

Science Serving Florida's Coast

**Florida Sea Grant
College Program
Year 2007
Work Plan**

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

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

Florida's citizens, industries and governments

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WORK PLAN 2007

FLORIDA SEA GRANT COLLEGE PROGRAM

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Introduction

The Florida Sea Grant College Program is committed to enhancing the practical use and development of coastal and marine resources while at the same time creating a sustainable economy and environment. Florida Sea Grant's Strategic Plan sets the four-year stage for program priorities. A competitive research proposal process selects two-year projects twice within the period and program areas are enhanced with additional projects funded through national competitions and other sources of funding. Detailed, peer-reviewed proposals are developed every four years for Extension, Communications and Management activities and they are updated at the middle of the four-year period. An Implementation Plan¹ is developed each two years and detailed work plans and progress reports² are written annually. This is the work plan for 2007.

The Florida Sea Grant cycle of strategic planning, implementation of two-year activities, development of a detailed annual work plan and reporting on annual progress is shown in the table on the next page. Florida Sea Grant's Strategic Plan addresses issues that are important both nationally and in Florida, and reflects the input of hundreds of Floridians representing academia, government, industry and citizens. This 2007 Work Plan defines specific tasks to be carried out under the Florida Sea Grant Strategic Plan: 2006-09. Florida Sea Grant is hosted by the University of Florida, the state's Land Grant University. This allows Florida Sea Grant priorities to consider land-based actions that affect the coast, activities along the shoreline, bays and estuaries, and ocean priorities in planning its research, education and extension goals.

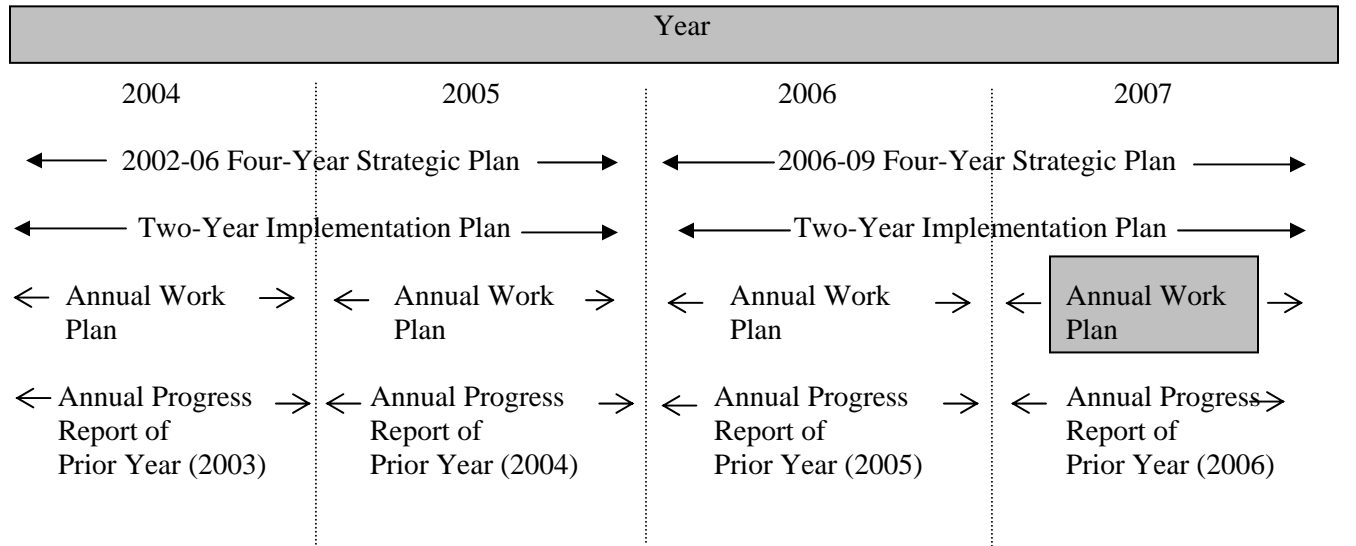
Every Florida Sea Grant activity outlined in this work plan satisfies three simple but tough criteria: 1) it is based on a strong rationale; 2) it demonstrates scientific or educational merit; and 3) it will produce results that are clearly useful and applicable in industry, management or science. A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

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 Website, www.flseagrant.org.

programs. It is also used to build public and private support for Florida Sea Grant; 5) **Partnerships**; Faculty, students, and citizens all benefit when functioning in a partnership mode. Scientific results and education projects reach greater success levels and are implemented when partners, from agencies to businesses, provide financial support to an activity. Greater emphasis will be placed on developing partnerships.

The following table shows the 2007 Work Plan in the context of the Florida Sea Grant four-year cycle strategic plan, implementation plan and annual work plan.



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

Economic Leadership

Goal 1: Biotechnology: Use Marine Biotechnology to Create and Enhance Products and Processes from Florida's Coastal Resources

- 1.1 Nemertines and sponges produce pyridyl alkaloids that affect barnacle larvae. The goal is to develop single analogs of pyridyls that can be economically synthesized and could be practical antifouling additives for marine paints that are less harmful to the marine environment than currently used paint additives. (Kem/Soti: R/LR-MB-20)
- 1.2 Conopeptides are powerful neuropharmacological agents that can be used for a wide variety of applications. A new class of conopeptides from snails has been discovered and the goal is to carry out extensive biological assays geared towards the evaluation of these new compounds as potential for therapeutic agents. (Mari/Fields: R/LR-MB-21)
- 1.3 The overall goal of this project is to discover new natural products from Florida benthic marine cyanobacteria that will be useful as drugs in the treatment of human disease. 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, and this project will be the first systematic approach to studying benthic cyanobacteria from Florida coastal waters for biotechnological applications. (Paul, V./Ross/West/Luesch: R/LR-MB-22)
- 1.4 The goal is to provide 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. (2008) (Lopez: R/LR-MB-23)
- 1.5 Lack of supply has hampered the development of many marine natural products. The aim of the project is to purify the native terpene synthase leading to eleutherobin and clone the corresponding gene. The long-term goal is to develop a commercially relevant production method of eleutherobin combining recombinant technology with chemical synthesis. (2008) (Kerr: R/LR-MB-24)

Goal 2: Fisheries: Create and Teach Production and Management Techniques That Make Fisheries Sustainable and Competitive

- 2.1 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: SGEF-13-FE-C)
- 2.2 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. 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)
- 2.3 Many fisheries scientists throughout the southeast U.S. have been using passive acoustics to identify spawning habitat of sound-producing fishes. 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 seatrout, where issues such as egg transport and egg identification may be more difficult. (2008) (Mann: R/LR-B-58)
- 2.4 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. This study 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. (2008) (Patterson/McBride/Allman: R/LR-B-59)
- 2.5 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. (2008) (Shivji: R/LR-B-60)
- 2.6 Continue to serve on the Scientific and Statistical Committee of the Gulf of Mexico Regional Fisheries Management Council. (Adams)
- 2.7 Continue to develop educational programs designed to focus on the benefits associated with the use of fish venting tools. Will travel to Oregon in spring 2007 to present seminar on the topic and engage in field work with venting tools (Adams w/Stevely and Sweat).
- 2.8 Continue to serve as the Florida representative on the Southeast Regional Fisheries Extension Enhancement Committee. (Adams)
- 2.9 Develop 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. Inventory of studies will take place in 2007. Brochure will be developed in 2008. (2007-08: Adams, Stevely, Simoniello).

