Science Serving Florida's Coast

Florida Sea Grant College Program Year 2001 Work Plan

A partnership program among the State University System of Florida Sea Grant College Program

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

Florida's citizens, industries and governments

Technical Paper 116

May 2001

UNIVERSITY OF
FLORIDA

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For additional copies or information:

Florida Sea Grant College Program
University of Florida
PO Box 110400
Gainesville, FL 32611-0400
(352) 392-5870
www.flseagrant.org

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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 for 1998-2001[1] defines the purpose of the program, highlights Florida's coastal wealth, and demonstrates the need for research and education. The plan also recognizes the three strategic areas of economic leadership, coastal ecosystem health and public safety, and education and human resources for Sea Grant investments and describes the programmatic framework for implementing the strategic plan.

The implementation plan for 2000 covered research, extension, communication and administrative goals and tasks scheduled to end in 2000 and beyond. The 2000 Florida Sea Grant annual progress report reported accomplishments and benefits against those tasks ending in 2000. This work plan for 2001 updates the 2000 implementation plan to include research, extension, communication and administrative tasks scheduled for completion during 2001 and beyond. The 2001 annual progress report, scheduled for May 2002, will cover accomplishments and benefits resulting from each of these tasks. Copies of the 1998-2001 Strategic Plan, previous Implementation Plans and annual progress reports for 1998, 1999 and 2000 can be obtained from the Florida Sea Grant College Program office.

Beginning with this 2001 Work Plan, this document will be referred to as the Annual Work Plan. It is formerly referred to as an implementation plan. Since NOAA/NSGO refers to the annual grant instrument which causes the receipt of annual federal funding as the implementation plan, this document which defines overall FSG detailed activities will be referred to as the Annual Work Plan.

Sea Grant
Florida

[1] Florida Sea Grant College Program Strategic Plan 1998-2001. Florida Sea Grant College Program Technical Paper 90. Gainesville: University of Florida. April 1998.

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Economic Leadership

Goal 1: Create Products and Processes from Florida's Coastal Resources Using Marine Biotechnology

1.1 A statewide faculty task force formed by Florida Sea Grant in 1998 to advance marine biotechnology will continue to operate. The goal is to partner with industry in a way that will yield both state and industry funds to support marine biotechnology research and economic growth in Florida. (Seaman/Cato)

1.2 A mixture of pseudopterosins is sold commercially in skin creams and some have potential as anti-inflammatory and analgesic agents. The overall goal of this project is to develop a biotechnological production method of the pseudopterosins and seco-pseudopterosins from the sea whip and to test them for their anti-inflammatory activity. (2002) (Kerr: R/LR-MB-8)

1.3 Protection of marine surfaces against fouling organisms is not only a big business, but also a difficult process to make coatings environmentally friendly. The world market for marine paints is over $2 billion annually. A worldwide ban on some paint ingredients will occur in 2003. The goal of this project is to develop nemertine bipyridyls from marine species, which have potential as potent antifouling agents. (2002) (Kem/Soti: R/LR-MB-9)

1.4 One solution to increase resistance by humans to pathogen treatment therapy is to identify novel antimicrobial compounds, which can serve as leads in drug discovery programs. Marine microbes are an exciting potential source of compounds. Bacteria will be isolated from several species of Floridian tunicates and sponges that produce bioactive compounds and tested for potential as clinical antimicrobiological agents. (2002) (Baker, B./Grimwade/Leonard: R/LR-MB-10)

1.5 Traditional isolation methods from marine environments are thought to recover only 0.1-12.5% of the microbial community. It is thus necessary to develop and implement methods to enhance the recovery of a novel suite of microorganisms associated with deep sea sponges. This will yield new isolates, which may lead to minimizing the need for the continued collection of the host sponge. (Olson/McCarthy: R/LR-MB-11 [T-99-57])

1.6 Marine sponges are known to produce thousands of biologically active natural products with potential as pharmaceuticals and other bioproducts. Sponges are thus targets for cell culture and aquaculture efforts to supply sufficient quantities for preclinical and clinical evaluation. DNA microarray technology will be evaluated as a novel technology for simultaneous screening/hybridization of thousands of probes and targets, increasing the probability of discovery of novel genes with commercial application potential. (Pomponi/Willoughby/Russell: R/LR-MB-13 [T-99-43])

1.7 A marine biotechnology summit meeting of Florida faculty and business interests will be organized, in order to establish long-range priorities for research, education and outreach. This will allow the identification of partnerships and approaches for developing national academic and commercial leadership in this field. (Seaman)

1.8 American horseshoe crab populations are in decline. An important commercial use of horseshoe crabs is in the production of *Limulus Amebocyte Lysate* (LAL), which is used in medicine to test intravenous solutions and drugs, vaccines, body fluids and for other important purposes. The goal of this project is to develop a synthetic medicine that will support long-term culture of horseshoe crab cells. (Kimble: PD-00-8)

Goal 2: Determine Production and Management Techniques Which Make Florida's Fisheries Sustainable and Competitive

2.1 The spiny lobster, stone crab, king mackerel and snapper and grouper fisheries in the Florida Keys are harvested by the same group of fishermen and vessels on a seasonal basis. The biological and economic effects of managing these fisheries on a single species versus multispecies basis will be determined. (Milon/Lee/Adams/Ehrhardt: R/LR-E-18A, B)

2.2 Commercial catches of small coastal shark species have increased dramatically in recent years, as large coastal sharks have been over fished. Management quotas have been set for small coastal sharks. A scientific framework for assessing the current status of small coastal sharks and to access the impact of future harvest strategies will be completed. (2002) (Simpendorfer/Burgess: R/LR-B-48)

2.3 The gag grouper is one of the most valuable fisheries in the Southeast United States. The fishery is presently under intense management scrutiny and is a priority for federal fisheries research related to essential fish habitat. Thus, it is important to test the role of habitat in mediating predator-prey interactions and individual fish growth dynamics in gag grouper to ensure that appropriate management measures can be implemented to ensure fishery sustainability. (2002) (Lindberg/Mason / : R/LR-B-49)

2.4 The Florida spiny lobster is the most valuable fishery in Florida, when both the commercial and recreational economic impact of the fishery are considered. The stock relies on continued input of post larvae and the suitability of the habitat. This project builds on previous research investments and will provide Florida spiny lobster managers with an accurate method to predict the fishable lobster population several years in advance and to track the health of the essential nursery habitat. (2002) (Herrnkind/Butler: R/LR-B-50)

2.5 Fish populations living in estuaries can be improved by adding fish raised in hatcheries and by protecting their habitats. However, for these techniques to be effective, methods need to be developed to determine which habitats in the estuary are the "best" for stocking and protecting. The purpose of this project is to develop tools such as computer models and surveying techniques that can be used to accurately evaluate fish nursery habitats in estuaries. The project is being conducted in cooperation with Texas and North Carolina Sea Grant. (2002) (Leber/Miller/Neill: R/LR-A-25)

2.6 A vessel-level economic behavior analyses on the pelagic longline feet in the North Atlantic will be completed. The study is funded by the NOAA/NMFS Highly Migratory Pelagics Program. Ten federal managers will become more aware of the economic/diversification characteristics of the pelagic longline fleet. (Adams)

