft. Myers
Dave Westra, Lehr's Economy Tackle, Ft. Myers
Betsy Clayton, Lee County Parks and Recreation, Ft. Myers
Lonnie Carson, REDstart Volunteer, Alva
Heather Stafford, Estero Bay and Charlotte Harbor Aquatic Preserves, Ft. Myers Beach
Capt. Larry Hendricks, Ft. Myers
Chuck Listowski, West Coast Inland Navigation District, Venice

L. Scott Jackson Extension Director (Wakulla County)

No advisory board.

Eddie Leonard (Brevard County)

Advisory committee is in formation.
Capt. Mark Leslie, Titusville
Kathy Hill, Indian River Lagoon Program, Palm Bay
Sgt. Byron Keck, Brevard County Sheriff's Department, Cocoa

William T. "Bill" Mahan (Franklin County)

David Barber, Barber's Seafood, Apalachicola
Anita Grove, Chamber of Commerce, Apalachicola
Grady Leavins, Leavins Seafood, Apalachicola
Lynn Martina, Oyster Dealers Association, Apalachicola
Vance Millender, Millender & Sons Seafood's, Apalachicola
Smokey Parrish, Buddy Ward's Seafood, Apalachicola
Bevin Putnal, Franklin County Commissioner, Apalachicola
Steve Rash, Waterstreet Seafood, Apalachicola
Tommy Ward, Oyster Dealers Association, Apalachicola
Billy Dalton, Franklin County Seafood Workers Assoc., Apalachicola

Kevin Begos, Executive Director, Franklin County Oyster & Seafood Industry Task Force,
Apalachicola
Johnny Richards, Franklin County Seafood Workers Assoc., Apalachicola

Maia McGuire (Nassau, Duval, St. Johns, Flagler)

Dick Balduzzi, St. Johns County WAV Coordinators, St. Augustine
Frank Benham, Palm Coast
Chris Benjamin, St. Augustine
Linda Bremer, Jacksonville
Carrie Browder, NE Florida Education Consortium, Palatka
Steve Davidson, Palm Coast
Neil Davies, Palm Coast
Mike Hollingsworth, Jacksonville
Jerry Full, Palm Coast
Rick Gleeson, GTM NERR, St. Augustine
Carl Hampp, Marineland, St. Augustine
Pete Johnson, SJRWMD, Palatka
Suzanne Leach, St. Augustine
Bill Lewis, Palm Coast
Kevin Lussier, Amelia Island Yacht Basin, Amelia Island
Richard and Carole McCleery, Palm Coast
Cheryl McCrory, St. Johns County WAV Coordinator, St. Augustine
Kevin Micieli, Flagler County Public Works, Bunnell
Steve Nichols, Metropolitan Park & Marina, Jacksonville
Christina Nelson, Amelia Island Plantation, Amelia Island
Debbie Penrose, Palm Coast
Bonnie Simms, Palm Coast
Kelly Smith, UNF Dept. of Natural Sciences, Jacksonville
Lex Waters, Jacksonville
Joe Woodbury, Washington Oaks State Gardens, Palm Coast
Rene Stambaugh, Elkton
Tom and Key Wells, St. Augustine
Frances, Keiser, St. Augustine
Kathy Flemming, St. Augustine
Tara Dodson, St. Johns County Parks and Recreation, St. Augustine
Janet Koehler, Ponte Vedra
Joe Shannon, St. Augustine

Brooke Saari

Advisory committee is in formation.

Chris Simoniello (SEACOOS Education Coordinator)

Bill Arnold, Florida Fish and Wildlife Research Institute
Charlie Barans, South Carolina Department of Natural Resources
Andy Clark, Ocean US (Washington DC)
Braxton Davis, University of South Carolina
Jen Dorton, University of North Carolina-Wilmington
Sandy Eslinger, NOAA Coastal Services Center (SC)
Madilyn Fletcher, University of South Carolina

Rick Gleeson, Guana Tolomato Matanzas Reserve, Ponte Vedra Beach
Katie Greganti, Georgia Marine Extension
Mike Henderson, NOAA Fisheries
Brian Keller, Florida Keys National Marine Sanctuary
Parker Lumpkin, SECOORA (NC)
Mark Luther, University of South Florida
Frank Muller Karger, University of South Florida
Jim Nelson, Skidaway Institute of Oceanography (GA)
Kathleen O'Keefe, Florida Fish and Wildlife Research Institute
Geno Olmi, NOAA Coastal Services Center (SC)
Charlie Paxton, NWS – Weather Forecast Office – Tampa
Mitch Roffer, Roff's Fish Forecasting Service
Howard Rutherford, Florida COSEE/Pier Aquarium
Harvey Seim, University of North Carolina-Chapel Hill
Lundie Spence, Southeast COSEE (SC)
Vembu Subramanian, University of South Florida
Jim Sullivan, Gray's Reef NMS (GA)
Sandy Vargo, Florida Institute of Oceanography
Bob Weisberg, University of South Florida
Cisco Werner, University of North Carolina
Lizz Williams, University of Miami

