Sea Grant
Florida

FLORIDA SEA GRANT COLLEGE PROGRAM

2008-2009 PLAN OF WORK

This publication was supported by the National Sea Grant College Program of the U.S. Department of Commerce National Oceanic and Atmospheric Administration under NOAA Grant No. NA16RG-2195. The views expressed herein do not necessarily reflect the views of any of these organizations.

Online copies are available at the Florida Sea Grant Web site, www.flseagrant.org. Additional print copies are available by contacting:

Florida Sea Grant
University of Florida
PO Box 110400
Gainesville, FL 32611-0400
(352) 392-5870

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TP 162 August 2008

Florida Sea Grant
2008-09 Work Plan

“Science Serving Florida’s Coast”

August 2008
TP 162

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INTRODUCTION

Florida Sea Grant (FSG) is committed to enhancing the practical use and conservation of coastal and marine resources. The program priorities for FSG research, extension and education are established every four years in a Strategic Plan. Every two years a competitive research proposal process selects two-year projects to support those priorities, and these are enhanced with additional funds from national competitions and other public and/or private sources. Extension and outreach activities are also planned and undertaken in support of strategic planning priorities. Detailed, proposals are developed every four years for Extension, Communications and Management activities. These are updated at the middle of the four-year period. An Implementation Plan[1] and a Work Plan are developed every two years and progress reports[2] are written annually. This is the work plan for 2008-09. For 2010-11 the work plan will transition to integrate with the two-year Implementation Plan.

The current FSG cycle of strategic planning, implementation of two-year reporting activities, and reporting on annual progress is shown in the table on the next page. Florida Sea Grant's Strategic Plan addresses issues that are important in Florida, the nation and the world, and it reflects the input of hundreds of Floridians representing marine and coastal industries, people who live along the coast, resource managers and technical experts. This 2008-09 Work Plan specifies research and extension programming to be carried out under the Florida Sea Grant Strategic Plan for 2006-09. It also lays out a process that will begin in 2008 to align the strategic goal areas of FSG with four new over-arching goals of the National Sea Grant College Program, ensuring that FSG continues to excel in addressing national priorities while meeting the needs of Florida stakeholders.

FSG is hosted by the University of Florida, the state's Land Grant University. This allows FSG to effectively consider land-based actions that affect the coast, activities along the shoreline, bays and estuaries, and ocean priorities in planning its research, education and extension programs, projects and activities.

Every FSG activity outlined in this work plan satisfies three simple but rigorous criteria: 1) it is based on a strong rationale; 2) it demonstrates scientific or educational merit; and 3) it will produce results that are clearly useful to Florida's citizens and/or are applicable in industry, management or science. A number of core values allow FSG to deliver results based on these criteria:

1) **Excellence.** Research is funded on a competitive basis, with scientific merit as the most important criterion. Extension programs are based on reviewed faculty plans of work. Communication uses the latest technology to optimize utility, visibility and citizen receipt of our science-based information;

[1] The Implementation Plan is the two-year "grants" document containing all project and program activity that is sent to the National Sea Grant Office, NOAA, USDC for processing to provide funds to Florida Sea Grant. The Implementation Plan referred to here is the condensed and programmatic version of that document.
[2] Progress Reports are available at the Florida Sea Grant Web site, www.flseagrant.org.

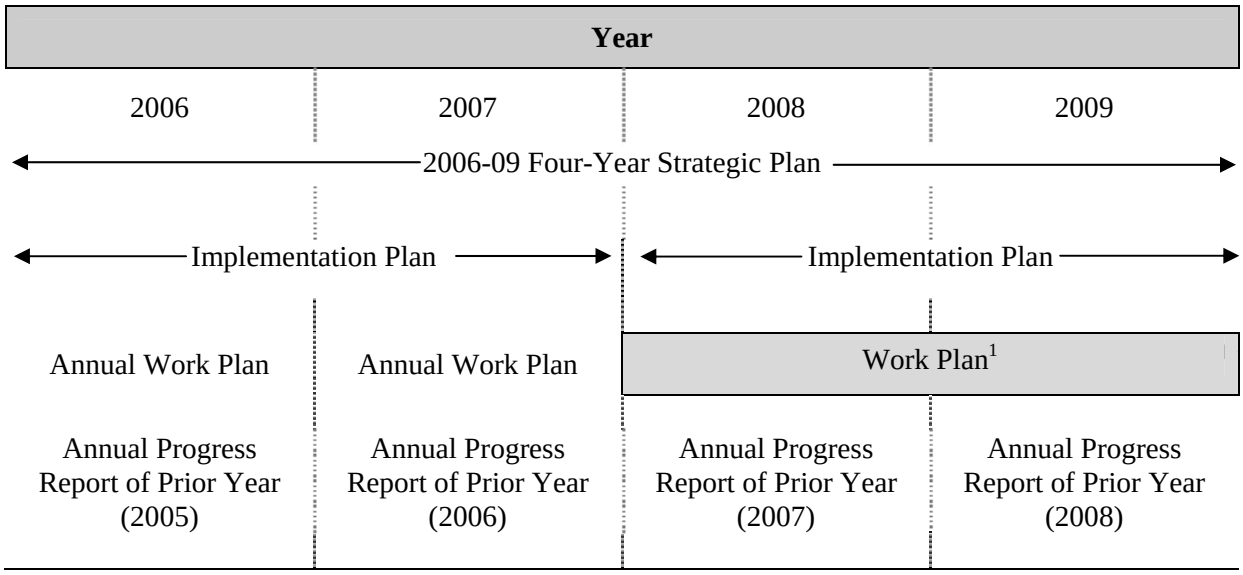
2) **Participation.** High value is placed on the involvement of a large number of participating institutions in research, education and extension programs. Graduate student involvement is high and a diverse faculty is involved, from assistant to full professors;

3) **Accountability.** Both external and internal processes are used to measure a wide range of achievements. These include tracking the scientific publication output of faculty and students, understanding the contribution to society of scientific discovery, measuring the way citizens receiving educational programs change their behavior, and determining the economic impact or level of new business activity resulting from a research project;

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

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

The following table shows the 2008-09 Work Plan in the context of Florida Sea Grant's four-year strategic planning and reporting cycle.