2.7 A vessel cost and earnings brochure will be developed for pelagic longline vessels utilizing logbook data as provided by NMFS. At least 20 vessel operators will have a better understanding of the financial characteristics of the pelagic longline fleet by vessel size and trip category. (Adams)

2.8 A website will be developed for the Socioeconomics Section of the American Fisheries Society. The initial website which will describe how the Section provides information and dialogue pertinent to effective fisheries management in the US. 500 individuals will become better informed as to the role of economics in developing fishery management strategies for domestic fisheries. (Adams)

2.9 A web page will be developed for FL317 Sustainable Marine Fisheries in Florida. All extension faculty will become more aware of the purpose and benefits associated with SMP FL317. (Adams)

2.10 A Florida Sea Grant Fact Sheet which describes the age/length relationship for several popular recreationally targeted species will be developed. Recreational fishers in Florida will become more aware of the age structure of fish populations in Florida. (Adams, Stevely, Sweat, Novak, Gregory)

2.11 Educational columns will be written for the Apalachicola & Carrabelle Times newspapers. Included will be a series of at least two educational columns on the topics of fisheries management. (Mahan)

2.12 The Southwest Florida fishing industry will be educated regarding the new stone crab fishery management program. (Stevely)

2.13 The Sea Grant economics specialist will serve on the Scientific and Statistical Committees of the Gulf of Mexico and South Atlantic Regional Fishery Management Councils. Ten federal and Council fisheries managers will better understand the economic consequences of proposed fishery regulations. (Adams)

2.14 The Monroe County Sea Grant extension agent will serve on the Scientific and Statistical Committees of Gulf of Mexico and South Atlantic Fishery Management Councils. Four meetings are anticipated that will involve review and recommendations related to fishery management policy. Membership will also continue on the Coastal Pelagics Stock Assessment Panel. The Panel's Report will be presented to the Scientific and Statistical Committees and Advisory Panels of the Gulf of Mexico and South Atlantic Fishery Management Councils. (Gregory)

2.15 Two industry workshops regarding proposed fishery regulations will be held in Monroe County. One hundred fishermen will become involved in the process through testimony. (Gregory)

2.16 Disaster relief assistance will be provided to the commercial fishing industry in Monroe County. Assistance will be provided to at least 25 fishermen seeking disaster aid for damages caused by Hurricane Georges. (Gregory)

2.17 An effective working relationship with Destin Charter boat Association will be established and maintained. At least two (per year) of their meetings will be attended. Fisheries biology and management information will be provided to elicit compliance with marine resource regulations. Programs designed to increase angling ethics and reduce by-catch mortality will be presented. (Jackson, S.)

2.18 Lobster monitoring research of the Florida Keys National Marine Sanctuary Ecological Reserve in the Lower Florida Keys will be continued with one fisherman being contracted to provide data collection support to conduct both an open and closed season sample of lobster size and abundance. (Gregory)

2.19 Funding will be obtained and data will be collected, analyzed and distributed on the recovery of sponge populations in the Middle and Upper Keys and scientific information necessary to evaluate proper sponge fishery management measures will be presented to the Florida Fish and Wildlife Conservation Commission. (Stevely, Sweat)

2.20 A workshop for artificial reef coordinators in Citrus, Pasco, Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, and Collier counties will be held. Ten county artificial reef coordinators will increase their ability to properly plan, permit, design, and manage artificial reef programs. (Stevely, Sweat, Novak)

2.21 Two meetings of the Extension Artificial Reef Advisory Committee will be held in Monroe County. Ten individuals will learn the process of developing artificial reef construction grant proposals and permit applications. These individuals will assist in generating support for and knowledge about artificial reef programs. (Stevely)

2.22 Technical support will be provided to Manatee County in construction of one inshore reef and three inshore reefs. Technical support will be provided in monitoring of three artificial reefs. (Stevely)

2.23 Two new sites will be permitted and two artificial reefs deployed in Charlotte County. Data will be collected on three artificial reefs sites. At least 1,500 fishers will receive fish venting tools and training. (Novak)

2.24 The Taylor County Reef Research Dive Team (TCRRDT) will be assisted in applying for grants to monitor existing Taylor County artificial reefs as well as construct a new artificial reef, including permitting, site surveys, and materials suitability issues. Two classes will be taught for TCRRDT (fish identification and reef research diving techniques) team members. (Aubrey)

2.25 Assistance will be provided the Taylor County Reef Committee in developing a comprehensive artificial reef management plan for Taylor County. (Aubrey)

2.26 The economic impact of artificial reefs in Taylor County will be estimated using a boater's use survey. (Aubrey)

2.27 Lee and Charlotte Counties will be aided in the planning, development, securing of grants, materials and deployment of artificial reefs. (Wasno, Novak)

2.28 An effective artificial reef program in Okaloosa and Walton Counties will be created and maintained. Tasks will include: Service on county artificial reef advisory committees; writing and maintaining county artificial reef plans; assisting in grant writing; assisting in organization and maintenance of artificial reef monitoring programs; providing assistance and information to county personnel and potential artificial reef builders. (Jackson, S.)

2.29 An Annual Artificial Reef Workshop for recreational, commercial, and charter fisherman and divers, bait and tackle providers, and artificial reef producers will be organized and held. Local, state, and federal regulatory agency personnel will be invited to provide information and take part in panel discussions. An attendance goal of 75 individuals representing these groups from Okaloosa and Walton Counties has been set. (Jackson, S.)

2.30 Assistance will be provided in the formation of a volunteer artificial reef monitoring program in Okaloosa and Walton Counties. Data collection training, and data management and reporting will be provided. (Jackson, S.)

2.31 The fish venting brochure will be revised for distribution. Fish venting tools and informational materials will be distributed at three offshore fishing tournaments. At least 60 tournament fishermen will become knowledgeable of the use of fish venting tools. Three bait and tackle stores will collaborate in the distribution of fish venting tools and informational materials. (Stevely) Five fish venting tournaments will be officiated in Charlotte County. At least 1,500 fishers will receive fish venting tools and training. (Novak)

2.32 A fish venting training workshop will be held for new Florida Sea Grant marine extension agents. Eight new marine agents will become knowledgeable of the use of fish venting tools. (Stevely, Novak, Sweat, Adams)

2.33 A workshop on fish venting, circle hooks, and catch/release fishing will be organized with the Greater Miami Billfish Tournament. Venting tools will be constructed and distributed along with brochures to recreational fishermen and charter boats in the Miami-Dade County area. (Crane)

2.34 A new fact sheet will be developed: "How Old is the Fish I Caught?" (Stevely, Sweat, Adams)

2.35 A new fact sheet will be developed: "Does Catch and Release Work?" (Stevely, Novak, Adams)

2.36 Two educational seminars will be conducted on catch and release fishing techniques, venting fish, circle hooks, and pelican conservation. Videos and/or brochures will be distributed to recreational and commercial fishermen and boaters. About 100 recreational and commercial fishermen and boaters will become more aware of the use of catch and release techniques, venting of fish, use of circle hooks and pelican conservation methods. (Crane)

2.37 Technical support will be provided to the Sebastian Inlet Fishing Tournament. (Combs, Creswell)

2.38 Recreational fishermen will be educated on catch and release techniques, use of circle hooks, and marine conservation. Approximately 500 recreational fishermen will be educated in the use of circle hooks and catch/release techniques. (Novak)

2.39 Training on marine education will be provided to Charlotte County youth. Approximately 600 youth will be introduced to concepts of marine conservation. (Novak)

2.40 The annual Pier Fishing Tournament will be conducted in St. Petersburg. 250 youth and their adult sponsors will receive with an introduction to fisheries conservation and fishing ethics. (Sweat)

2.41 Approximately 300 boat owners will become familiar with the Boaters and Anglers' Pledge Program and will join the effort to clean up Florida's coastal waters. (Sweat)

2.42 Information on fishing ethics and fisheries conservation will be distributed at five youth fishing tournaments. Over 250 kids and their adult sponsors will gain knowledge on fishing ethics and conservation. (Crane)

2.43 The need for the development of an urban fishery program in Okaloosa County will be determined. Information gathered will be for a future program to increase the participation by non-traditional resource users, specifically minorities or women. (Jackson, S.)