- 2.10 Conduct a hands-on training session on the use of various methods to reduce release mortality in recreationally caught fish at the annual Florida Sea Grant Extension meeting that will be held in Cedar Key, Florida in October, 2007. (Adams)
- 2.11 Conduct workshop for state fishery managers from Florida, Georgia, South Carolina and North Carolina at the Waddell Mariculture Lab in January, 2007. The workshop will focus on current fisheries management issues and research needs common to the states within the region (Adams w/Von Harten, Baker, and Liqori).
- 2.12 Assess the economic impact of the commercial fishing/seafood industry on the Atlantic coast of Florida to the state economy (NMFS proposal pending) (Adams w/Stevens and Mulkey).
- 2.13 Develop a storm damage assessment/projection methodology for the trap fisheries in the Florida Keys (NMFS proposal pending) (Adams w/Gregory, Shivilani, and Murray).
- 2.14 Begin FWC/WCIND-funded study to determine 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-Pinellas Counties region (Adams w/Larkin, Sidman, and Swett).
- 2.15 Conduct ethical angling workshops/displays and teach at least 50 fishermen the importance of venting fish, using circle hooks, proper handling skills, and proper length measurements. (Cameron)
- 2.16 Continue to increase awareness of fisheries management regulations through the exchange of information among non-governmental agencies, governmental agencies, local media, and the fishing community. (Cameron)
- 2.17 Conduct educational programs to the public and provide assistance on methods of deployment and maintenance of artificial reefs and continue to work towards the development of an artificial reef program in Bay County. (Cameron)
- 2.18 Conduct kids fishing clinics with local agencies and businesses to increase the number of youth getting involved in fishing and other outdoor activities. (Cameron)
- 2.19 Promulgate and distribute the 58th Proceedings of the Gulf and Caribbean Fisheries Institute and disseminate it to members, libraries, universities, and computer databases. (Creswell)
- 2.20 Serve as chairman of the Steering and Program Committees for the 60th Gulf and Caribbean Fisheries Institute and publish its Book of Abstracts. (Creswell)
- 2.21 Conduct two-day youth fishing tournament. (Creswell)
- 2.22 Conduct educational programs for the public and provide assistance to the Escambia County Marine Resource Division in the monitoring, maintenance, and development of artificial reefs off the northwest Florida coastline. (Diller)
- 2.23 Conduct fish survival workshops for recreational fishermen, charter boat operators, and fishing tournament organizations that address such topics as fish venting, circle hooks, proper handling and release, and fishery management issues. (Diller)
- 2.24 Conduct at least 3 youth fishing camps/ clinic with local agencies, 4-H clubs in order to increase the number of youth involved in fishing. (Fluech)

- 2.25 Educate at least 100 anglers about circle hooks, proper fish handling, venting tools, and fishing regulations through printed materials, workshops and displays. (Fluech)
- 2.26 Assist state specialists with a charter captain artificial reef needs assessment. (Fluech)
- 2.27 Assist Rookery Bay NERR staff with their monthly fish monitoring project. (Fluech)
- 2.28 Coordinate with Richard Makopondo to conduct a series of focus groups to address multicultural fisheries issues with Hispanic ethnic groups in Collier County. (Fluech)
- 2.29 Develop a pilot project that will explore links of communication of recreational fishing information with the non-English speaking community. The contacts will be initially with church groups and teen-aged individuals. It is hoped that establishing an effective dialogue with these groups will open avenues of communication with larger user groups in the region. The topic areas may include seafood safety, current regulations, and others. The results of this initial effort will be reported at the Annual FSG Extension Meeting in Cedar Key. (Fluech).
- 2.30 Continue providing scientific advice to the various fishery regulatory agencies through participation on advisory panels and testimony at public hearings. (Gregory)
- 2.31 Empower the Florida Keys Commercial Fisherman's Association to conduct the Florida Keys Seafood Festival in Key West largely with their own resources and with Extension in more of an advisory role rather than a full partnership role as was the case for the 2006 and 2007 events. This will allow more time for developing an educational component to this now successful public event. (Gregory)
- 2.32 Assist the local fishing industry, county planners, and interested public with workshops, meetings and research to provide waterfront management with the aim of maintaining a sustainable level of waterfront access for the commercial fishing industry. (Gregory)
- 2.33 Explore continuation of the REDStart Fisheries Enhancement Program as a research facility that will be utilized by Florida Gulf Coast University, US Fish and Wildlife Service and Sanibel-Captiva Conservation Foundation. (Hazell)
- 2.34 Develop Release Methods/Techniques Kit for distribution to all FSG field agents and interested specialists. This would be in addition to the table-top displays already available. The kit would include examples of venting tools, rapid release tools, circle hooks, brochures, cards, and CDs. (Kearl, Fluech, Adams).
- 2.35 Develop an EDIS article from the existing FSG Venting Tool Brochure. Completing this task will make the information more available to interested individuals via the internet. (2007: Stevely, Adams, Kearl, Zimmerman).
- 2.36 Develop a Release Methods Video in conjunction with Mote Marine Lab staff. The video will be available on the FSG Website and available on a DVD by request. The video may also be used in developing PSA's or other outreach materials to provide education on venting and other release methods. (Kearl, Sweat, Fluech).
- 2.36 Develop and conduct fish identification classes for anglers and interested citizens in Brevard County. (Leonard).
- 2.37 Contribute to the enhancement of artificial reef science, technology and use in Florida. Lead program activities related to the Steinhatchee Fisheries Management Area and to the development

of artificial reef BMPs, and to provide expertise to county and multi-county reef extension programs. Planned activities include: (Lindberg)

- 2.37.1 In partnership with FWC and local interests, (a) initiate funding requests for Phase II construction of the Steinhatchee Fisheries Management Area (SFMA), (b) continue to provide up-to-date SFMA information to the Taylor County Sea Grant Extension Agent for dissemination through the county program, and (c) design placement strategies for the Levy and Dixie County development of the SFMA area zoned for fishing reefs.
- 2.37.2 A proposal for SFMA Phase II construction was prepared, submitted and approved for \$256,000 in Florida FY 2007-2008, with a commitment by FWC to partner directly with the University and FSGE in this development and to continue funding in subsequent years until the SFMA construction is completed.
- 2.37.3 Communication of SFMA information and coordination of related extension programs within Taylor County will be enhanced when SG Extension Agent position is refilled. The placement strategy for SFMA fishing reefs has been developed and communicated to the Taylor County Extension Director, who is overseeing the construction contract from FWC for the first placements of fishing reefs.
- 2.38 In partnership with FWC, convene an internal science colloquium for its staff in July 2007, with Lindberg and other researchers invited to present and debate these issues. The result will be more knowledgeable staff focused on directing program investments to fill critical gaps and reduce uncertainties. (Lindberg)
- 2.39 Plan for regional artificial reef workshops. These workshops will be coordinated by FSG Extension faculty and based on regional needs of county artificial reef coordinators. (Ongoing: Stevely, Sweat, Cameron, Sweat, Lindberg)
- 2.40 Develop an “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. (Lindberg)
- 2.41 Provide one-on-one consultations to seafood processors, harvesters and retailers on seafood related topics. (Mahan)
- 2.42 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. (Mahan)
- 2.43 Provide technical support to the Franklin County Seafood Industry Taskforce on fisheries and Apalachicola Bay management issues. (Mahan)
- 2.44 Provide technical information to the Franklin County Board of County Commissioners on local, state, and Gulf of Mexico fisheries management issues. (Mahan)
- 2.45 Work as the appointed liaison between and to be the Franklin County Board of County Commissioners and the Florida Department of Agriculture & Consumer Services and other regulatory state and federal agencies on Apalachicola Bay fisheries and environmental management issues. (Mahan)
- 2.46 Work with FL State University faculty & staff to educate commercial and recreational fishermen about fisheries management issues. (Mahan)

- 2.47 The capability of organizations and technical staff concerned with coastal fisheries to utilize artificial reefs will be enhanced through development of an 2007 International program on artificial reefs will be held in Spain in 2007. (Seaman)
- 2.48 Determine the availability of marine fisheries-related citation incidence data by ethnic group. If available, this information may provide some guidance regarding the most needed educational information for these ethnic groups. (Simoniello).
- 2.49 Conduct “Proof of Concept” on the usefulness of available sea surface data for the for-hire and offshore anglers in two regions of Florida: 1) Broward-Dade Counties and 2) Tampa Bay area. Informal meetings and sessions will be conducted to determine demand for the information currently available. The differing informational demands of the two types of anglers will help determine the efficacy of developing educational efforts utilizing this information. The educational effort will be a part of the overall sustainable recreational fishing program and will help anglers understand the impact of potential increased fishing effort (via the use of ocean data as a means to reduce search time) on regional fisheries management efforts. (2007-08 Simoniello)
- 2.50 Evaluate utility of data buoy deployed on the West Florida Shelf in 2006 that is coupling physical oceanographic data with fisheries data test deployment. (Simoniello)
- 2.51 Work with FSG Extension faculty, SEACOOS researchers and National Weather Service Forecasting Offices to develop pilot oceanographic maps and real-time data websites that provide timely information to recreational fisheries. (Simoniello)
- 2.52 Continue evaluation of sponge population recovery in Florida Keys following a widespread mortality. Project funded by Florida Fish and Wildlife Commission. A final report was submitted to FWC in fall, 2006. It is anticipated a new rule by FWC to expand sponge grounds and change regulations to require cutting sponge will occur in 2007. (Stevely)
- 2.53 Enhance artificial reef habitat in Charlotte County. (Staugler)
- 2.53.1 Identify site for a new Charlotte County artificial reef.
- 2.53.2 Enhance existing reefs in need of materials as money allows.
- 2.53.3 Educate resource users of reef locations and proper etiquette for using reef resources through the Boating and Angling Guide to Charlotte Harbor, and through the development of a Charlotte County Artificial Reef brochure and local Sea Grant extension website.
- 2.53.4 Develop artificial reef cleanup and treasure hunt event as an educational tool and fundraiser.
- 2.53.5 Continue to work on seven county socioeconomic study of SW Florida artificial reefs
- 2.54 Participate in the planning and implementation of the Kids Cup Redfish Tournament (Staugler)
- 2.55 Continue to work cooperatively with the FWC fisheries independent monitoring program with their monthly fisheries. (Staugler)
- 2.56 Serve clients with educational programming (workshops, seminars, presentations and publications) relating to seafood safety, coastal zone management and sport fishing. Will continue restoration effort programming with sponge, scallop and oyster reefs. (Sweat)