[1] Representation of this document on the planning timeline.

FSG conducts its work through applied research, extension/outreach and communications activities, and it strategically plans along theme areas consistent with the National Sea Grant program and focused on key state, regional, and national priorities. One goal may require mostly research to achieve the objective; another, mostly extension and communications activity. Yet another may require a mixture of both. Thus, each of Florida Sea Grant's current goal areas and the work planned within each contains research, extension and communications activity. FSG management provides oversight and makes available the resources to achieve each of the stated goals through the work outlined in this plan.

The following sections of this document provide an overview of research and extension/outreach activities planned for 2008-09 organized into three broad focus areas that are being developed for the new (2009-2013) FSG Strategic Plan. Additional activities are anticipated in 2009 under a fourth focus area dealing with predicting the impacts from and developing adaptations to climate change. The work plan also identifies program management activities that will be implemented in support of the focus areas. Communications activities are addressed in the Strategic Plan and Implementation Plan.

FOCUS AREA 1 – Seafood Production and Safety

Goal 1: Develop the food and hobby 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 Florida Sea Grant now is supporting research to develop the marine ornamental species sector. The following are examples of research and extension activities planned for 2008-09 aimed at increasing the value and sustainability of Florida's aquaculture industry.

Objective 1. Diversify the aquaculture industry to promote stability and expansion of the industry in Florida to support local coastal economies.

Planned Research Programming

1.1.1 *Triploid Clams to Tolerate 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; therefore spawning does not occur and energy is available during this stressful period for basic metabolism. (Scarpa/Baker/Sturmer/Adams: R/LR-A-39)

1.1.2 *Enhancing Marine Ornamental Larval Production*: 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 command 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. (Turingen/Creswell/Gaines: R/LR-A-43)

1.1.3 *Diversifying the Clam Industry:* The Florida clam industry is built on a single species. Diversifying the shellfish culture industry by developing farming technology and markets for other bivalve species will increase 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. (Adams/Scarpa/Sturmer/Creswell/Sweat: R/LR-A-44)

1.1.4 *Diversifying the Clam Industry: Part II:* This project continues an earlier FSG-funded investigation (R/LR-A-44) dealing with spawning and culture of larvae of the sunray venus clam, an alternative species for potential commercialization in the Florida marine aquaculture industry. This new research project will establish the methods for land-based nursery culture of sunray venus clams, compare field methods for nursery and growout of those clams, determine salinity and temperature preferences of the animals, evaluate shelf-life of live products, examine alternative markets for shucked meat products and characterize the economics for commercial culturing of sunray venus clams. (Scarpa/Sturmer/Creswell/Adams: R/LR-A-45)

1.1.5 *Extending Baitfish Spawning Cycles:* Spawning protocols are being developed for marine baitfish to achieve year-round spawning and availability of those fish to the recreational fishing sector. (Ohs/Rhyne: PD-08-4)

Planned Extension/Outreach/Communications Programming

1.1.6 Increase aquaculture production by evaluating biological and environmental conditions and by improving genetic stocks to generate optimal production and survivability. (Sturmer/Creswell)

1.1.7 Maintain a shellfish aquaculture research and education facility in Cedar Key. This saltwater running laboratory on Florida's Gulf of Mexico coast allows UF faculty to address the research needs of the clam farmers. (Sturmer)

1.1.8 Explore the potential for aquaculture farming and markets in Florida. (Adams/Sturmer/Mahan/Hazell/Creswell)

Objective 2. Increase scientific, industry, agency, and citizen knowledge about Florida aquaculture products.

Planned Extension/Outreach/Communications Programming

1.2.1 Coordinate and provide technical assistance, training and support for Florida's aquaculture farmers and to state agencies involved with the regulation and support of the industry. (Sturmer/Mahan)

1.2.2 Increase public knowledge about aquaculture in Florida through various communication modes (e.g., training, radio, newspaper, Web site, quarterly newsletter and fact sheets, demonstrations/exhibits and festivals). (Sturmer/Mahan/Diller/Creswell/Sweat)

Goal 2: Use marine biotechnology to create and enhance products and processes from Florida's coastal resources.

This goal seeks to use biotechnology to discover, develop and use products and processes from the living resources of the sea, to protect ocean resources and to promote human health.

Objective 1. Support the development of bio-products that promote human and ocean health and productivity.