2.44 The organizing committee of the 2001 Cortez Commercial Fishing Festival will be assisted. (Stevely)

2.45 Educational programs will be provided at the grand re-opening of the Centennial Park Fishing Pier in Lee County. Youth will learn about bait casting, fishing and rigging techniques, as well as fishing ethics. An educational kiosk will be developed to provide basic fishing concepts, rules, regulations and fish ethics. (Wasno)

2.46 The Lee County Department of Parks and Recreation will be assisted to develop a duplicate pier enhancement project (similar to the Centennial Park Fishing Pier) in North Fort Myers. Activities will focus on the planning and permitting aspects of the project. (Wasno)

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

3.1 In Florida, marine aquarium species are primarily collected from the wild (about $4 million annually) while farm-level sales of freshwater fish reached nearly $60 million in 1997. A Sea Grant goal is to increase the culture of marine ornamentals in order to generate economic activity in Florida while protecting the wild-caught stocks. Market information, the acceptability of various marine ornamental attributes, and the overall demand for marine ornamentals will be determined as a way to measure the potential of this culture industry. (2002) (Degner/Milon/Larkin: R/LR-A-29)

3.2 Certain marine algal species make up an important part of the natural diet of Atlantic surgeonfish, which have economic importance in Florida, and are traded globally for the aquarium trade. An experimental diet that approximates the natural diet of these fish will be developed and tested. The goal is to develop diets that can be used to improve the health and management of Atlantic surgeonfish and to enhance efforts for captive propagation. (2002) (Francis-Floyd/ Phlips/ Berzins/ Cardeilhac: R/LR-A-30)

3.3 Almost all of the 3000 species of marine fishes and invertebrates marketed in the aquarium industry, valued at over $7.2 billion annually worldwide, are collected from coral reef systems. Extensive and improper collection techniques can damage reef systems. Over 18 species of marine shrimps are harvested. The effects of different broodstock diets will be tested on two species of ornamental shrimps. The long-term goal is to produce aquarium shrimp in culture and reduce wild harvest. (Lin/Creswell: R/LR-A-31 [TAQ-99-16])

3.4 The First International Marine Ornamentals Conference 1999 was held in Hawaii in late 1999. Over 300 attendees discussed the collection, conservation and culture of marine ornamental fish. Attendees voted to hold the second conference, Marine Ornamentals 2001 in Florida. Florida Sea Grant will assume the lead role in organizing the conference. (Cato)

3.5 Adequate seed availability is a major nuisance to the further development of the hard clam culture industry in the southeastern U.S. Critical shortages have occurred, and remote setting will allow nursery operators and growers to become less dependent upon traditional seed sources. Technical procedures will be developed and the economic feasibility determined of transferring remote setting technology from the Pacific Northwest molluscan shellfish industry to the Florida hard clam industry. Over 100 nursery operators and 300 growers will learn of the economic costs and benefits of utilizing remote setting to obtain clam seed for field planting. (2002) (Adams/Sturmer/Supan: R/LR-A-27)

3.6 The fishery for naturally occurring hard clams is of major cultural and economic importance to many eastern U.S. states. Landings from the traditional stock have declined in the past due to over harvesting and removal of spawning stock. Stock enhancement in natural settings is an alternative to increase stock size. The feasibility of introducing

hatchery-sponsored larvae directly to the water column as a cost-effective means of stock enhancement for hard clams will be tested in the Indian River Lagoon. (2002) (Irlandi/Hitchcock/Arnold: R/LR-A-28)

3.7 The American bay scallop is a commercially important species along the U.S. east coast. However, commercial fishing for wild stocks has declined in many states and is banned in Florida. Ten commercial fishermen will be provided juvenile bay scallops and taught the technical growout, economic feasibility and marketing potential for bay scallops as a cultured species. (Blake/Sweat: R/LR-A-33 [TAQ-99-15])

3.8 Depletion of bay scallops in the Eastern Gulf of Mexico is largely due to loss of seagrasses which form an essential habitat. Seagrasses are recovering, but bay scallop spawning stocks are at an all-time low abundance in Tampa Bay. The goal is to significantly advance developing hatchery-release technology to replenish bay scallop populations on the Florida West Coast and to test the relative efficiency of cage versus free-planting cultured scallops in the field. (Leber/Halstead/Arnold/Blake: R/LR-A-34 [TAQ-99-104])

3.9 Overharvesting, adverse environmental conditions, oyster diseases and human health related diseases from oyster consumption have lead to overall industry declines. The goal of this project is to determine Dermo (*Perkiusus marinus*) tolerance or resistance of the Caribbean oyster and compare the tolerance to that of the American oyster. If successful, these traits can be hybridized from the Caribbean oyster to the American oyster for use in culture. (Scarpa/Bushek: R/LR-A-32 [OD-99-47])

3.10 A principal barrier for the development of a solid marine fish aquaculture industry in the U.S. is the consistent, large-scale production of fingerlings. Previous research and development aquaculture techniques for mutton snapper and greater amberjacks will be refined, the technology transferred to industry and the feasibility of producing commercial quantities of fingerlings tested at Grassy Key, Florida. (Benetti/Feeley/Mader: R/LR-A-35 [TAQ-99-108])

3.11 Sturgeon is a high value aquaculture species in some regions of the world. Very little is known about the demand for and the value of sturgeon in Florida. Little is known about the production of sturgeon in ponds as opposed to tanks. The performance of sturgeon in ponds will be evaluated, market demand and packaging techniques for the meat will be tested and the economic feasibility of pond growout techniques will be determined. At least 10 prospective sturgeon growers will learn the economic characteristics of culturing sturgeon in tanks and ponds in Florida. (2002) (Lazur/O'Keefe/Wirth/Zajicek/Zimet: R/LR-A-26)

3.12 The shrimp industry in Nicaragua has been decimated during the last two years by natural disasters such as hurricanes and virus contamination. Research and training will be initiated that focuses on the economic feasibility of shrimp culture techniques that minimize virus contamination possibilities and that focus on making shrimp safe for seafood consumption. This work will be conducted as part of a USAID funded activity involving Michigan and Puerto Rico Sea Grant. Fifty shrimp growers and lenders in Nicaragua will become aware of the financial characteristics of culturing shrimp in zero exchange systems. (Cato:Adams/Otwell/Garrido)