- 2.57 Provide fish survival information and ethical angling information for recreational fishermen and youth. (Verlinde)
- 2.58 Coordinate the Santa Rosa County FY 2007-2008 FWCC artificial reef monitoring proposal application. (Verlinde)
- 2.59 Create a Recreational Work Action Team (WAT) that will have responsibility to conduct specific training activities in various parts of the state. This core group will be of particular value to FSGE agents who do not have expertise in fisheries. Discussion and implementation of this WAT will take place at the fall annual FSGE meeting in Cedar Key. (All)

Goal 3: Aquaculture: Develop the Food and Hobby Segments of Florida's Marine Aquaculture Industry

- 3.1 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 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. (Turingen/Creswell/Gaines: R/LR-A-41PD)
- 3.2 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. (2008) (Scarpa/Baker/Sturmer/Adams: R/LR-A-39)
- 3.3 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. (2008) (Turingen/Creswell/Gaines: R/LR-A-43)
- 3.4 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. (2008) (Scarpa/Sturmer/Creswell: R/LR-A-44)
- 3.5 Continue working on NSG-funded study with U. Connecticut concerning the economic feasibility of bio-fouling control for commercial shellfish culture operations. Study will address the efficacy of two different control methods. (Adams)
- 3.6 Continue to work with Mote Marine Aquaculture Park on the FWC/ARC-funded study concerning the feasibility of pompano culture in Florida. The study will address the economic feasibility of culturing pompano fingerlings utilizing a recirculation system and feeding regimen developed by Mote Marine Lab. (Adams)
- 3.7 Assist Mote Marine Aquaculture Park in addressing the economic feasibility of several marine finfish and crustacean species. Mote has requested that UF/FRED assist in future research on candidate species with on-going assistance in the form of a post-doc or other support. (Adams)
- 3.8 Give presentation at Aquaculture 2007 in San Antonio on the economic feasibility of low cost, small-scale, inland, freshwater shrimp culture in Florida. Presentation will address a hypothetical system developed by FSG and the UF Tropical Aquaculture Research Lab. (Adams)
- 3.9 Continue assisting Leslie Sturmer on various aspects of the hard clam culture industry as related to economics, marketing, and community impact. (Adams)

- 3.10 Continue working on the FSG-funded triploid hard clam study (w/ Leslie Sturmer, Shirley Baker, and John Scarpa). Will focus on identifying the costs associated with producing triploid seed and the required grow-out production needed to cover those costs. (Adams)
- 3.11 Continue working on the FSG-funded sunray venus clam culture project (w/ Leslie Sturmer and John Scarpa). Will focus on the financial characteristics of the grow-out component of the culture process. (Adams)
- 3.12 Continue serving as Chair of FRED MS student, Jennifer Clarke, as she works toward completing her thesis work on the economic feasibility of utilizing shrimp culture as an alternative/complementary enterprise for south Florida citrus growers. (Adams)
- 3.13 Continue to serve as the FSG representative on the FWC Aquaculture Interagency Coordinating Committee. (Adams)
- 3.14 Continue to serve on the Aquaculture Sub-committee of the Florida Oceans and Coastal Resources Council. (Adams)
- 3.15 Develop a series of two-page fact sheets on potential aquaculture species in Florida. (Creswell, Ohs)
- 3.16 Conduct at least six radio broadcasts (30 minutes each) dedicated to aquaculture topics. (Creswell)
- 3.17 Present at least one ½ day workshop on the potential for baitfish/shrimp aquaculture in Florida. (Creswell/Ohs)
- 3.18 Promulgate a manual for the aquaculture of ponderous arks and blood arks from hatchery through harvest. (Creswell, Sturmer, Nunez, Baker)
- 3.19 In collaboration with UF aquaculture specialist L. Sturmer and Dr. J. Scarpa of Harbor Branch Oceanographic Institution, develop and demonstrate the aquaculture potential of the sunray venus clam, *Macrocollista minbosa*, as a alternative species for Florida's hard clam industry. The results of this work will be presented at the World Aquaculture Society annual staff meeting and through professional and trade publications in 2007. (Creswell)
- 3.20 Serve as a liaison between state aquaculture specialist and local clam farmers to promote the clam industry in Collier County. (Fluech)
- 3.21 Develop and deliver workshops on "basic pond problems" and "stocking of ponds" for the Brevard County Master Gardeners. (Leonard).
- 3.22 Assist with providing technical assistance to the clam industry in Brevard County. (Leonard)
- 3.23 Provide one-on-one consultations to individuals interested in freshwater and/or marine aquaculture. (Mahan)
- 3.24 Work with the FL Department of Agriculture & Consumer Services' 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. (Mahan)
- 3.25 Work with Leslie Sturmer (FL Shellfish Aquaculture Agent) to provided technical support to the 46 clam aquaculture lease holders working in Alligator Harbor. (Mahan)

- 3.26 Develop a EDIS publication on “Recommendations for Ornamental Aquaculture Production Facility Emergency Preparedness.” (Martinez)
- 3.27 Continue work with the Polk county Sheriff’s Training and Respect Program (STAR), formally known as The Bartow Boot camp. Expand the aquaculture program which has shown success in the raising of red drum to explore feasibility of the grow-out of Barramundi. (Martinez).
- 3.28 Continue conducting regional seminar series on marine ornamental throughout South and Central regions of Florida (Martinez)
- 3.29 Host the “focus on aquaculture commodities” IFAS Extension In-service Training at the Tropical Aquaculture Laboratory in Ruskin. This IST will provide technical support, training, and information on marine ornamentals. (Martinez).
- 3.30 Collaborate with researchers at North Carolina State University in developing a multi-state “induced spawning workshop. (Martinez)
- 3.31 Participate in the regional small farms conference that will be held at the IFAS Mid-Florida Research and Education Center in Apopka. (Martinez).
- 3.32 Continue 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. (Martinez)
- 3.33 Establish, coordinate and provide training for Lee and Charlotte County clam farmers impacted by hurricanes. It is anticipated that 44 growers will receive 30,000 seeds in Spring 2007 to rebuild their businesses. Educational signs on clam farming will also be displayed. (Sturmer)
- 3.34 Increase the scientific, industry and agency knowledge about Florida clam aquaculture through participation at regional and national conference. (Sturmer)
- 3.35 Establish, coordinate and provide training and technical assistance in counties where clam farming is ongoing. Counties involved include Levy, Dixie, Charlotte, Lee, Brevard, St. Lucie, Indian River and Franklin. (Sturmer)
- 3.36 With funding through a USDA special research grant, put together a team of researchers and submitted a proposal to evaluate the use of stock hybridization for improving clam production and to assess the soil characteristics of lease areas. This applied research project will begin in 2007. (Sturmer)
- 3.37 Continue evaluate the production and processing for alternative techniques and alternative species of clams for Florida clam growers. (Sturmer)
- 3.38 Provide statewide service to clam grower associations and state agencies. (Sturmer/Adams)
- 3.39 Provide easy access to up-to-date information on shellfish aquaculture in Florida through website, quarterly newsletter and fact sheets. (Sturmer)
- 3.40 Maintain 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 the clam farmers. (Sturmer)
- 3.41 Provide aquaculture consultations and shrimp pond assistance throughout South Central region. (Sweat)