Betty Staugler (Charlotte County)

Capt. Ralph Allen, King FisherFleet, Punta Gorda Boating Alliance, Punta Gorda
Kelly Bealle, Peace River Seafood, Punta Gorda
Michael Heller, Water Life Magazine, Port Charlotte
Maran Hilgendorf, Charlotte Harbor National Estuary Program, Ft. Myers
Jim Joseph, Fantasea Scuba, Port Charlotte
Brian Knight, Inn Marina, Punta Gorda
Frank Kudrna, Port Charlotte
Paul Marcuzzo, 4 Winds, Marine Electronics, U.S. Coast Guard Auxiliary and Charlotte
County Marine Advisory Committee, Punta Gorda
Bret Blackburn, Mote Marine Laboratory, Sarasota
Greg Tolley, Florida Gulf Coast University, Ft. Myers

John Stevely (Manatee, Sarasota and Collier Counties)

Bill Ireland, Coastal Conservation Association, Bradenton
Charlie Hunsicker, Ecosystems Manager, Bradenton
Capt, Jonathan Davis, Fishing Guide, Palmetto
Larry Borden, Scuba Diver, Bradenton
Gary Raulerson, SBNEP, Sarasota
Greg Fagan, Manatee County Parks and Recreation, Bradenton
Gail Cole, Mayor, Bradenton Beach, Bradenton Beach
Kevin Lausman, Coastal Conservation Association, Bradenton
James Zacharis, Fishing Guide, Cortez
Karen Bell, Bell Fish Company, Cortez
Rick Meyers, Manasota Fish & Game Association, Bradenton
Bob Fluke, Manatee County Environmental Management Department, Bradenton Beach
Jim Terry, Palmetto
Jim Wedel, Bradenton

Otto Bundy, Bradenton
Richard Eckenrod, NEP, St. Petersburg
Larry Swanson, Palmetto
Mark Alderson, Sarasota
Bob Bixby, Bradenton
Nannette Eubanks, Palmetto
Bill O'Shea, Conservation Land Mgt. Dept, Bradenton
Robert Fields, Palmetto
J.D. Arndt, Bradenton

Leslie Sturmer (Multi-County Aquaculture)

Sue Colson, Clamalot Farm, City Commissioner, Cedar Key
Ricky Cooke, Cedar Key Oystermen's Association, Cooke's Oysters and Seafood, Cedar Key
Tony Heeb, Cutthroat Clams, St. James City
Mike Hodges, Cedar Key Aquaculture Association, Hodges Seafood, Cedar Key
Dan Leonard, Bull Bay Clam Farm, Englewood
Ed Mangano, Orchid Island Shellfish Company, Sebastian
John Scarpa, Harbor Branch Oceanographic Institution, Ft. Pierce
Dan Solano, Cedar Key Aquaculture Farms, Inc., DACS Aquaculture Review Council, Cedar Key
Chris Topping, Clamtastic, Cedar Key
Rick Viele, Rick's Seafood, Inc., Cedar Key
Joe Weissman, Harbor Branch Clams, Ft. Pierce
Phyllis Woodford, Woodford Shellfish, Merritt Island
William Lartz, Bill's Seafood, Carrabelle
Rose Cantwell, Cedar Key Aquaculture Association, Cedar Key
Billy Leeming, Southern Cross Seafarm, Cedar Key

Don Sweat (Citrus, Hernando, Pasco and Pinellas Counties)

Citrus/Hernando

Jeff Carter, Marina Owner, Homosassa
Bob/Cathy Gill, Owners, Shrimp Landing Fish House, Crystal River
Mary Craven, Citrus County Tourist Development Council, Homosassa Springs
Alicia Lowe, River Safaris, Homosassa Springs
Mark Edwards, Citrus County Aquatic Services, Lecanto

Pasco/Pinellas

Norm Blake, University of South Florida, St. Petersburg
Blake Longacre, Businessman, Sport Fisherman/Boater, Largo
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Bill Hay, Milton
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Florida Sea Grant is 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.

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