3.13 Clam growers on Florida's west coast have reported high mortalities of seed planted just hours before one of many recurring decreases in salinity. Adjacent adult clams and previously planted seed were unaffected, making crop insurance claims difficult to substantiate. Salinity change tolerances for newly planted seed clams need to be known in order to make informed planting decisions. (Baker, S., Baker, P., L. Sturmer: PD-00-7)

3.14 Worldwide sea urchin fisheries are declining at a time when demand is high. In some cases harvesting techniques have resulted in catastrophic changes to the ecosystems, causing irreversible damage. This project will determine the fishery and aquaculture potential of the short-spinned sea urchin *Lytechinus variegatus* in the Gulf of Mexico. This is a regional project with Mississippi-Alabama Sea Grant. (Lawrence: R/LR21PD)

3.15 An existing study on the economic feasibility of small-scale culture of hard clams in Florida will be updated to reflect current practices and costs. This revised extension document will provide information to those interested in entering the business to make informed financial decisions. Three hundred commercial hard clam growers will become aware of the updated financial feasibility characteristic of clam culture in Florida. (Adams, Sturmer)

3.16 The financial characteristics of small-scale bullminnow culture will be described. The data to be utilized in this study have already been compiled at the UF Mitchell Aquaculture Facility in Blountstown, FL. The analysis will be featured in an IFAS EDIS publication. Twenty-five prospective marine bait culturists will become aware of the potential profitability of culturing bullminnows for commercial purposes. (Adams, Lazur)

3.17 Science and vocational/technical teachers in the St. Lucie County Public School District will increase their general knowledge of aquaculture and develop topic specific teaching demonstrations that address the transferable skills for aquaculture outlined in the Florida Department of Education "Student Performance Standards – Aquaculture", Program Number 812000. (Creswell)

3.18 Ten new clam aquaculture industry members holding leases in the Indian River Lagoon will implement up-to-date culture practices and demonstrate knowledge of applicable Florida Department of Agriculture and Consumer Services regulations through compliance. (Creswell)

3.19 Research results on restricted and satiate feeding of two genetically isolated strains of juvenile channel catfish *Italurus punctatus* reared on 28 and 32 percent protein diets will be presented to the World Aquaculture Society in Orlando, Florida. (Jackson, S.)

3.20 The Third Annual Franklin County Oyster Industry Workshop will be held. (Mahan)

3.21 Regional and national Interstate Shellfish Sanitation Conference meetings will be attended to provide technical support to the Gulf oyster industry. (Mahan)

3.22 Volunteer members of the Franklin County Aquaculture Task Force that oversee development of the clam aquaculture industry in Franklin County will be recruited and organized. (Mahan)

3.23 A statewide extension effort that will support the emergent shellfish aquaculture industry in Florida by working in counties where clam farming is either on-going or has significant potential for growth will be continued. A marine agent educational network will be established that focuses on the targeted areas within Brevard, Indian River, Charlotte and Lee Counties. (Sturmer, Combs, Creswell, Novak, Wasno)

3.24 The current multi-county shellfish aquaculture advisory committee will be expanded to an industry-wide advisory committee that will assist in needs assessment and identification of educational programs and materials. (Sturmer)

3.25 Seventy-five percent of shellfish growers in eligible counties (Brevard, Dixie, Indian River, and Levy) will participate in a pilot crop insurance program and contribute to improving policy provisions during this initial evaluation period. (Sturmer)

3.26 The Clam Lease Assessment, Management, and Modeling using Remote Sensing (CLAMMRS) project will be implemented with the assistance of University researchers and state agency staff. This 4-year, $860,000 project funded by the U.S. Department of Agriculture will establish remote water quality monitoring systems in various Florida locations. CLAMMRS will gather real-time data important for shellfish production. (Sturmer)

3.27 Sixty percent of shellfish growers in six counties (Brevard, Charlotte, Dixie, Indian River, Lee and Levy), where remote water quality monitoring systems and weather stations (CLAMMRS) will be deployed at lease areas, will understand the benefits of a continuous database system that will assist them to identify trends in environmental conditions that are important to clam health and production. (Sturmer)

3.28 Thirty percent of shellfish growers in Brevard, Charlotte, Dixie, Indian River, Lee and Levy Counties will understand and adopt record-keeping in their activities. They will learn to use computerized spreadsheets to maintain crop inventories, record planting and harvesting activities, calculate yields and crop times, and track farm income and expenses. (Sturmer)

3.29 The 4th annual Hard Clam Growers Conference to discuss latest regulations, research findings, production and harvest techniques will be held. (Sturmer)

3.30 Sixty percent of Florida's shellfish hatchery and nursery operators will increase their awareness of the application of remote setting techniques and genetic selection programs by attending a genetic selection workshop. (Sturmer)

3.31 Sixty percent of new leaseholders in Indian River and Wakulla Counties will receive information on production techniques, economic feasibility and marketing strategies so they able to make informed decisions on whether or not to enter the shellfish business. (Sturmer)

3.32 The Shellfish Aquaculture newsletter that is distributed to over 600 industry members with businesses in 9 countries will be continued. (Sturmer)

3.33 The potential for development of a new scallop fishery resource product through open-water aquaculture for the west coast of Florida that will compete as a non-traditional product will be investigated. The project will include renewing aquaculture permit/lease with DCAS; growing a minimum of 5,000 juvenile scallops to market size (40 mm) in a cage system in the off-shore waters of Crystal River; placing a minimum of 250,000 juvenile scallops in natural areas in a restoration effort; conducting taste panels that will assist in the market acceptability and marketing strategy; and continuing scallop freezing/self life studies. (Sweat)

3.34 A proposal will be made to the 2001 International Pectinid Conference to host the 14th International Pectinid Conference in 2003 in St. Petersburg, Florida. It is expected that over 130 scientists from around the world will attend the conference. This conference has only been held once in the United States. (Sweat)

3.35 Mote Marine Lab will be assisted with the "Red Start" Program. This will be a cooperative effort to raise redfish from fry to 6-inch fingerlings for release into Charlotte Harbor. (Novak)

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

4.1 Bacteriophage has proven to be effective in killing pathogenic bacteria in mice and farm animals. *Vibrio vulnificus* are a bacteria present in oysters. *V. vulnificus* is lethal when consumed by people in certain risk categories. Bacteriophage may offer a practical and realistic method for making oysters safe for human consumption. They will be used to test their ability to kill *V. vulnificus* in oysters. (2001) (Duckworth/Gulig: R/LR-Q-20 [GMO-99-1])

4.2 Preliminary tests have shown *Vibrio vulnificus* could not be detected in oysters processed using certain freezing techniques. Oyster processors and consumers are not aware of this process, which could insure the viability of the raw oyster market. Additional tests will be conducted, the potential market demand for frozen (raw) oysters determined, and the results will be transferred to processors and consumers. (McNeely/Otwell/Rodrick/Zimet: R/LR-Q-21 [GMO-99-3])

4.3 Based on the training needs identified by the Seafood HACCP Alliance, sanitation training has been identified as a critical need in processing plants. The HACCP Alliance will complete reorganization during 2000 to focus on training in the use of Sanitation Standard Operating Procedures (SSOPs) in commercial and regulatory programs. (Otwell: E/TP-2)

4.4 Assistance and support will be given to local seafood producers in developing and implementing individualized HACCP Plans. (Combs)