Goal 4: Seafood Safety: Improve the Product Quality and Safety of Florida's Seafood Products

- 4.1 The goal of this work is to define genetic elements that regulate the on/off switching involved in the phase variation from virulent to avirulent forms of *V. vulnificus*. Preliminary data have identified phase variable genes within the capsular polysaccharide (CPS) operon, and these mechanisms and others will be investigated for application to intervention strategies to reduce risk of oyster consumption and also for virulence-specific gene probes and/or molecular typing. (Wright: R/LR-Q-27)
- 4.2 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 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. (2008) (Otwell: R/LR-Q-28)
- 4.3 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 VAP and PHP oyster products and 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. (2008) (Jamison: R/LR-Q-29)
- 4.4 The FDA recently mandated validation and verification protocols for oysters that quantify *V. 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. (2008) (Wright/Rodrick: R/LR-Q-30)
- 4.5 Science-based direction, that supports and augments current research directed at developing and implementing educational and outreach programs, is needed to better inform consumers of the potential risks associated with *Vibrio vulnificus*. Researchers will develop methodology and determine consumer behavior toward seafood safety information across different media sources. Consumer responses will be measured and their relative impact on consumer behavior quantified. (2008) (Morgan/Huth/Martin: R/LR-E-19-PD)

- 4.6 The possibility, extent and quantification of “color enhancement” data using carbon monoxide is non-existent. 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. (2008) (Balaban/Kristinsson/Otwell: R/LR-Q-31)
- 4.7 Continue work with Steve Otwell (FSG Seafood Specialist) on USDA CREES Grants to develop and certify post-harvest processing techniques to reduce that number of *Vibrio vulnificus* bacteria to non-detectable levels in Post-Harvest-Processed oysters. (Mahan)
- 4.8 Work with Steve Otwell (FSG Seafood Specialist) to provide technical assistance to Florida’s oyster industry as it works to develop management strategies to address concerns that the US Food & Drug Administration and the Interstate Shellfish Sanitation Conference have about *Vibrio parahaemolyticus* and reducing the number of illnesses caused by this bacteria. (Mahan)
- 4.9 Attend the 2007 Interstate Shellfish Sanitation Conference’s Biennial Meeting in Albuquerque, New Mexico. (Mahan)
- 4.10 Work with Steve Otwell (FSG Seafood Specialist) to plan, organize, and teach the first “Oyster School” to target major oyster retailers in the US to teach them about oyster safety, product forms, Post-Harvest Processing, storage, and marketing. (Mahan)
- 4.11 Continue membership in the Interstate Shellfish Sanitation Conference and continue to work on assigned committees to address state and national shellfish issues. Current committee assignments are; *Vibrio* Education Subcommittee, Education Committee, and Biotxin Committee. (Mahan)
- 4.12 Continue work on the FL Department of Agriculture and Consumer Service’s *Vibrio vulnificus* Illness Reduction Workgroup. (Mahan)
- 4.13 Provide one-on-one consultations to individuals and small groups of processors, harvesters and retailers about seafood safety issues and topics. (Mahan)
- 4.14 Conduct second Annual “Certification School” for Cooked Shrimp Processors in Feb 2007 in conjunction with the Laitram Equipment Corp (New Orleans) for domestic and other processing operation about the work cooking both warm and cold water species. (Otwell)
- 4.15 Initiate First Annual “Shrimp Product Development School” in conjunction with the National Shrimp Industry Association in Orlando, April 2007. (Otwell)
- 4.16 Conduct annual International Shrimp School. (Otwell)
- 4.17 Update and maintain inventory for all seafood HACCP education materials in support of four nationwide HACCP and AFDO training workshops. (Otwell)
- 4.19 Direct and maintain the National Seafood HACCP Alliance for Seafood Safety and Education.
- 4.20 Plan and conduct a series of Seafood HACCP Update sessions about the nation to orient trainers and users per new regulatory mandates and changes in HACCP requirements. (Otwell)
- 4.21 Continue in leadership and advisory positions with number of seafood technology organizations. (Otwell)

- 4.21.1 Seafood Science and Technology Society (SST) of the America's, Executive Director.
- 4.21.2 U.S. Representative on the Board of Directors for the International Association of Fish Inspectors (IAFI) – convene in Ireland in 2007.
- 4.21.3 U.S. Advisory Representative to the European 'Seafood Plus' organization involving every European nation collaborating in various aspects of seafood safety and quality research.

- 4.22 Determine ways to advance the use of post-harvest treatments (PHT) for production of safer Florida oysters for raw consumption. Coordinator for current USDA Special Research Projects extending into 2009. Work includes assessing use of special freezing techniques at industry-based lab for analytical certification for product safety based in Apalachicola, Florida. (Otwell)
- 4.23 Continue to participate in the development of a "Mark of Quality" program for the U.S. domestic shrimp industry. Work in collaboration with Sea Grant staff at TXAM, LSU, MSU, UGA, Clemson and NCSU. (Otwell)
- 4.24 Conduct seafood workshops and seminars at local seafood festivals and boat shows. (Sweat)
- 4.25 Continue recreational scallop restoration program. (Sweat)
- 4.26 Promote Seafood Safety tips and science for clientele. (Verlinde)

Goal 5: Waterfront Communities: Increase the Economic Competitiveness and Environmental Sustainability of Coastal Communities and Water-Dependent Businesses

- 5.1 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)
- 5.2 The Florida Sea Grant Boating and Waterway Management Program will broaden the scope of the existing efforts to: 1) enhance smart growth planning and implementation in Florida by identifying and pursuing opportunities for smart growth collaboration with Florida’s coastal communities; 2) provide science-based information, planning models, and innovative tools and methods to state and local decision-makers to encourage sustainable growth and waterway management in coastal communities; 3) use Geographic Information Technologies to provide solutions that foster sustainable shorefront development and waterway management; and, 4) develop training opportunities for Extension faculty who will use the information in their individual educational activities. (2008) (Spranger/Swett/Sidman: R/C-P-29)
- 5.3 Local waterfront governments would 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 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. (2008) (Ankersen/Hamann/McLendon: R/C-P-30)
- 5.4 Florida Sea Grant Extension will continue its fifth-year outreach activity as a component of the Southeast Atlantic Coastal Ocean Observing System (SEACOOS). Four Sea Grant programs (North Carolina, South Carolina, Georgia and Florida) are cooperating in this regional project. Florida Sea Grant will serve as a member of the SEACOOS Extension and Education Workgroup. Regional and state educational products and resources will be developed for extension agents and marine and coastal resource users. (Simoniello/Spranger: E/T-12)
- 5.5 Continue 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 (FLCOOS) Consortium. (Spranger)
- 5.6 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 University of Florida Department of Tourism, Recreation and Sport Management and the Florida Sea Grant Waterway Management Program will assist 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. This project is scheduled for completion in June 2007.
(Confer/Delaney/Swett/Sidman/Schnell/Ankersen/Holland/Fann)

- 5.7 Continue working with the Clean Boating Partnership to designate new Clean Marinas and Boatyards. Present Clean Boater education materials to boaters at the Pensacola Boat Show and other environmental events. (Diller)
- 5.8 Continue working with the Clean Boating Partnership and DEP staff to designate new Clean Marinas and Boatyards. (Gregory)
- 5.9 Continue to work with local government on waterfront access issues. (Gregory)
- 5.10 Identify critical information on public waterfront access and facilitate presentation of the information to surveyors and county planners in Brevard County. (Leonard)
- 5.11 Provide technical information to the consultants of Lampl/Herbert as they finalize their feasibility study on constructing a Seafood Industrial Park in Franklin County. (Mahan)
- 5.12 Continue work to identify areas in Franklin County that are appropriate for the construction of boat ramps to provide increased public boat access in the county. (Mahan)
- 5.13 Assist the county and city government to identify ways to reduce problems associated with derelict/abandoned vessels and to identify and secure funding for vessel removal. (Mahan)
- 5.14 Work with Pierce Jones (UF Energy Specialist) to offer a Low Impact Development workshop to teach individuals about low impact development strategies that can be used to help minimize the environmental impacts of development on the environment. The program will target local elected officials, Planners, Planning & Zoning Board Officials, developers, and builders. (Mahan)
- 5.15 Continue work with the County and city officials to address waterfront issues such as community development, public access, zoning issues, and minimizing environmental impacts on coastal environments. (Mahan)
- 5.16 Continue working with the Clean Boating Partnership and DEP staff to designate new clean Marinas and Boatyards. (McGuire)
- 5.17 Work with GA SG to help them develop their Clean Marina program. (McGuire)
- 5.18 Work with Volusia County Extension Faculty to investigate the possibility of developing a paddling trail through St. Johns County, Flagler County and Volusia County. (McGuire)
- 5.19 A seasonal characterization of recreational boating in Brevard County will be initiated to characterize the preferences, activities, and use-patterns of area boater populations. The information will be used for resource management and planning applications by Brevard County and the Florida Fish and Wildlife Conservation Commission. (Sidman/Swett/Fann/Sargent)
- 5.20 Support Hurricane Preparedness efforts of other Sea Grant agents by providing literature, explanations of technology used to measure topics of relevance (e.g. storm surge models, water level data); and provide maps of COOS asset locations so boaters can customize local forecasts and make more informed decisions. (Simoniello)
- 5.21 Continue producing information, brochures and other products to help Sea Grant agents in FL, GA, SC and NC educate the public about coastal ocean observing systems (COOS). Oversee redesign of extension and education portion of www.seacoos.org website, including layout and content. (Simoniello)