Planned Research Programming

2.1.1 *New Emphysema and Chronic Bronchitis 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)

2.1.2 *New Anti-Tumor 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, or "toolkit," for research and industry, enabling downstream experiments and sustainable production of unique bioactive marine natural products. (Lopez: R/LR-MB-23)

2.1.3 *New Products from Marine Sponges:* Cell lines will be developed for use in producing marine bio-products. Over 2,600 novel chemicals have been isolated from sponges, but their low levels preclude commercial development. If successful, this work will make a significant breakthrough in addressing the supply problem for marine biotech products. (Pomponii/Wijffels/Sennett: R/LR-MB-25)

2.1.4 *Anti-Tumor Compounds from Sponges:* Methods will be developed to sustainably produce leiodermatolide, an anti-tumor compound that recently has been discovered in marine sponges. (McCarthy/Wright: R/LR-MB-26)

2.1.5 *Protecting Corals:* Research will be conducted to determine how probiotic bacteria associated with coral reefs may protect the corals from disease, providing information needed to sustainably manage Florida coral reefs and their associated $3 billion a year economy. (Teplitski/Ritchie/Horenstein: R/LR-MB-27)

2.1.6 *New Drugs from Cone Snails:* Carboxylated neuro-protective agents will be isolated from cone snails and assays will be conducted to identity new therapeutic drugs. (Mari/Wu: R/LR-MB-28)

Planned Extension/Outreach/Communications Programming

2.1.7 Increase citizen knowledge of the importance of oceans for current and potential life-saving marine-derived pharmaceuticals. (Fluech)

2.1.8 Sponsor a focus group on marine biotechnology at the 2008 BioFlorida meeting. Harbor Branch Oceanographic Institute at Florida Atlantic University will coordinate and lead this event. The aim is to have a dialogue between scientists working in the marine biotechnology sector and those leading efforts in other areas of biotech development and application, to better define the role of marine research in the future development of biotechnology products in Florida.

Goal 3: Ensure that recreational and commercial fisheries are managed in a way to achieve sustainable populations and economic returns.

The recreational and commercial fishing industries in Florida generate an economic impact to the Florida economy of over $3 billion. However, the growing number of saltwater anglers and demand for high-quality seafood are placing increasing pressure on Florida's marine fishery resources. This focus area seeks to generate new, innovative, and effective approaches to identify and maintain critical habitats, manage marine resources and evaluate the effects of management decisions on fishery resources and the people who use these resources.

Objective 1. Create and teach production, management and sustainable harvesting/angling techniques that preserve recreational and commercial fisheries.

Planned Research Programming

3.1.1 *DNA Fingerprinting 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)

3.1.2 *Reducing Disease in Lobsters:* The effects of trap fishing on transmission of a lethal viral disease in spiny lobster populations will be examined by University of Florida scientists. Spiny lobsters are one of the most economically valuable fisheries in Florida. The results of this work will help the fishing industry and state agencies manage lobster populations in a manner that helps control viral infection. (Behringer/Butler: R/LR-B-61)

Planned Extension/Outreach/Communications Programming

3.1.3 *Recreational 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 the recreational fishing sector. During 2008-09 the project will focus on reducing recreational fishing mortality, artificial reef enhancement, developing ethical angling educational materials for ethnic groups, and fostering industry input to regulatory matters. To this end, FSG is developing a recreational fishing Web site and conducting several regional artificial reef workshops. In addition, a pilot project will demonstrate the usefulness of available sea surface data for the for-hire and offshore anglers in two regions of Florida. (Spranger: SGEP-13-FE-C)

3.1.4 Teach sustainable harvesting and angling practices to recreational and commercial fishers to increase fish survivability and reduce by-catch by using turtle excluder devices (TED's) and by-catch reduction devices (BRD's). This will involve the implementation of a coordinated statewide effort to instruct anglers on the use and application of circle hooks, de-hooking tools, proper handling, and venting procedures so that they can comply with a new Florida law governing the catch and release of reef fish. (Adams/Cameron/Diller/Fluech/Hazell/Staugler/ Saari/Verlinde/McGuire/Mahan/Leonard/Stevely/Sweat)

3.1.5 Increase scientific, industry, agency and local government knowledge about management issues and impacts to Florida's fisheries and marine resources by organizing and participating in symposia, conferences, and trade meetings; producing publications; service on committees and advisory boards; and participation in workshops. (Otwell/Lindberg/Adams/Creswell/Fluech/Gregory/McGuire/Mahan/Stevely)

3.1.6 Increase citizen knowledge about management issues and human impacts to Florida's fisheries and marine species resources (e.g., pelicans, dolphins, manatees, turtles) by organizing and developing short courses for citizen education and participating in community events (e.g., fishing tournaments, fishing camps/clinics, fairs, etc.). (Creswell/Cameron/Diller/Fluech/Hazell/Staugler/Leonard/Sweat)

3.1.7 Inform the commercial fishing industry, local governments and citizens regarding management, regulations and fisheries-related issues through communication opportunities and media events

(radio, newspaper articles, Web sites, displays, surveys, etc.). (Creswell/Cameron/Fluech/Saari/Sweat/Stevely)

3.1.8 Provide up-to-date scientific information on management regulations and fisheries-related issues to policy makers at annual meetings of the Gulf and Caribbean Fisheries Institute. (Adams/Creswell/Fletcher)

Objective 2. Determine the social and economic impacts of fishery management strategies.

Planned Research Programming

3.2.1 Estimate the economic impact of artificial reefs to the SW Florida Economy. The study will assess the economic activities and local impacts of artificial reefs in the Collier to Pinellas Counties region. This project is being funded by the West Coast Inland Navigation District and the Florida Department of Environmental Protection. (Adams/Swett/Larkin)

3.2.2 Estimate the economic impact of the hard clam culture industry in Florida. This project was funded by the Florida Department of Agriculture and Consumer Services Division of Aquaculture and approved by the industry-based Aquaculture Research Council. (Adams)

Objective 3. Identify and manage essential natural and artificial fisheries habitat.