4.5 One Sanitation Training Program for seafood dealers and workers in Franklin County and surrounding area will be taught. (Mahan)

4.6 At least two newspaper columns and/or press releases to inform/educate seafood industry of new regulations and/or educational opportunities available to them will be written in Franklin County. (Mahan)

4.7 The Franklin County Airport Manager and local seafood processors will be assisted in developing a seafood processing/freezer operation at the airport. (Mahan)

4.8 Membership will continue on Florida's *Vibrio vulnificus* Risk Management Work Group to develop and implement the statewide management plan to reduce *V. vulnificus* oyster related illnesses in Florida. An annual evaluation of illnesses in Florida will be done to determine if the management plan is working. One FDACS *Vibrio vulnificus* Risk Management Workshop will be attended to receive public comments on the management plan the work group developed. (Mahan)

4.9 Membership on the Interstate Shellfish Sanitation Conference's *Vibrio vulnificus* Education Subcommittee will continue to develop a national education plan to reduce V.*vulnificus* oyster related illness nationwide. National illness statistics will be monitored to determine if the education program is having the desired impact. (Mahan)

4.10 Six seafood safety workshops for 200 home seafood consumers who live along the West Coast of Florida. (Sweat)

4.11 Annual industry training sessions will be held with the assistance of county faculty . (Otwell)

4.11.1 Conduct Shrimp School, domestic processing firms, May 2001 and May 2002 for 25-30 firms. (Otwell)

4.11.2 Conduct Shrimp School, international, 2001-Nicaragua and 2002-Vietnam for 25-30 firms. (Otwell)

4.11.3 Conduct training for clam processors in Franklin County, July 2001 and June 2002. (Mahan)

4.12 The publication "Good Aquacultural Practices for Farmed Shrimp", will be completed to serve as the domestic and international guide to be referred by the U.S. Food and Drug Administration. (Otwell)

4.13 Shelf-life and taste panel trends for aquaculture produced sturgeon will be completed. (Otwell)

4.14 Periodic training schools for HACCP and Sanitation Control Procedures for seafood processing and regulatory inspectors will continue. Schools will be held every six months, plus as needed in response to firms, agencies or organizations that assure 25 attendees. (Otwell)

4.15 Leadership will be provided for numerous seafood technology organizations. (Otwell)

4.15.1 National Seafood HACCP Alliance, 2001-2003, National Coordinator, quarterly meetings. (Otwell)

4.15.2 Executive Director, Seafood Science and Technology Society of the America's Annual Conference. (Otwell)

4.15.3 U.S. Representative to International Association of Fish Inspectors Annual Meeting. (Otwell)

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

5.1 Federal and state governments have recently begun encouraging or requiring local governments to prepare various plans and strategies for reducing the impact of hurricanes and for dealing with post-storm problems. Local communities have, however, been reluctant to get involved in these activities. This project seeks to develop a gaming simulation that can be used in training local officials to prepare for hurricanes and their aftermath. In addition, the simulation will illustrate the impact of policy changes at higher levels of government on local communities. The resulting simulation will be implemented throughout the state by the Florida Department of Community Affairs. (Deyle: R/C-P-22)

5.2 Continued growth of the boating industry cannot be sustained unless conflicts are reduced among urban baywater resource users and the impact of marine facility development on coastal resources is minimized. The legal and institutional framework for regional coastal waterway management in Southwest Florida will be developed and implemented. (Hamann/Ankersen: R/C-P-23)

5.3 This effort builds on a number of Florida Sea Grant research projects to address bay water management issues by functionally integrating physical, biological, social and economic components of coastal ecosystems to promote sustainable use. It provides for an extension education program to facilitate non-regulatory, environmentally sensitive management of Florida's waterways. These program activities will be undertaken with federal (NOAA/Coastal Service Center, NOAA/Coast Survey), state (Florida Department of Environmental Protection), regional (inland/inlet navigation districts), county/municipal, and private sector (boating organization, homeowner association) participation through Memoranda of Understandings (MOUs) for anchorage and waterway management. (Swett, Sidman, Fann: E/CSC-4; SGEP-12)

5.3.1 An Advisory Council that will assist the Urban Bay Management Program to clarify and prioritize issues, develop program objectives, identify and establish partnerships with governmental entities, and evaluate program activities will be organized. (Swett)

5.3.2 Thirty community leaders and citizens will be educated through three workshops, one extension bulletin, five meetings with state and local governments, and 15 individual consultations and meetings. (Swett, Sidman, Fann)

5.3.3 Field surveys for five Florida Anchorages will map sea grasses, bottom characteristics, and water depth and produce large-scale photomaps of each site for resource managers and for boaters. (Swett, Sidman, Fann)

5.3.4 Expert scientific services will be provided to local, regional and state governments, in implementing anchorage management plans. (Swett, Sidman, Fann)

5.3.5 A one-year monitoring program at three locations using social and bio-physical management criteria for recreational water-use zoning will be completed and results reported to state and local authorities. (Swett, Sidman, Fann)

5.3.6 A management analysis of 90 miles of waterways in Manatee County will be completed. Products will include large-scale maps for planners, managers and users. (Swett, Sidman, Fann)

5.3.7 A management analysis for 100 miles of waterways in south Lee County will be initiated with WCIND funding. Products will include large-scale maps for planners, managers and users. (Swett, Sidman, Fann)

5.3.8 A regional dredge-and-fill GIS database for Manatee and Sarasota Counties will be developed with WCIND funding. Historical data (digitized) for Charlotte and Lee Counties will serve as a basis for extending the historic waterway analysis to the southern sector of the southwest Florida coast. (Swett, Sidman, Fann)

5.3.9 Three in-service training workshops and tutorials in the utilization of GIS and GPS technology in addressing coastal management issues will be given for 30 local, regional and state government staff. (Swett, Sidman, Fann)

5.3.10 A 60-page blueways atlas under the auspices of the Sarasota Bay Heritage Trail Program will be published. The Florida Marine Research Institute (FMRI) will be assisted to develop a conceptual, analytical framework of the human-use component of the Florida Blueways Initiative. (Swett, Sidman, Fann)

5.3.11 The second revised edition of the Guide to Anchorages in Southwest Florida will be published. (Swett, Sidman, Fann)

5.3.12 The accessibility and information content of the Florida Sea Grant anchorage web page will be enhanced by using the latest map server technology. (Swett)

5.3.13 Collaborate will occur with the NOAA Marine Chart Division (MCD) in the design and product evaluation of a prototype photochart (NC11425) based on recreational boater needs and chart-reading skills. (Swett, Sidman, Fann)

5.3.14 Local public and private sectors will be aided in developing partnering arrangements to sponsor the printing and distribution of these photomap products for the recreational boaters. (Swett, Sidman, Fann)

5.3.15 Under a cooperative agreement with the West Coast Inland Navigation District, (WCIND) a valuation study will be designed that will assess the waterway infrastructure investments in Manatee and Sarasota County waters. (Swett)

5.3.16 Scientific advisement and program support to WCIND in implementation of their five-year comprehensive Regional Waterway Management Plan will be provided. (Swett, Sidman, Fann)

5.3.17 The historical waterway analysis will be extended south into Charlotte Harbor, Pine Island Sound, Caloosahatchee River, Estero Bay and the Imperial River. (Swett)