- 5.22 Participate in state, regional, national and international activities that are associated with coastal ocean observing systems, providing “best management practices” and “lessons learned” through publications and presentations at workshops. (Spranger, Simoniello)
- 5.23 Assist with water dependent enhancement activities in Charlotte County. (Staugler)
- 5.23.1 Conduct on-site training and guidance to assure Clean Marina or Clean Boatyard designation at 2 pledged marinas.
- 5.23.2 Increase 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.
- 5.23.3 Work with the Punta Gorda Boaters Alliance to develop a marine overlay district for the City of Punta Gorda waterfront.
- 5.23.4 Work with Team Punta Gorda to develop a managed mooring field.
- 5.23.5 Work with Bob Swett to develop a regional waterway management system for Charlotte County.
- 5.23.6 Work with Bob Swett to develop a Cruising (Maritime History) Guide to Charlotte Harbor.
- 5.24 Assist Sea Grant waterway management program in providing technical assistance in managing anchorages and boat ramps. (Stevely)
- 5.25 The State of Florida, with the guidance of Florida Sea Grant (FSG), will develop a new administrative rule for dredging public waterways in Lee County under the authorization of a general permit. The rule will apply to traffic sheds with high priority maintenance dredging needs as identified by applications of the FSG Regional Waterway Management System. (Swett/Fann/Sidman)
- 5.26 Local municipal regulations that govern boating activities on local waterways will be identified, documented, and incorporated into a statewide GIS database for use with the Florida Fish and Wildlife Conservation Commission’s Coastal Resource Information System. The purpose is to assist the FWC and partners in implementation of more effect waterway management. The project will span multiple years. (Swett/Ruppert/Ankersen/Fann/Purdy/Sidman/Sargent-FWC)
- 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. (Swett/Sidman/Ankersen/Cameron/Leonard/Verlinde)
- 5.28 Florida Sea Grant, the Department of Fisheries and Aquatic Sciences and School for Forestry and Resource Conservation at the University of Florida will conduct a 2.5 day GIS training, scheduled for February 2007. (Swett/Lindberg/Fann/Andreu)
- 5.29 The Florida Coastal Training Program (CTP) provides coastal decision-makers with the best available science based information, tools, and techniques required to make responsible decisions about land use in Florida and the resulting effects on coastal resources. The Florida Conflict Resolution Consortium, Center for Economic Forecasting and Analysis at Florida State University, and the Florida Sea Grant Program at the University of Florida will assist in this mission. Their

objectives will include an assessment of the training and information needs of elected and appointed government officials and land use planners, a pilot project based on the results of the assessment, and an outreach plan to continue positive, long-term relationships with the target audience. This project is scheduled for completion in spring of 2007.
(Taylor/Harrington/Swett/Sidman)

- 5.30 Promote the Clean Marina Program to marinas and fish camps still recovering from storms.
(Verlinde)
- 5.31 Promote the Clean Marina Program and the Clean Boating Partnership at the Pensacola Boat Show, Spring 2007. (Verlinde)
- 5.32 Complete the Boating and Angling Guide to Pensacola Bay, 2007. (Verlinde)
- 5.33 Work with the Bagdad Waterfronts Partnership to address invasive species, public access and the development of the historic Bagdad Mill Site Community Park. (Verlinde)
- 5.34 Provide Santa Rosa County community leaders with coastal information Support the SRC Board of County Commissioners Marine Advisory Committee. Work with Florida Sea Grant Waterfront group to develop a long range waterway management plan for Santa Rosa County. (Verlinde)
- 5.35 Continue working with the Clean Boating Partnership and DEP staff to designate new Clean Marinas and Boatyards and assist recovery of marinas damaged by hurricanes in 2004 and 2005. Present Clean Boater education materials to boaters at the Pensacola Boat Show and other environmental events. (All agents, as needed)

Coastal Stewardship and Public Safety

Goal 6: Ecosystem Health: Protect, Restore and Enhance Coastal Ecosystems

- 6.1 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 work will design and deliver a public education and outreach plan for the region. (Spranger: Fletcher: E/T-9)
- 6.2 Health-related management of recreational coastal sites is currently undertaken by monitoring fecal coliform and enterococci 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 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. (2008) (Patterson/Paul/Fries/Farmer: R/C-E-52)
- 6.3 The worm *Phragmatopoma lapidosa* 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 subtidal 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, and 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. (2008) (McCarthy: R/C-E-53-PD)
- 6.4 Continue with US EPA-funded project to assess the economic implications of red tide events on the Gulf coast of Florida. Study will determine 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 (Adams w/ Sherry Larkin and Bob Degner).
- 6.5 Give presentations on the effects of red tide events within the SW Florida region to various interested groups. (Adams)
- 6.6 Present professional paper on education and outreach activities associated with harmful algal blooms at the American Fisheries Society annual meeting in Fall 2007. (Adams, Stevely)
- 6.7 Develop educational programs that maintain and increase the quality of Florida’s estuaries and ecosystems through the North Florida NEMO (Nonpoint Education for Municipal Officials) Program with regards to water quality and critical fish habitat. (Cameron)
- 6.8 Develop educational programs with other Sea Grant agents in the Panhandle for shoreline restoration where it is appropriate to substitute sea walls and rip rap. (Cameron)
- 6.9 In collaboration with St. Lucie County Artificial Reef Coordinator establish an oyster restoration program for the Indian River Lagoon; secure necessary permits for deploying spat collectors and oyster cultch; establish a youth education and volunteer program for distribution and monitoring of “artificial oyster reefs”. (Creswell)

- 6.10 Continue to promote utilization of monofilament recycling through newspaper articles and radio programming. (Creswell)
- 6.11 Partner with the Florida Yards and Neighborhood agent, natural resource agents, Florida Lakewatch, and other organizations to reduce stormwater runoff, provide watershed education, and develop water quality monitoring programs. (Diller)
- 6.12 Develop and assist with coastal restoration programs such as sea grass planting, dune restoration and beach renourishment that will improve coastal ecosystems as they recover from hurricanes. (Diller)
- 6.13 Continue to work with the Project Greenshores team to develop site two of this coastal ecosystem restoration project in Pensacola Bay that includes oyster reefs, seagrass beds, and salt marsh habitats. Also form partnerships to develop other ecosystem restoration projects. (Diller)
- 6.14 Coordinate the Turtle Friendly Beach program for sea turtle awareness and protection. Conduct sea turtle lighting workshops and provide sand fencing information as beaches recover from hurricanes. Provide educational assistance and Sea Grant Extension representation to various sea turtle working groups. (Diller)
- 6.15 Continue support and development of educational programs for teachers, boaters and interested citizens on marine debris, coastal clean-ups, and monofilament line recycling. (Diller)
- 6.16 Coordinate a “Human Dimensions Science in the Everglades” workshop for South Florida Ecosystem Restoration researchers and managers. (Fletcher)
- 6.17 Work with University of Florida scientists at the South Florida Tropical Research and Education Center and managers with Florida Department of Environmental Protection to develop a water quality training program in May 2007 for researchers, managers and educators. (Fletcher)
- 6.18 Coordinate meetings to bring together individuals from various local, state, and federal agencies involved in South Florida Ecosystem Restoration Outreach to better facilitate information sharing. (Fletcher)
- 6.19 Explore opportunities to incorporate Everglades-related restoration information into coral reef teacher training workshops that have been scheduled for the fall of 2007. (Fletcher).
- 6.20 Continue to work with state and local agencies to develop a “Water Academy/South Florida Issues” Class. (Fletcher)
- 6.21 Develop a South Florida and Everglades Ecosystem Restoration “education tool kit” that can be utilized by individuals who are presenting information on this complex topic. (Fletcher)
- 6.22 Explore opportunities for international collaboration and sharing of experiences and expertise in ecosystem restoration efforts through contacts within NOAA’s Office of International Programs, Gulf and Caribbean Fisheries Institute, and personal contacts in Latin America. (Fletcher).
- 6.23 Coordinate design and development of a “synthesis book” of Florida Bay research. This will include identifying authors, developing tracking sheets for authors and databases for documents that will be included in the book, and conducting design/production meetings. (Fletcher)
- 6.24 Assist Pamela Fletcher with the implementation of the S. Florida Marine Ecosystems Project; help expand efforts to the west coast of Florida. (Fluech)