Planned Research Programming

3.3.1 *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 migration to adult habitat. Researchers will examine population dynamics of gray snapper and 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)

3.3.2 *Passive Acoustics Identifies Spawning Habitat:* This study will determine 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)

3.3.3 *Boater Impacts to Coral Reefs:* This study will map and quantify vessel activity and use patterns related to coral reefs, and document impacts to reefs associated with boat anchoring and user activity. (Behringer/Frazer/Swett/Watkins/D. Fann)

3.3.4 *Delineating Grouper Habitat:* This project, funded by the NOAA Marine Fisheries Initiative (MARFIN), will use side-scan sonar imagery to identify gag grouper essential fish habitat. (Lindberg/Watson/Davidson)

Planned Extension/Outreach/Communications Programming

3.3.5 Conduct educational programs to satisfy the information needs of artificial reef users and to develop, monitor, and maintain artificial reef habitats. (Diller/Cameron/Fluech/Staugler/Saari/Stevely/Sweat)

Goal 4. Improve the product quality and safety of Florida's seafood products.

Florida is recognized as a center for high-valued seafood products. At the same time, Florida ranks in the top 10 states for food-borne illnesses and its seafood food contributes to this ranking. This goal area addresses the increasing need to develop technologies and procedures for eliminating biological and chemical hazards in seafood and the processing, handling and shipping of marine food products to enhance product safety and consumer value.

Objective 1. Develop and enhance the production and marketing and safety of seafood products via post harvest processing, proper and consistent labeling, and quality monitoring/assessment.

Planned Research Programming

4.1.1 *New Oyster Product Characterization Standards*: A historical change is occurring in the production and marketing of oyster products due to federal mandates for alternative processing methods and changes on public perceptions and preferences. Specifically, the mandate for post-harvest treatment (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. (Otwell: R/LR-Q-28)

4.1.2 *Rapid Test for Verifying the Success of Post-Harvest Process Oyster Treatments:* 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 post-harvest processing (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)

4.1.3 *Treatments to Retain Seafood Freshness:* The possibility, extent and quantification of "color enhancement" data using carbon monoxide are 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)

Planned Extension/Outreach/Communications Programming

4.1.4 Increase industry, agency and public awareness of the impacts of mislabeling and the fraudulent substitution and sale of seafood products. (Otwell/Mahan)

4.1.5 Increase industry, agency and public awareness of the health issues related to the consumption of aquaculture and shellfish products and post-harvest treatments to reduce risks. (Otwell/Mahan)

4.1.6 Increase scientific, industry, agency and local government knowledge about seafood safety issues by organizing and participating in symposia, conferences, and trade meetings; producing publications; service on committees and advisory boards; and participation in workshops. (Otwell/Mahan/Sweat)

Objective 2. Increase citizen awareness and knowledge about seafood safety issues.

Planned Research Programming

4.2.1 *Influencing Consumer Behavior Toward Seafood Safety:* 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 will be quantified. (Morgan/Huth/Martin: R/LR-E-19-PD)

4.2.2 *Species Substitution and Fraud Perceptions:* A survey will be conducted for the Florida consumer and food service sectors regarding the impact on seafood demand, perceptions and awareness resulting from the mislabeling of grouper products. This project, funded by the Gulf and South Atlantic Fisheries Foundation, also will assess perceptions concerning sustainability programs. (Adams, Larkin, Otwell)

Planned Extension/Outreach/Communications Programming

4.2.3 Develop news and media publications and education programs that are geared toward the general public and describe facets of seafood safety, economically important fish species, and health-related issues. (Cameron/Fluech/Verlinde/Mahan/Otwell)

4.2.4 Provide technical support to local governments, seafood processors, harvesters, retailers and consumers on seafood safety and management issues. (Mahan/Sturmer/Sweat)

FOCUS AREA 2 – Sustainable and Hazard-Resilient Coastal Communities

Goal 1: Sustainable Coastal Communities and Waterways

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 waterway management and planning initiatives, legal analysis and policies within this goal area with a focus on safe navigation and boating, and promoting recreational and commercial access to Florida's waterways.

Objective 1. Develop policies and plans to sustain coastal communities and waterfront businesses, and promote public access to waterways and waterfronts.

Planned Research Programming

1.1.1 *Promoting Public Access to Waterfronts and Waterways:* This grant has been continued to support legal extension/outreach for state and local policy professionals across a range of waterway and waterfront issues. Local waterfront governments are benefiting 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 usable format. This is 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)

Planned Extension/Outreach/Communications Programming

1.1.2 Develop locally applicable policies, plans and strategies to promote coastal planning and public access to waterways, which are tailored to individual community needs. (Ankersen/Ruppert/Swett/Watkins)

1.1.3 Increase scientific, industry, agency and local government knowledge and collaboration regarding waterfront access, waterway planning and sustaining working waterfronts/coastal heritage by organizing and participating in symposia, conferences, and trade meetings; producing publications; service on committees and advisory boards; and participation in workshops. (Ankersen/Ruppert/Adams/Gregory/Swett/Watkins/Fletcher/Leonard/Verlinde/ McGuire/Stevely)

Objective 2. Develop decision support tools and information to guide public policy and support coastal planning and waterway management efforts.