5.3.18 An ArcView GIS decision support system for use by resource managers that incorporates methodology developed for the Regional Waterway Management Systems (RWMS) conducted in Lee, Manatee, and Sarasota Counties will be developed. (Swett)

5.3.19 A survey of methods for characterizing recreational boating in Charlotte Harbor will be completed. (Sidman, Fann)

5.3.20 Presentations on boating related coastal waterway management will be made at the Biennial Coastal GeoTools '01 Conference in Charleston, South Carolina and for a National Sea Grant sponsored panel at the 12th Bienniel Coastal Zone '01 Conference in Cleveland, Ohio. (Swett, Sidman, Fann)

5.4 Nature-based tourism providers in Taylor County will be assisted in the development of tourism activities relative to sustaining the natural resources (i.e., infrastructure required, planning, species inventories, and ecosystem processes). (Aubrey)

5.5 Taylor County's boater's use survey will be conducted to help determine the economic impact of fishing, diving, and boating as well as evaluate the efficiency of dollars spent by the county. (Aubrey)

5.6 2,500 Taylor County boater's guides will be produced. (Aubrey)

5.7 One hundred recreational boaters will gain knowledge and adopt methods to conserve fuel when boating by receiving a fact sheet on Fuel Conservation Techniques. (Crane)

5.8 A Boater's Guide to address boating safety, access, fishing conservation, and recreational localities within Biscayne Bay will be produced. (Crane)

5.9 Fifty boaters will gain knowledge about pollution prevention and adopt alternatives to using non-toxic boat cleaning products. (Crane)

5.10 One marina in Escambia County will begin the certification process in the state's "Clean Marina Program" as measured by program guidelines. (Diller)

5.11 Technical assistance will be provided for development of a Bradenton Beach anchorage management plan. (Stevely)

5.12 Fifty resource managers and elected officials will more effectively manage anchorage resources (Regional Harbor Board Anchorage Management Plan) through Sea Grant's involvement and continued participation on the Regional Harbor Board in Southwest Florida. (Stevely)

5.13 A regional MarinaNet meeting will be attended to explore future educational program activities. (Jackson, D.)

5.14 State Clean Boating Partnership Advisory Council meetings will be attended to develop training programs for Florida's marinas and boatyards. (Spranger, Jackson, D.)

5.15 Best Management Practices for Boatyard Resource Kits for new Clean Boatyard Program will be developed. (Jackson, D.)

5.16 Curricula and two training programs will be conducted on "Preparing the Presenters" for the new Clean Boatyard Program. (Jackson, D.)

5.17 An evaluation of the new Clean Boatyard Training Program will be completed. (Spranger)

5.18 Ten low power radio units will be placed in 10 marinas around the state to test the effective of this new technology in conveying important marina and boating safety information. (Jackson, D.)

5.19 The Pensacola Bay Boater's Guide will be reprinted and distributed to Santa Rosa County citizens. (Verlinde)

5.20 The Boaters Guide To Lee County will be revised, printed and distributed to boaters. This guide provides a concise depiction of regulated water zones, navigation channels, sea grass meadows, artificial reefs and boat ramp locations. (Wasno)

5.21 The Fort Myers Yacht Basin will be assisted in expanding their mooring field to allow transient vessels safe harborage for short or long-term anchoring. (Wasno)

5.22 Five hundred "Don't Splash Your Trash" signs will be distributed to over 40 marinas and boatyards in the Miami-Dade County region. (Crane)

Coastal Ecosystem Health and Public Safety

Goal 6: Protect and Enhance Coastal Water Quality and Safety

6.1 A major and rapidly growing source of non-point source contamination in the coastal zone is nutrient loading from septic and other types of on-site disposal systems. This project will develop new approaches to study rates of water and nutrient transport via groundwater from on-site disposal systems. It will simulate both short- and long-term flow rates on St. George Island, Florida. (2002) (Burnett/Chanton/Corbett: R/C-E-42)

6.2 In 1987, persistent and widespread phytoplankton and cyanobacterial blooms have coincided with the large-scale decimation of sponge communities in Florida Bay. One hypothesis is that the large-scale loss of suspension feeding sponges has rendered the ecosystem susceptible to these recurring blooms. The goal is to experimentally determine the potential for suspension feeding sponges to control nuisance phytoplankton blooms caused by internal non-point source pollution. (2002) (Peterson/Fourqurean: R/C-E-43)

6.3 When wastewater contaminates coastal waters there is an increased risk of infection by human pathogenic microbes, including viruses, bacteria and protozoans. This could affect water-based industries, which create multi-billion dollar economic impacts in Florida. This project will improve enteroviral detection methods for use in coastal waters, to ensure the safety and quality of human uses of these waters, and to provide a method that can be used to improve water quality. (2000) (Paul/Rose: R/LR-MB-12 [T-99-55])

6.4 Restoration and long-term sustained quality of the Florida Bay ecosystem and dependent economies involves major expenditures of public and private funds. More than 100 research projects focused on Florida Bay. Scientists will contribute data vital to the description, understanding and prediction necessary for management of the Florida Bay ecosystem. But ultimately the success of management will depend on the awareness and knowledge of citizens, businesses and organizations in the Florida Bay region. The purpose of the Florida Bay Education Project is (1) to provide a communication link between South Florida citizens and the research community working toward ecosystem management and thus empower citizens to make science-based decisions on issues that affect Florida Bay and (2) to serve as the education arm of the Florida Bay Program Management Committee, the multi-agency research coordination body overseeing scientific research in Florida Bay. This program will be continued, but phased out at the end of 2001, if continuation funding is not found. (Gregory, Engleby: E/COP-1, E/COP-2, E/COP-3)

6.5 Thirty 4-H participants and adults will participate in the UF/IFAS program Project Coast. Baseline data and the long-term outlook of Taylor County's water quality derived from these programs will be disseminated to the public. (Aubrey)

6.6 Taylor County residents will be educated on the effects of their practices on water quality through newsletters, public media, and workshops. (Aubrey)

6.7 Input regarding design of the collecting devices and assistance in a shoreline cleanup effort will be given to the Brevard County Monofilament Recovery and Recycling Program (MRRP). (Combs)

6.8 Participation in the State of the Indian River Lagoon Conference and the Melbourne Harbor Festival will provide the opportunity to give information concerning Sea Grant programming to 400 visitors. (Combs)

6.9 Dr. Mikhail Shilin will be given long distance assistance in developing a system of Science Fairs in Russia, and developing a Russian component to the Internet-based International Math Program. (Combs)

6.10 Fifty boaters will gain knowledge about pollution prevention and adopt alternatives to using non-toxic boat cleaning products. (Crane)

6.11 Thirty percent of the homeowners in one identified neighborhood whose storm water enters Bayou Texar will adopt yard and garden practices that reduce the amount of fertilizer in runoff as measured by pre and post surveys. (Diller)

6.12 Fifty boaters will adjust their cleaning, fueling, and maintenance methods to reduce pollutants entering local waterways. (Diller)

6.13 Two programs will identify water quality and habitat problems and solutions for Okaloosa/Walton County residents. (Jackson, S.)