- 6.25 Coordinate with local agencies and the Ocean Conservancy, and recruit volunteers for Bay Daze, the International Coastal Clean Up, derelict trap removal programs, and other marine debris removal events. (Fluech)
- 6.26 Continue to serve as project manager for the Marine Resource Conservation Partnership of Collier County: (Fluech)
 - 6.26.1 Serve as a liaison between FWC/DEP and local agencies participating in the pilot boater stewardship program
 - 6.26.2 Work with partners to develop training curriculum/ materials for a boating stewardship volunteer training program.
 - 6.26.3 Develop a portable education exhibit on sustainable boating/angling practices
 - 6.26.4 Coordinate with participating agencies in the development of a social marketing program aimed at promoting boating stewardship.
- 6.27 Conduct at least 2 workshops for K-12 teachers and informal educators on marine invasive species. (Fluech)
- 6.28 Assist with the coordination of education seminars relating to boating/ environmental issues at the Naples Boat Show; deliver a presentation about boating impacts on seagrasses. (Fluech)
- 6.29 Present professional paper on education and outreach activities associated with coastal restoration efforts related to the 2004-2005 hurricanes at the American Fisheries Society annual meeting in Fall 2007. (Jackson)
- 6.30 Work with agents in the Panhandle 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. (Jacoby)
- 6.31 Work with partners throughout Florida and beyond to develop and improve volunteer water quality monitoring programs. (Jacoby)
- 6.32 Work with partners to develop and implement training and curricula dealing with a watershed approach to water quality through planned extension in-service training programs (Jacoby)
- 6.33 Work with FL Sea Grant Agent Brian Cameron (Bay County) and Chuck Jacoby (FSG Estuary Specialist) to coordinate the Nonpoint Education for Municipal Officials (NEMO) program in Franklin County. (Mahan)
- 6.34 Provide one-on-one consultations to homeowners on actions they can take to reduce/eliminate environmental impacts by selecting the proper pesticide, herbicide, and fertilizers for their lawns and gardens. (Mahan)
- 6.35 Research and write at least two newspaper columns for the Apalachicola & Carrabelle Times newspapers to educate residents about what they can do to minimize their impact on the local environment/ecosystem. (Mahan)
- 6.36 Work with City of Carrabelle officials in implementing the FL Department of Environmental Protection's "Clean Marina Program" at the city's new marina. (Mahan)

- 6.37 Work with FL Sea Grant Agents – Andrew Diller, Chris Verlinde, Scott Jackson, and Brian Cameron on devolving and coordinating a “Living Shorelines” program to educate adults and youth about the importance of ‘protecting” the coastline. (Mahan)
- 6.38 Work with GA Marine Extension faculty to develop outreach materials on marine invasives for use in both states. (McGuire)
- 6.39 Develop Florida Master Naturalist Program for Charlotte County. (Staugler)
- 6.40 Provide general educational training and assistance to improve coastal ecosystem health. (Staugler)
 - 6.40.1 Continue to chair the Charlotte Harbor NEP Hydrologic Alterations Subcommittee. Participate as a member of the Water Quality Quantifiable Objectives Sub-committee, and Habitat Conservation Sub-committee of the Charlotte Harbor National Estuary Program.
 - 6.40.2 Work with boating user groups, master gardeners and civic groups to promote BMPs for improved coastal water quality.
 - 6.40.3 Provide educational program to boating and fishing groups, master gardeners, civic groups and citizens on coastal habitats and invasive species.
 - 6.40.4 Develop an Estuary/Marine needs assessment for the waters of Charlotte County – a database/GIS project to identify research, monitoring & educational efforts.
 - 6.40.5 Assist with local mangrove transect monitoring effort to document recovery of mangroves post hurricane Charley and changes to shoreline.
 - 6.40.6 Develop a community based restoration program for Charlotte Harbor mangroves severely impacted by hurricane Charley.
- 6.41 Work 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. Both a one two-minute video on “Sea Grasses: Good Boater Practices” and a seven minute video on “Sea Grass & Boaters” will be developed and will be shown at all US Power Squadron and US Coast Guard Auxiliary Safe boaters classes in Charlotte County. (Staugler)
- 6.42 Train 40 Extension Master Gardeners in Manatee and Sarasota County in coastal plant ecology and identification. (Stevely)
- 6.43 Conduct two mangrove management programs for property managers and landscape maintenance professionals in Manatee and Sarasota County. (Stevely)
- 6.44 Present information on relationships between Red Tides and nutrients at Extension Summit. (Stevely)
- 6.45 Prepare peer reviewed article on public perceptions of Red Tide biology and impacts. Present paper at American Fisheries Society Annual Meeting. (Stevely)
- 6.46 Maintain functional Sarasota Bay Estuary Program Technical Advisory Committee. (Stevely)
- 6.47 Enhance the sustainability of the commercial fishing heritage of Cortez. (Stevely)

- 6.47.1 Organize 26th Annual Cortez Commercial Fishing Festival. This festival reaches 15,000 citizens with information on environmental issues. The festival generates the revenue (approximately \$60,000/year) to purchase 95 acres of environmentally sensitive land.
- 6.47.2 Assist 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 Work to enhance water quality around Pensacola Bay. (Verlinde)
- 6.49 Coordinate materials, equipment and sample drop-offs for the Lakewatch program in Santa Rosa County. (Verlinde)
- 6.50 Coordinate and lead the 3rd Pensacola Watershed Tour. This will be a tour of the watershed of the Pensacola Bay System. The goal is 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. (Verlinde)
- 6.51 Provide aquatic nuisance species information to 4-H leaders, teachers, and the public at various talks and programs. (Verlinde)
- 6.52 Coordinate the oyster reef restoration project in East Bay. Use oyster reef importance and ecology curriculum developed in support of this project. Provide updates on restoration and field activities at restoration sites for community leaders and students. (Verlinde)
- 6.53 Work with UF/IFAS West Florida Research and Education Center researchers on dune restoration research projects. Coordinate volunteers for planting. Provide educational materials at restoration sites and to various organizations. (Verlinde)
- 6.54 Continue to support Project Greenshores, a FDEP habitat restoration initiative. (Verlinde)

Goal 7: Coastal Hazards: Respond to Shoreline Change and Coastal Hazards

- 7.1 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. (2008) (Kennedy/Gurley/Sheremet: R/C-S-46)
- 7.2 The majority of 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. Outcome of the research will directly benefit NOAA's effort to improve its storm surge models. (2008) (Sheng: R/C-S-47)
- 7.3 Continue to provide educational programs/displays for beach safety and hurricane preparedness focusing on rip currents, shark awareness, sun safety, and boat preparation for hurricanes. (Cameron)
- 7.4 Conduct educational programs on sea grass beds and salt marshes in St. Andrew Bay and how they are an important part of the ecosystem for various fish species and water quality. (Cameron)
- 7.5 Continue assisting Escambia County Marine Resource Division and other groups respond to tropical storms, develop Specialized Marine Action Response Teams (SMART), and produce and distribute educational information. (Diller)
- 7.6 Work with county extension staff to plan the 2nd annual Collier County Extension Hurricane Expo; Deliver presentations on hurricane preparedness for boat owners and coordinate with CG Auxiliary to deliver demonstrations on properly securing a boat for hurricanes. (Fluech)
- 7.7 Continue project to produce a comprehensive digital video guide on hurricane preparedness for marinas and boat owners that was initially developed by Miami-Dade Sea Grant Agent who resigned in 2006. A new FSG Extension Team will work with producer and Progress Energy to finish the project. (Fluech, Fletcher, Simoniello, Verlinde, Diller).
- 7.8 Provide one-on-one consultations to individuals on red tide and other coastal hazards. (Mahan)
- 7.9 Work with the Franklin County Parks & Recreation and Road Departments to post "Rip Current" education signs up at county beach access points and facilities. (Mahan)
- 7.10 Research and write at least one newspaper column for the Apalachicola & Carrabelle Times newspapers to educate Franklin County residents and visitors about coastal hazards. (Mahan)
- 7.11 Expand the Carolina's Coast project-a partnership between ocean observing system programs in the southeast and the Wilmington, NC Weather Forecast Office- into Florida. Extension efforts include facilitating meetings between the National Weather Service, SEACOOS data management folks and private stakeholder groups; forming a marine advisory group to provide feedback/test products developed through the Tampa WFO/SEACOOS project. Regional extension efforts to promote the Carolina's Coast project will commence when the NWS officially launches the website in the Fall, 2007). (Simoniello)