Planned Research Programming

1.2.1 *Safe and Effective Waterway Management*: This continuing grant will support the activities of a coastal planning specialist within the Florida Sea Grant boating and waterway management program. The specialist will enhance 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 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)

1.2.2 *Recreational Boating Characterizations:* FSG has partnered with the Florida Fish and Wildlife Conservation Commission's (FWC) Fish and Wildlife Research Institute to undertake a series of coordinated studies aimed at developing spatial information on the boating patterns and behaviors of Florida's boating community. In 2008, a study will be completed for Bay County (Sidman/Swett/S. Fann/D. Fann/Sargent/Cameron) and a study for Collier County will be initiated in partnership with the Collier County Coastal Management Program. (Swett/S. Fann/ D. Fann/Sargent/Sidman/Fluech)

1.2.3 *A GIS Risk Analysis for Boating Safety Rule Making:* This study will develop a GIS-based risk analysis 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. This project is being funded by the FWC. (Watkins/Sidman/Swett)

1.2.4 *A Regional Waterway Management System for Charlotte County:* This study will complete an evaluation of the waterway maintenance needs and prioritization analysis for counties within the West Coast Inland Navigation District's jurisdiction. The study will develop detailed spatial data on the locations and draft characteristics of vessels and waterway depth conditions in Charlotte County. A GIS routing analysis will identify and prioritize waterway segments in the county according the number of vessels restricted within canal systems under a mean lower low (MLLW) water condition. Information from this project will be used by the WCIND and FDEP to develop a regional waterway maintenance permitting plan. (Swett/D. Fann/Staugler)

Planned Extension/Outreach/Communications Programming

1.2.5 Florida Sea Grant leadership and selected affiliated faculty and staff will continue to participate in activities of Coastal Ocean Observing System (COOS) projects, including the Florida COOS, the Southeast Atlantic COOS and the Gulf of Mexico COOS. (Spranger/FSG Faculty).

1.2.6 Provide scientific, technical and planning expertise to the West Coast Inland Navigation District (WCIND) in support of its legislative mandate to maintain coastal waterways for safe navigation. (Swett/Coffin/D. Fann/Staugler)

1.2.7 Increase scientific, industry, agency and local government knowledge about waterway access and management issues, stewardship, and safe and sustainable boating by organizing and participating in symposia and conferences; producing publications; service on committees and advisory boards; and participation in workshops.
(Swett/Fluech/Watkins/Hazell/Mahan/Verlinde/Leonard)

1.2.8 Build international capacity on ocean observation systems through partnerships with NOAA's office of international programs and office of climate change. (Spranger/Fletcher/Hazell/Staugler)

Objective 3. Promote non-regulatory/incentive-based approaches to promote industry/agency partnerships, stewardship and smart community growth.

Planned Extension/Outreach/Communications Programming

1.3.1 Support the Clean Boating Partnership by working with local marinas, boatyards and retail sectors to enhance voluntary compliance with environmental best management practices (BMP's). (Spranger/Diller/Gregory/Hazell/Staugler/Verlinde/Creswell)

1.3.2 Promote smart growth concepts in community forums for energy conservation, green development practices and sustainable living. (Cameron/Saari/Mahan)

1.3.3 Develop programs and products that instill stewardship for Florida's waterways. (Swett/Fann/Staugler/Saari/Cameron/Verlinde).

Objective 4. Provide GIS training and learning opportunities for graduate students, university faculty and resource managers with a focus on waterway resource and management issues.

1.4.1 Offer GIS training to graduate students and professionals seeking to learn about GIS functionality and applications related to water resource planning and management. (Swett/Lindberg/Andreu/D. Fann)

Objective 5. Foster community decision-making processes that involve and balance the full-range of interests, to establish common understanding and consensus regarding complex coastal land use, development, public access, climate change and water resource planning.

1.5.1 Partner with the University of Florida's Natural Resource Leadership Institute (NRLI) in a pilot study to strengthen decision-making and consensus-building capacity to find common solutions to priority coastal planning issues. (Racevskis/Delaney/Havens/Sidman/Olson)

1.5.2 Participate in the NRLI program to enhance competencies related to public leadership and group facilitation skills. (Fluech)

Goal 2. Hazard-Resilient Communities

This goal seeks to improve the ability of coastal communities to identify risks and reduce losses of human life, property and coastal habitat from storms and natural hazards and increase the cost effectiveness of mitigation measures to improve community resiliency.

Objective 1. Improve prediction of the impacts of storms and community vulnerability to coastal storm events.

Planned Research Programming

1.1.1 *Evaluating Wave Transformation Impacts from Hurricanes*: Hurricane damage from waves and storm surge can be 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)

1.1.2 *Modeling Hurricane Storm Surge Impacts*: High resolution data on coastal flooding, collected by the USGS during recent hurricanes, will be used to fine-tune storm surge models for emergency managers and coastal planners. Accurate models can save lives and minimize economic losses from the tropical storms that impact our coasts. (Sheng/Davis/Sheremet: R/C-S/49)

Planned Extension/Outreach/Communications Programming

1.1.3 Participate in the Specialized Marine Action Response Team (SMART) program to respond to tropical storms and foster community and agency hurricane preparedness. (Spranger/Diller – all agents involved during/after storm events)

1.1.4 Increase citizen knowledge about hurricane preparedness through seminars, communication opportunities, radio shows, and distribution of materials at community events. (Spranger/Creswell/Cameron/Fluech/Verlinde/McGuire/Mahan/Diller)

Objective 2. Develop building products and construction standards to mitigate coastal storm impacts.

Planned Research Programming

2.2.1 *New Hurricane Resistant Building Materials*: As a part of the Gulf of Mexico Regional Research Project, engineers at Florida International University will develop and measure cost effectiveness of an advanced fiber support system that can be incorporated into new and existing buildings to increase their resistance to hurricanes. (Chowdhury/Simiu/Mirmiran: GOM/RP-1)

2.2.2 *New Building Standards for Hurricane Resistance:* Florida International University scientists also will evaluate the wind pressures that typically occur on coastal buildings during hurricanes, and identify how building codes can be improved to reduce hurricane damage to residences and businesses. (Chowdhury/Simiu/Mirmiran: R/C-D-18)

Planned Extension/Outreach/Communications Programming

2.2.3 Activities in this area will occur as needed and as opportunities arise for FSG to have a meaningful contribution.

Goal 3. Improve the ability of coastal communities to reduce risks to human life from natural coastal processes and environmental conditions.