6.14 Three meetings of the Sarasota Bay National Estuary Program Technical Advisory Committee will be coordinated. (Stevely)

6.15 A research project designed to estimate the economic impact of Red Tide will be assisted. (Stevely)

6.16 Three hundred boat owners will receive beach cleanup materials and "Boaters & Anglers Pledge Program materials. (Sweat)

6.18 A public information (warning) poster on the Green Mussel, an exotic species that has been found in Tampa Bay will be developed and distributed. (Sweat)

6.19 Florida Yards and Neighborhood Program workshops will enable at least one waterfront community to obtain knowledge on water quality issues, resulting in changes that will improve the quality of water in their area. (Tavares)

6.20 One hundred boaters will learn about and adopt environmentally friendly boating practices that encourage healthy sea grass communities. (Tavares)

Goal 7: Protect, Restore, and Enhance Coastal Ecosystem Habitats

7.1 A web site for the nation's 20 most invasive non-indigenous aquatic plants will be developed. The site will include information for identification, eradication and native replacements. Seven plants will be documented during 1999 and 13 plants will be added during 2000. (Ramey: E/NS-1 [ANS-99-107])

7.2 Stock enhancement and habitat enhancement are methods being used to enhance and conserve estuarine fishes. The variability of environmental factors in known and potential nursery areas for red drum, snook and flounder will be determined by Florida, Texas and North Carolina Sea Grant as a way to improve the success rate of stock enhancement programs. (Leber: R/LR-A-25)

7.3 Establishment of sea oats on restored beaches is critical for combating erosion losses. However, concerns about genetic diversity have lead to restrictions in harvesting and planting sea oats. The overall goal is to enhance ecologically sound establishment of micropropagated sea oats by developing compatible plant/mycorrhizal fungus ecotype combinations for out planting onto Florida beaches. (2002) (Sylvia/Kane: R/C-S-38)

7.4 West Florida shelf-edge reefs are of major importance to reef fish fishery production in the Gulf of Mexico. These reefs support major fisheries for groupers and other reef fish. However, little is known of the biological and geological characteristics of these reef systems, and some of the fisheries are overfished and some species are threatened. The goal of this project is to monitor changes in these fish stocks in relation to the reef habitat. (2002) (Koenig, Coleman, Levitan: R/LR-B-51)

7.5 Artificial reefs are a potentially powerful management tool that can be used to enhance fish production and divert deleterious impacts away from natural habitat. Marine ornamental fish are currently collected from natural reefs with pressure being applied to restrict collection on a worldwide basis. The goal of this project is to begin the examination of the use of artificial structures for marine ornamental fish production, thus preserving the natural reef system. (2002) (Osenberg, St. Mary, Bolker, Bohnsack, Lindberg, Watson: R/LR-B-52)

7.6 The brown macroalga *Dictyota* presently dominates the Florida Keys reef tract. However, little is know about the related abundances of each morphology in this area, and little is known on how this bloom is impacting resident macrophytes, invertebrates and fishes. This pilot project will begin to answer this question and lead to more developed research proposals in this area. (Walters: PD-99-10)

7.7 A number of National Estuarine Research Reserves now exist around the coastal areas of the U.S. The goal of this study is to determine appropriate techniques to manage recreation use in the research reserves. The Rookery Bay reserve in Florida will be used as a model for development information that can be transferred to other reserves. (Stein: PD-99-11)

7.8 Aquatic nuisance species are a major problem nationally and in Florida. Yet, few scientists at Florida universities have developed interests in this area, and few have taken advantage of national funding opportunities. The goal of this project was to send three faculty members to the Second International Conference on Marine Bioinvasions to learn about scientific needs and opportunities, and then to provide leadership to a statewide faculty group in order to formulate a statewide university approach to research in marine aquatic invasive species. (Baker, S., Baker, P., Walters: PD-01-2)

7.9 Workshops on the exotic Zebra Mussel and green mussel will be conducted in order to heighten awareness of this serious economic and environmental threat. (Combs)

7.10 Invasion of Brazilian peppers in mangrove communities continues to cause loss of mangrove habitat and reductions in juvenile fisheries habitat associated with mangrove roots. Four public presentations, and four Sea Grant displays at public events, such as the Brevard County Fair and Melbourne Harbor Festival will be made. (Combs)

7.11 Ten local decision-makers, such as County Commissioners and City Councilmen, will be provided Sea Grant coastal ecosystem publications and information that is based on university research results, in order to assist them in making science-based management and planning decisions. (Combs)

7.12 Two hundred volunteers will participate in the Annual International Coastal Beach Cleanup to reduce trash on beaches and to record the number and types of marine debris found. (Crane)

7.13 Two hundred marine facilities will receive "Don't Splash Your Trash" signs to increase the communities awareness of the impacts of marine debris. (Crane)

7.14 One hundred boaters will learn the impacts of marine debris and adopt practices to minimize it by receiving educational brochures. (Crane)

7.15 Thirty percent of beach residents will turn their beach-front lights off during sea turtle nesting and hatching season as measured by pre and post season lighting surveys by volunteers. (Diller)

7.16 Fifteen Gulf-front homeowners will be trained to plant dune vegetation to increase dune height between their homes and the gulf as measured by successful transplanting (plants survive and grow). (Diller)

7.17 Local television, radio, and newspaper media (monthly) will be used to provide information to clientele regarding marine habitat and water quality issues, fishing ethics, "Essential Fish Habitat", fisheries regulations and management, and county artificial reef programs in Okaloosa and Walton Counties. (Jackson, S.)

7.18 At least 100 shoreline area residents in Okaloosa and Walton Counties will implement environmental landscape practices in their yards. (Jackson, S.)

7.19 A water quality monitoring program for the fifteen coastal dune lakes in Walton County will be established. (Jackson, S.)

7.20 Local government and other entities in Okaloosa and Walton Counties will be assisted in distributing will be assisted in native dune plants for at least 25 residents. (Jackson, S.)

7.21 At least 15 shoreline residents in Okaloosa and Walton Counties will restore wetland vegetation. (Jackson, S.)

7.22 Two plantings of native plants for either restoration or stabilization using area youth will occur in Okaloosa and Walton Counties. (Jackson, S.)

7.23 The knowledge of at least 50 Master Gardeners in Hillsborough, Manatee, and Sarasota counties (and as requested by other counties) in water quality issues and coastal plant identification and ecology will be increased. (Stevely)

7.24 A Coastal Environment and Water Quality Design Team will be established. (Jacoby)

7.25 An editorial team of extension agents and campus faculty will be formed together to review and revise the "What is an Estuary" publication, and to identify other educational needs that focus on Florida's estuaries. (Spranger, Jacoby)

7.26 A meeting between Florida Sea Grant extension agents and Florida Yard and Neighborhood staff in South Florida will be coordinated to explore future joint educational activities and development of educational materials. (Spranger)

7.27 Coordination with the Greater Fort Lauderdale Marine Protected Area Committee, a coalition of dive operators, volunteer organizations and citizens, to hold three public hearings on developing a Marine Protected Area in waters off Broward County will be achieved. Planned activities will include publicizing the meetings and serving as host and facilitator. (Tavares)

7.28 One hundred and fifty residents and tourists will participate in underwater, rivers and coastal cleanup activities that are co-sponsored by Florida Sea Grant. (Verlinde)

Goal 8: Prepare and Respond to Coastal Storms

8.1 A gaming simulation technique of community planning for hurricane mitigation and disaster recovery for use in training local officials and testing the impacts of government policy changes on local planning for disaster recovery and hazard mitigation will be developed. (Deyle: R/C-P-22)