- 7.12 Present professional paper on education and outreach activities associated with hurricane response and recovery efforts at the American Fisheries Society annual meeting in Fall 2007. (Spranger)
- 7.13 Explore opportunities to work with the Gulf of Mexico Alliance to develop and deliver regional programs on “community resiliency. (Spranger)
- 7.14 Provide hurricane preparedness and water safety information at various events and programs. (Verlinde)

Scientific Literacy

Goal 8: Graduate Education: Produce a Highly Trained Workforce in Marine and Coastal Related Sciences

- 8.1 Enhance graduate education in disciplines related to the coast and ocean by active participation in public and privately funded graduate programs. (Cato)
 - 8.1.1 A minimum of two qualified applicants will be submitted annually to the Sea Grant John A. Knauss Marine Policy Fellowship national competition. Over each five-year period, an average of one Knauss Fellow per year (of 30 nationally) will be from Florida.
 - 8.1.2 At least one national Sea Grant Industrial Fellow candidate (of 2-4 per year nationally) will be successful every three years.
 - 8.1.3 At least 30 percent of the annual Florida Sea Grant federal core program research budget will be used to support graduate students.
 - 8.1.4 A minimum of five graduate students will receive scholarship funding through private funds in cooperation with the Aylesworth Foundation for the Advancement of Marine Science and the Old Salt Fishing Club.
 - 8.1.5 One high school student will receive a college scholarship through the Chuck Skoch Florida Sea Grant Scholarship.
 - 8.1.6 A minimum of two qualified applicants will be submitted to the NOAA Coastal Services Center Competition each time it is held.
- 8.2 A minimum of \$600,000 per year in non-national Sea Grant CORE program funding will be received from extramural funding sources to support Sea Grant programs. (Director)
- 8.3 Florida Sea Grant will participate in National Strategic Investment, National Outreach and National NOAA/Sea Grant proposal competitions when available. Funding data will be analyzed to measure the success rate of Florida Sea Grant against the other Sea Grant programs. (Director)
- 8.4 At least 15 different academic disciplines and six different Florida universities and research laboratories will receive Florida Sea Grant funding in each proposal cycle. This can only be achieved through the encouragement of competitive proposals from many participants because peer review determines actual funding. At least six institutions participating in Florida Sea Grant will be visited each year to meet faculty and students to keep a high level of participation in Florida Sea Grant. Six faculty progress reports will be distributed annually to 800 faculty statewide to inform them of Sea Grant activities and opportunities. (Director)
- 8.5 An average of four Florida Sea Grant supported seminars will be funded annually 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 will be supported for Florida Sea Grant researchers and potential researchers and Florida Sea Grant Extension and Communications faculty. The activity will be supported when consistent with priorities in the Florida Sea Grant Strategic Plan: 2006-2009. (Director: PD-07-2)

- 8.7 Sea Grant Extension faculty will improve their content and process skills by attending a minimum of 8 days of in-service training workshops or conferences that support their individual educational programs (all agents).
- 8.8 Coordinate annual in-service training meeting for Extension faculty that provides a status report of on-going research and extension activities, and organizes program planning efforts. (Spranger)
- 8.9 Enroll in an ichthyology course offered by Florida Gulf Coast University during fall 2007. (Fluech)
- 8.10 Continue coursework toward Master's Degree in Environmental Science at Florida Gulf Coast University. (Staugler)
- 8.11 Complete coursework and requirements for Master's Degree in Agriculture Communications and Education from the University of Florida. (Verlinde)

Goal 9: Marine Education: Create a Scientifically and Environmentally Informed Citizens

- 9.1 A number of educational activities are implemented under the previous goals. The following ones cross many goals and are implemented in general.
- 9.1.1 Produce high quality publications and productions that effectively communicate results of Florida Sea Grant activities to both general and specialized audiences. Productions include 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 At least ten print or broadcast news releases will be produced. (Kearl/Zimmerman)
 - 9.1.3 The Florida Sea Grant Internet home page and website will be upgraded and maintained. (Zimmerman/Whitehouse/Damron/Wagner)
- 9.2 Continue to conduct marine educational programs on monofilament recycling, marine debris, and marine/natural resources for local K-12 teachers in Bay County. (Cameron)
- Three hundred fourth grade students will become more knowledgeable about the marine environment by attending the “Ecosystem Explorer” program at the St. Lucie County Marine Center. (Creswell)
- 9.3 Two hundred seventh grade students will become more knowledgeable about the marine environment by attending the “Ecosystem Explorer” program at the St. Lucie County Marine Center in conjunction with classroom instruction at their schools. (Creswell)
- 9.4 Two hundred 4-H, Indian River “Lagoon Days”, and other summer camp students will increase their knowledge of the Indian River Lagoon through field activities, such as beach seining, benthic sampling, canoeing, and observation. (Creswell)
- 9.5 Continue bi-weekly radio broadcast “At Home in St. Lucie” (1/2 hour program) discussing topics related to the impacts of coastal development and man’s activities on the marine environment. (Creswell)
- 9.6 Conduct at least two workshops dedicated to public education of marine invasive species. (Creswell)
- 9.7 Maintain and update the Escambia County Marine Extension website with local marine resource information, sea turtle education, and educational events. (Diller)
- 9.8 Work with Extension 4-H specialists and agents in the development of marine environmental programs for youth. Assist with development and activities at state marine and county 4-H camps. (Diller)
- 9.9 Develop marine environmental programs for K-12 teachers and youth. Continue writing Resource Rangers video series and developing associated educational programming. (Diller)
- 9.10 Develop and assist production of website, newsletter, or newspaper articles on local marine/coastal topics that are distributed to interest citizens. (Diller)

- 9.11 Provide Master Naturalist Program training to interested citizens and continue to develop volunteer program for local Sea Grant extension programs. (Diller, S. Jackson,)
- 9.12 Coordinate with Rookery Bay staff to teach the coastal module of the Florida Master Naturalist program. (Fluech)
- 9.13 Coordinate with the Collier County Residential Horticulture agent to train 20 Master Gardner volunteers on coastal plant ecology and identification. (Fluech)
- 9.14 Conduct public education programs for youth and adult audiences to increase community awareness and protection of coastal and marine environmental resources in Collier County: (Fluech)
 - 9.14.1 Continue to manage and work with volunteers to monitor and install monofilament bins and clean line in the county.
 - 9.14.2 Maintain and update a Collier County Sea Grant web page with marine resource information and upcoming events.
 - 9.14.3 Work with extension 4-H specialists, agents and club leaders in developing and teaching marine education programs for 4-H youth at the local and state level.
 - 9.14.4 Coordinate with local agencies to organize guest speakers, set up educational displays and conduct presentations relating to marine/ coastal topics at festivals and events.
 - 9.14.5 Continue to provide marine/coastal related information/ curriculum to formal and informal educators.
 - 9.14.6 Research and write 12 monthly articles dealing with marine and coastal issues for the Marco Island Eagle; daily distribution of 6,000.
- 9.15 Serve on the GOMA EEN steering committee. (Fluech)
- 9.16 Continue serving on the GOMA Environmental Education Underserved/ Underrepresented Populations working group. (Fluech)
- 9.17 Assist with the organization of the FMSEA conference in Naples, FL. Deliver presentations at the FMSEA and FAST conference. (Fluech)
- 9.18 Develop and conduct marine technology workshops for the Brevard County recreational boater that will provide better awareness of the vessel's mechanical systems, and lead to better care and maintenance. (Leonard)
- 9.19 Participate in a weekend boating conference that will provide technical assistance and information to the boaters of Brevard County that will lead to a better recreational experience, and lessen impact on the county's aquatic resources. (Leonard)
- 9.20 Research and write at least 40 newspaper columns on a variety of environmental issues and topics. (Mahan)