Objective 1. Improve education and prediction techniques that prepare and warn coastal users of dangerous conditions.

Planned Research Programming

3.1.1 *Rip Current Characterization*: Field observations and computer models will be used by University of West Florida scientists to more accurately characterize rip currents along Pensacola Beach. Improved understanding of rip current behavior will allow better forecasts of conditions that are hazardous to swimmers. (Houser/Meyer-Arendt: R/C-S-50)

3.1.2 *Trap Fishery Storm Resiliency:* This research will attempt to determine the infrastructural characteristics of the Florida Key trap fisheries and associated waterfront communities concerning needs for storm damage assessment and resiliency. This study is being funded by the NOAA National Marine Fisheries Service. (Adams/Gregory/Shivlani/Murray)

Planned Extension/Outreach/Communications Programming

3.1.3 Increase citizen knowledge about water safety, beach and sun safety, rip currents, red tide and shark awareness through seminars, other communication opportunities and media events. (Cameron/Fluech/Verlinde/McGuire/Mahan/Saari/Stevely)

FOCUS AREA 3 – Healthy Coastal and Marine Ecosystems

Goal 1. Protect, restore and enhance coastal ecosystems.

Florida estuaries, where fresh water from the land meets saltwater from the sea, are characterized by enormous ecological, social and economic diversity. Most of the marine species that support Florida's multi-billion dollar fisheries depend on estuaries to complete their life cycle. Meanwhile, most of Florida's urbanization is taking place alongside estuaries, placing stress on the quality and quantity of these valuable habitats. The purposes of this goal area are to improve water quality and protect and restore coastal habitats, by increasing the information for science-based decision-making of resource managers and by empowering citizens to be good stewards of the environment.

Objective 1. Provide science-based information to decision-making that protects, restores and enhances coastal systems.

Planned Research Programming

1.1.1 *Rapid Fecal Test for Water Quality Monitoring:* 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 indicator 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 objective of this research is to develop portable sensor technology for rapid, sensitive and specific detection and quantification of entercocci 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)

1.1.2 *Creating Habitat from Marine Worms:* 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 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 will test the applicability of a marine byproduct to aid in the recovery and recruitment of worms and reef formation. (McCarthy: R/C-E-53-PD)

1.1.3 *Development Impacts Affecting Snook Productivity:* Effects of degraded coastal creek habitat on the survival of juvenile snook will be determined by scientists at Mote Marine Laboratory. Snook are a prized sport fish in Florida coastal waters, and understanding how land development affects their habitat is important to both survival of the species and the marine fishing-related economy. (Adams: R/C-E-54)

1.1.4 *Predicting Seagrass Changes in Florida Bay:* Scientists at Florida International University will predict and map changes in seagrass expected to occur in Florida Bay if there are changes in sea level, salinity and nutrient inputs. That information will help water managers successfully implement the Comprehensive Everglades Restoration Plan by guiding decisions about future water flows to the Bay. **(**Herbert/Fourqurean: R/C-E-55)

Planned Extension/Outreach/Communications Programming

1.1.5 Enhance and restore coastal and marine habitats (dunes, mangrove, oyster, reef, seagrass and turtle habitats) and water quality. (Verlinde/Hazell/Diller/Creswell)

1.1.6 Increase scientific, industry, agency and local government knowledge about water quality and marine ecosystem resources by organizing and participating in symposia, conferences, and trade meetings; producing publications; service on committees and advisory boards; and participation in workshops. (Mahan/Verlinde/Staugler/Hazell/Cameron/Fluech/Stevely/McGuire)

1.1.7 Educate elected officials, teachers and the public on environmental issues associated with invasive species. (Mahan/McGuire/Verlinde/Creswell)

Goal 2. Create a citizenry of all ages that is scientifically literate and environmentally engaged who act as stewards of the coastal environment.

Creating a scientifically and environmentally informed citizenry is essential as Floridians find an acceptable way to satisfy the demands for coastal resources while protecting their environmental integrity. This goal area seeks to instill an environmental ethic among Floridians of all ages through extension and outreach programming.

Objective 1. Provide formal K-12 education programming and informal learning opportunities to increase environmental and coastal science literacy among elementary, middle and high-school teachers and their students.

Planned Extension/Outreach/Communications Programming

2.1.1 Develop and teach marine environmental curriculum to educators and youth at schools, 4-H summer camps, and K-12 events/field trips. (McGuire/Verlinde/Saari/Staugler/Hazell/Cameron/Fluech/Diller/Creswell/Sweat)

2.1.2 Develop and implement annual formal and informal educator workshops as part of Coastal Gulf of Mexico Center for Ocean Science Education Excellence. (Spranger)

Objective 2. Increase marine environment and coastal science literacy of citizens through formal and informal communication and teaching/learning opportunities.

Planned Extension/Outreach/Communications Programming

2.2.1 Design and deliver a public education and outreach plan that uses new decision support tools to educate the public on natural systems and human impacts in South Florida. The study area will include the Everglades, Florida Bay and the Florida Keys. The program will focus on natural systems, their connections and how they respond to human activities. (Spranger/Fletcher: E/T-9)

2.2.2 Advise citizens of actions that they can take to reduce and monitor environmental/water quality impacts (pesticides and fertilizers), through consultations, seminars, communication opportunities and media events. (Mahan/McGuire/Verlinde/Staugler/Hazell/Fluech /Diller/Creswell/Fletcher/Leonard/Stevely)

2.2.3 Foster opportunities to develop teaching/learning facilities (marine education laboratories) in support of community marine education programs. (Verlinde)

2.2.4 Teach coastal modules for the Florida Master Naturalist Program. (Hazell/Fluech/Diller/Leonard)

Objective 3. Promote citizen involvement in the protection, restoration, and enhancement of coastal ecosystems and habitats, including volunteer-based monitoring, clean-ups, restoration projects and use of best management practices.

Planned Extension/Outreach/Communications Programming

2.3.1 Increase citizen knowledge about human impacts to coastal and marine resources and habitats (stormwater runoff) and interventions by organizing and developing programs and short courses for adult education, and by organizing citizen involvement in beach and waterway community clean-ups and restoration projects (oyster reefs) to enhance coastal ecosystems. (Verlinde/Staugler/Hazell/Cameron/Diller/Creswell)

2.3.2 Expand the scope and increase citizens' understanding of the importance of monofilament recycling programs, and increase citizens' use of recycling devices through extension and outreach.
(Fluech/McGuire/Verlinde/Staugler/Hazell/Fluech/Diller/Creswell/McGuire/Cameron)

FOCUS AREA 4 – Climate Change: Impacts and Adaptations

Climate change has the potential to significantly impact Florida's coastal communities and its coastal and marine ecosystems. NOAA recently has recognized climate change as a critical area for research and extension, the State of Florida has recently formed a Climate Task Force to provide recommendations to the Governor, and major metropolitan areas now are developing plans on how to adapt to such things as rising sea level. Florida Sea Grant can play a major role in providing the research, extension and education necessary to better inform citizens and local governments regarding the probable impacts of climate change and the suite of adaptations that can minimize impacts on both society and natural coastal and marine ecosystems. Therefore climate change will be a fourth goal area in the 2009-2013 FSG Strategic Plan. Specific objectives and activities will be identified at the September 2008 strategic planning workshop, and then implemented in research, extension and education programs in subsequent years.

PROGRAM MANAGEMENT

During 2008 the Director and associate directors will lead activities to support the mission of Florida Sea Grant and ensure that its resources are used in a manner that effectively addresses the critical issues facing Florida's coastal communities and marine resources. The management activities will reinforce the program's commitment to excellence, accountability, partnerships and connection with users identified in the introduction to this plan of work.

1. Strategic Planning

During 2008, the FSG Strategic Plan for 2009-2013 will be developed in a manner that provides considerable opportunity for stakeholder input; actively identifies synergies with ongoing activities being conducted by state and federal agencies, institutes and the private sector; and strengthens the working relationship among members of the statewide FSG program, particularly strengthening the research-extension link.

1.1 *Stakeholder Survey* – To obtain input from informed citizens regarding their views on top priority coastal and marine issues, a survey will be conducted targeting over 2,000 persons including: (1) members of the advisory councils of all FSG marine agents; (2) alumni of the Florida Coastal Master Naturalist program; and (3) alumni of the University of Florida Natural Resources Leadership Institute (NRLI). The survey respondents will rate a suite of pre-identified coastal issues and have the opportunity to write in additional priority issues. This information will help guide the major outcomes and activities to be identified at a strategic planning workshop (item 1.4).

1.2 *Development of Programmatic Focus Areas* – FSG currently has nine major focus areas that were developed during strategic planning in 2005. New focus areas will be developed in 2008 based on results of the stakeholder survey, advisement by FSG extension faculty, careful consideration of program capacity and emerging issues of substantive importance to Florida, and consideration of effective alignment with regional and national plans. At this time the directors have identified four major focus areas for the 2009-2013 FSG Strategic Plan: Seafood Production and Safety; Sustainable and Hazard-Resilient Coastal Communities; Healthy Coastal and Marine Ecosystems; and Climate Change: Impacts and Adaptations. As has been the case in the past, research, education, extension, communications and decision-making support will cross-cut all of these areas.

1.3 *SWOT Analysis* – The Director will develop a draft analysis of program Strengths, Weaknesses, Opportunities and Threats (SWOT) and lead a focus session with extension specialists to identify and prioritize actions that would make weaknesses and threats into opportunities (and ultimately strengths). This exercise is considered a foundational part of strategic program management.

1.4 *Strategic Planning Workshop* – In September 2008 a two-day strategic planning workshop will be held in St. Petersburg to identify the priority outcomes and associated research, and education and extension activities within each major focus area. The workshop will include all of the FSG marine agents, extension specialists, directors and campus coordinators, to provide an opportunity for all members of the program to contribute to the plan development and gain a better understanding of their role in the program. The workshop also will include representatives from state and federal agencies working on coastal and marine issues in Florida, as well as technical experts and major stakeholders for each focus area. Representatives from the National Sea Grant Office (NSGO) and from the two regional research planning teams—

Gulf of Mexico (GOM) and Southeast Atlantic (SEA)—will participate, to assist FSG in developing a plan that while being primarily driven by Florida issues, also is supportive of regional and national priorities.

2. Strategic Program Management

To have significant impacts on the issues affecting Florida's coastal communities and marine resources, the FSG program must be strategically managed, and a concerted effort must be made to garner additional funding beyond that provided by the NSGO and the host institute UF. Following development of the 2009 – 2013 FSG Strategic Plan, and in consultation with its Advisory Council (see item 3), FSG will identify a limited number of targeted research areas to focus on in its January 2009 Request for Proposals – areas where FSG can have a significant impact with sustained funding over the next four-year strategic planning horizon. Revised guidelines for research projects will be developed this year that will strengthen the requirement that projects have clearly defined and funded extension/outreach components with specific information on how results will contribute to the outcomes identified in the new strategic plan. While quality of science will remain the top priority for selecting research projects, greater emphasis will be placed on their potential to solve important societal and/or marine resource issues. This year the directors also will work with IT experts to create a more user-friendly Web interface both for proposal submission and peer review. The Director will pursue opportunities for public-private partnerships to support FSG research, education and/or extension. He will also pursue additional endowments to support critical program areas, and work with faculty and agents to obtain the resources required to effectively carry out the program mission.