- 9.21 Continue to work with the Apalachicola River Basin Invasives Workgroup to establish partnerships and educate elected officials and the general public on environmental problems associated with invasive species. (Mahan)
- 9.22 Work with the Apalachicola National Estuarine Research Reserve's Environmental Education staff to plan, organize and teach a "Seagrass Awareness" program. (Mahan)
- 9.23 Work with the Apalachicola National Estuarine Research Reserve's Environmental Education staff to plan, organize and teach the "Estuaries' Day" program at the ANERR. (Mahan)
- 9.24 Teach at least one garden club program on a topic of interest to the club members. (Mahan)
- 9.25 Work with FL State University faculty & staff to educate the general public about coastal & fisheries management and issues. (Mahan)
- 9.26 Teach 4-H and other youth programs (including summer camps) relating to marine issues/topics. (McGuire)
- 9.27 Teach workshops for 4-H marine ecology judging event. (McGuire)
- 9.28 Conduct teacher workshops including presentation at NMEA, FAST, FMSEA conferences. (McGuire)
- 9.29 Coordinate and teach Kids' Day activities for First Coast Birding & Nature Festival (2 days). Serve on planning committee for First Coast Birding and Nature Festival. (McGuire)
- 9.30 Continue to write monthly articles for Flagler News Tribune. (McGuire)
- 9.31 Judge at local and regional science fairs. (McGuire)
- 9.32 Continue to represent FSG on US Fish & Wildlife Service's Manatee entanglement and manatee education working groups. (McGuire)
- 9.33 Continue to coordinate monofilament recycling program in NE Florida. (McGuire)
- 9.34 Teach field trip programs for Coastal Master Naturalist classes. (McGuire)
- 9.35 Investigate funding sources to expand Georgia's "Adopt a Wetland" program into NE Florida. (McGuire)
- 9.36 As part of a four state effort in the Gulf of Mexico, sponsor and conduct informal educator Center for Ocean Science Education Excellence (COSEE) institute. Work with co-P.I.s in other states to coordinate activities, develop governance structure, develop online teacher training, and evaluate project activities (Spranger: COSEE-GOM)
- 9.37 Conduct public education programs in Charlotte County: (Staugler)
 - 9.37.1 Maintain Charlotte County Marine Extension website.
 - 9.37.2 Research and write at least 12 columns for the WaterLIFE Magazine on marine-related topics, monthly distribution of 30,000.
 - 9.37.3 Write marine-related column for quarterly Extension Newsletter.

- 9.37.4 Participate in the planning and aquatics testing section of the Envirothon competition for high school students in SW Florida.
- 9.37.5 Work with CCA, & U.S. Coast Guard Auxiliary, and 4-H Marine Ecology club to assemble, install and maintain monofilament recycling bins at marinas, ramps and fishing piers within the County.
- 9.37.6 Help coordinate Coastal Cleanup and derelict crab trap clean up events.
- 9.37.7 Provide coastal information and activities at various marine-related events.
- 9.37.8 Provide marine-related speaker programs to at least six-community organizations.
- 9.37.9 Work with Stevely to organize the Boca Grande Pass cleanup event.
- 9.37.10 Distribute 20,000 Boating & Angling Guides.
- 9.38 Attend and present at various in-service trainings concerning natural resource issues. (Verlinde)
- 9.39 Provide teacher workshops for the FWC/FMSEA aquatic species collectors permit, Project Learning Tree Energy and the Environment, Project Learning Tree, Invasive species, Project WET and coordinate Statewide 4H Environmental Education Institute for 4H volunteers, leaders and camp staff. (Verlinde)
- 9.40 Provide coastal information articles to various media outlets. (Verlinde)
- 9.41 Continue to support, coordinate and develop curriculum and videos for the Resource Ranger Program, and environmental education program for 4-H and students. The program includes curriculum, videos, day camps and field trips about coastal issues. (Verlinde)
- 9.42 Coordinate the 7th annual Seagrass Awareness Celebration and 4th annual Coastal Encounters events. (Verlinde)
- 9.43 Teach Florida Master Naturalist Program wetlands and coastal modules. (Verlinde)
- 9.44 Coordinate 22nd annual NW Florida Rivers Clean-up and International Coastal Clean-up. (Verlinde)
- 9.45 Develop educational programs for 4-H, teachers, boaters and interested citizens on marine debris, safe boating and monofilament recycling. (Verlinde)
- 9.46 Provide coastal information and hands-on activities at various environmental events. (Verlinde)
- 9.47 With Andrew Diller, provide “Sea Turtle Friendly Beaches” program to beach residents. (Verlinde)
- 9.48 Provide coastal issues talks to various community organizations. (Verlinde)
- 9.49 Support 4-H marine and county camps. Provide 4-H leaders and teachers with coastal information and opportunities. (Verlinde)
- 9.50 Work with the GCOOS outreach and education work action group to develop OOS materials for various audiences. (Verlinde)

- 9.51 Participate as a fellow in the Natural Resource Leadership Institute to develop skills necessary for effective natural resource leadership, communications and conflict resolution. The course consists of 7, 3-day sessions and a practicum will be completed. (Verlinde)
- 9.52 Serve as Secretary for the National Sea Grant Educators Network to provide minutes of meetings and updates for Sea Grant Marine Educators. (Verlinde)
- 9.53 Work with Panhandle agents and agency representatives to develop a living shorelines program that involves promoting living shoreline alternatives to traditional shoreline practices of seawalls, jetties and riprap. A component of this program includes a “grasses to classes” type program for schools in the Panhandle. (Verlinde)

Key to Individual Responsibilities

Adams	4, 5, 10, 11, 12, 20	McCarthy	20
Allman.....	4	McGuire	17, 23, 31
Ankersen	16, 18	McGurie	31
Baker.....	5, 10, 11	McLendon.....	16
Balaban	14	Morgan.....	13
Burgess.....	4	Mulkey	5
Cameron	5, 20, 22, 25, 29	Murray.....	5
Cato.....	27	Nunez	11
Confer	16	Ohs	11
Creswell	5, 10, 11, 20, 21, 29	Otwell.....	13, 14, 15
D.Jackson.....	16	Patterson.....	4, 20
Damron	29	Paul	20
Delaney	16	Paul, V.....	3
Diller	21, 29, 30	Purdy.....	18
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Director	27	Ross.....	3
Fann.....	16, 17, 18	Ruppert.....	18
Farmer	20	Sargent	17, 18
Fields.....	3	Scarpa.....	10
Fletcher	20	Sheng.....	25
Fluech.....	5, 6, 11, 21, 22, 25, 28, 30	Sheremet	25
Fries.....	20	Shivji.....	4
Gaines	10	Shivlani	5
Gregory	5, 6, 17	Sidman	5, 16, 17, 18, 19
Gurley	25	Simoniello.....	8, 16, 17, 18, 25
Hamann	16	Soti	3
Harrington.....	19	Spranger	16, 18, 20, 28, 31
Holland.....	16	Staugler	8, 18, 23, 28, 31
Huth.....	13	Stevely.....	8, 18, 23
Jacoby	22	Stevens	5
Jamison	13	Sturmer.....	10, 11, 12
Kearl.....	29	Sweat.....	4, 8, 12, 15
Kem.....	3	Swett	5, 16, 17, 18, 19
Kennedy	25	Taylor	19
Kerr	3	Turingan	10
Kristinsson	14	Turingen.....	10
Larkin	5, 20	Verlinde.....	9, 15, 18, 19, 21, 24, 26, 28, 30, 32, 33
Lindberg.....	7, 18	Von Harten.....	5
Liqori.....	5	Wagner	29
Lopez.....	3	Wasno	6
Luesch.....	3	West	3
Mahan	7, 11, 14, 17, 22, 23, 25, 30, 31	Whitehouse	29
Mann	4	Wright	13
Mari.....	3	Zimmerman.....	29
Martin.....	13		
McBride	4		