3. FSG Advisory Council

Florida Sea Grant has an outstanding history of being responsive to the needs of coastal citizens. This is exemplified by the fact that every FSG marine agent has an advisory council to provide feedback and recommendations regarding the agent's activities. Given the serious issues that are facing Florida's coasts, including but not limited to reduced water flow to estuaries, harmful algal blooms, hurricane impacts to coastal communities and reduced stocks of fish, it is critical that the program as a whole have an advisory council that is passionate about the program and can assist the Director in obtaining the resources necessary to help address the challenges facing coastal Florida. This council will be formed in late 2008, following the strategic planning workshop.

4. Maintaining Program Connectivity

Florida Sea Grant is highly effective because of its people, including the 18 marine agents who serve Florida's coastal counties, 9 extension specialists who are nationally-and internationally-recognized experts in their fields, a 'virtual faculty' of more than 800 persons located at 16 public and private universities and two research laboratories, and campus coordinators at those institutions who serve as liaisons between the FSG Director and the faculty. During 2008 the Director and associate directors will conduct activities to support the continued engagement of these persons with the program, including the Director meeting with marine agents and their advisory councils on an approximately bi-annual basis, and meetings of the Associate Director for Research with campus coordinators at approximately the same frequency. The Associate Director for Extension will continue his long-standing record of regularly interacting with the marine agents and extension specialists and will lead the yearly retreat with those program staff in fall 2008.

5. Supporting Regional Partnerships

The Director, associate directors and extension specialists will continue to be actively engaged with state and regional working groups, councils and other organizations that support coastal and marine

research, education and extension/outreach, including but not limited to: the Florida Oceans and Coastal Council (Director – appointed council member), the Florida Ocean Alliance (Director – member of the board of directors), the Gulf of Mexico (GOM) and Southeast Atlantic (SEA) Coastal Ocean Observing Systems (Associate Director for Extension – Board of Directors and voting member), the GOM Extension, Education and Outreach pilot study (Director – member of leadership team), and the GOM and SEA Regional Research Plans (Director – member of the leadership teams). During 2008 the Director and Associate Director for Research will work with faculty and staff from the UF Natural Resources Leadership Institute to develop a model for training experts in coastal issue resolution across the Gulf of Mexico and Caribbean, conduct at least one pilot issue resolution forum in a Florida Gulf community, and develop a full proposal for a GOM-Caribbean-wide scoping study to be presented to the NSGO for cost-sharing with FSG in 2009.

6. Aligning with National Priorities

In fall 2008 the Director will develop an 'alignment memo' that identifies how the goals, objectives and activities of Florida Sea Grant will support priorities identified in the national strategic plan during the 2009-2013 planning horizon. The Associate Director for Extension, Mike Spranger and the program leader for Seafood Safety and Technology, Steve Otwell, are serving as appointed members to national Sea Grant focus teams, and this will substantively facilitate alignment in the areas of sustainable coastal communities, and safe and sustainable seafood, respectively.

7. Strengthening Program Visibility

During 2008 the Director, associate directors and Communications Director will conduct a variety of activities to ensure that the impacts of Florida Sea Grant, the NSGO and UF/IFAS are clearly recognized at the university, state and national levels. The most critical piece of program visibility occurs via the almost daily interactions between FSG marine agents and extension specialists with our coastal and marine stakeholders. The Associate Director for Extension will continue to work with the agents and specialists to identify and implement actions that will facilitate those successful interactions and ensure that FSG is recognized in cases where it has a substantive impact. The directors will continue to represent FSG at major events such as Florida Oceans Day, as well as local and regional events where the program impacts can be showcased. The directors will annually visit the offices of every Florida congressional representative in Washington, D.C. and will conduct follow-up visits to selected congressional offices in Florida during months when Congress is not in session to keep our elected officials apprised of the impacts and upcoming activities of FSG and NSGO programs. In 2008, FSG will develop a special publication that summarizes the work that has been supported over the past five years related to coastal hazards and make it available in hard copy and electronic format. This will be the first in a series of yearly publications focused on specific issues of concern for coastal Florida. The Director will continue to inform faculty at the 16 participating institutions about major program events and funding opportunities with a quarterly E-newsletter, and he will develop a summary of major program impacts for yearly updates of the program Web site and for distribution to the NSGO and NOAA leadership. Locally, FSG will develop and implement Web-based informational spots on the myUFL Web portal (the web page where all UF employees go to view their paychecks and benefits, and where program leaders go to do online approvals), showcasing information such as rip current awareness that is of value to the employees of the University.

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.

Karl E. Havens
Director
khavens@ufl.edu

Michael Spranger
Associate Director
for Extension and Education
spranger@ufl.edu

Charles Sidman
Associate Director
for Research
csidman@ufl.edu

Steve Kearl
Communications Director
skearl@ufl.edu

Edwin Harvey
Assistant Director
for Program Services
ejh@ufl.edu

Sea Grant
Florida

Florida Sea Grant College Program
Bldg 803 McCarty Drive
PO Box 110400
Gainesville, Fl 32611-0400
(352) 392-5870 | (352) 392-5113 (fax)
www.flseagrant.org