8.2 Coastal dune stabilization by planting nursery propagated sea oats is the most cost-effective practice to control erosion in the southeast United States. Effects of transporting different plant ecotypes between sites for transplanting is a concern. The goal is to determine the extent of genetic divergence among sea oat populations to determine if transplanting among areas is feasible. (Kane: R/C-S-36, PD-99-6)

8.3 Establishment of sea oats on restored beaches is critical for combating erosion losses. However, concerns about genetic diversity have lead to restrictions in harvesting and planting of sea oats. The overall goal is to enhance ecologically sound establishment of micropropagated sea oats by developing compatible plant/mycorrhizal fungus ecotype combinations for out planting onto Florida beaches. (2002) (Sylvia/Kane/Alagely/Milman: R/C-S-38)

8.4 A recently completed Sea Grant project on long-term shoreline position resulted in the identification of previously unrecognized shoreline characteristics which are important to the long-term management of Florida's and the nation's beaches. This project will investigate these characteristics of sand sediment sources and sinks on Florida's east coast, determine the causes of unpredicted shoreline and advancement, develop more rationale sediment budgets and disseminate the information to professional and lay audiences for use in decision making and shoreline project planning. (2002) (Dean: R/C-S-39)

8.5 Rip currents account for 80 percent of beach rescues, accounting for 36,000 rescues in 1997. About 150 drownings (30 in Florida) occur each year due to rip currents. The ability to predict the occurrence of rip currents will reduce this dramatically. A database of rip currents will be developed and a predictive model will be developed and tested. (2002) (Hanes/Tieke/Dean: R/C-S-40)

8.6 Florida's extensive coastline and rapid urbanization is placing more people and property at risk. The goal of this project is to determine the performance of advanced transducer systems in monitoring of actions on coastal structures during strong wind events. It is a pilot study. (Pinelli, Subramanian: PD-00-6)

Education and Human Resources

Goal 9: Produce a Highly Trained Workforce

9.1 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. (Cato)

9.2 At least one national Sea Grant Industrial Fellow candidate (of 2-4 per year nationally) will be successful every three years. (Cato)

9.3 At least 25 percent of the annual Florida Sea Grant federal core program research budget will be used to support graduate students. (Cato)

9.4 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. (Cato)

9.5 One high school student will receive a college scholarship through the Chuck Skoch Florida Sea Grant Scholarship. (Cato)

9.6 A minimum of $400,000 per year in non-national Sea Grant CORE program funding will be received from extramural funding sources to support Sea Grant programs. (Cato)

9.7 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. (Cato)

9.8 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. (Cato/Seaman)

9.9 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. (Seaman/Cato: PD-00-1)

9.10 A minimum of two qualified applicants will be submitted to the NOAA Coastal Services Center Competition each time it is held. (Cato)

9.11 The process to become certified by the American Fisheries Society "Fisheries Biologist" will be initiated American Fisheries Association Florida Chapter Meeting will be attended. (Mahan)

9.12 Annual in-service training for Florida Sea Grant Extension faculty that provides administrative updates, reviews current Sea Grant research and extension activities, and program planning efforts will be organized. (Spranger)

9.13 Working with NOAA's Ocean Services Center, in-service training for Florida and Alabama Sea Grant faculty and governmental agency staff will be provided on effective meeting management, dealing with conflict and controversy and facilitation skills. (Spranger)

9.14 A regional Sea Grant Extension faculty meeting with program leaders from South Carolina, North Carolina and Georgia will be held. It will provide in-service training on and provide opportunities to explore regional collaborations. (Spranger)

9.15 A regional Sea Grant Extension faculty meeting with program leaders from Texas, Louisiana, Mississippi and Alabama will be coordinated that will provide in-service training on and provide opportunities to explore regional collaborations. (Spranger)

Goal 10: Create a Scientifically and Environmentally Informed Citizenry

10.1 A number of educational activities are implemented under the previous goals. The following ones cross many goals and are implemented in general.

10.1.1 High quality publications that effectively communicate the results of Florida Sea Grant activities to both general and specialized audiences will be produced. This includes Sea Grant Reports, Sea Grant Extension Fact Sheets and brochures, Sea Grant Technical Papers, books, book chapters, staff papers, conference proceedings, newsletters, posters and videos. The exact number will depend on the work plans and research results of faculty. (Kearl/Zimmerman)

10.1.2 At least ten print news releases will be produced. (Kearl/Zimmerman)

10.1.3 The existing Florida Sea Grant Internet home page will be upgraded and maintained. (Zimmerman/Whitehouse/Damron)

10.2 Taylor County adults and youth will be educated in terrestrial and marine navigation techniques. (Aubrey)

10.3 A National Association of State Boating Administrators boating safety class will be developed and taught to 50 Taylor County youth. (Aubrey)

10.4 Through 4-H program activities, 50 Taylor County youth will be educated on coastal ecosystems and the effects of man's activities on those ecosystems. (Aubrey)

10.5 Local school programs in Brevard County will target the involvement of 100 minority youth in environmental programs. 4-H Agents will be assisted in educating fifty 4-H youth about local marine environments. (Combs)

10.6 Twenty children in Miami-Dade County will acquire knowledge of marine debris and be able to list the sources, types and impacts. (Crane)

10.7 Technical assistance will be provided for the Smithsonian Ecosystem exhibit in St. Lucie County in the design and fabrication of living exhibits and life support systems; to coordinate collection, quarantine and transfer of live specimens to the exhibit; and to serve as member of the review committee for contributed static displays. (Creswell)

10.8 St. Lucie County science teachers will receive instruction on marine ecology at the New Smithsonian Ecosystem exhibit. One hundred students in high schools of the St. Lucie County School District will improve their knowledge of marine science, general ecology and the Indian River Lagoon as defined by the performance standards in "The Florida Sunshine State Standards and Instructional Practices". (Creswell)

10.9 One hundred of middle and high schools science educators in the St. Lucie County School District, marine science educational facilities, 4-H club leaders, and other educational programs in St. Lucie and Indian River counties will receive "The Directory of Marine Science Education Resources of the Treasure Coast". (Creswell)

10.10 One hundred students enrolled in St. Lucie County School District vocational/technical programs will increase their general knowledge of aquaculture and 200 students enrolled in St. Lucie County School District college preparatory program will increase their general knowledge of aquaculture. (Creswell)

10.11 Three 4-H marine science institutes, with two hosted at the Timpoochee 4-H Center and one at the Citrus County Crystal River Marine Lab, will be conducted. (Culen, Diller, Jackson, S., Mahan, Verlinde)

10.12 A statewide Marine Ecology contest for 4-H youth will be held. (Culen, off-campus faculty)

10.13 Curricula relating to aquatic and marine ecosystems to support 4-H and school enrichment programs will be developed. (Culen)

10.14 One hundred local government officials, media, educators, 4-H leaders, homeowners, commercial fishermen, port and marina personnel, and members of environmental groups will become aware of the Sea Grant/marine Extension program and its services in Escambia County. (Diller)

10.15 Eleven local educators, homeowners, developers, commercial fishermen, port and marina personnel, and Chamber of Commerce members will form the Escambia County Marine Extension Advisory Committee to advise the marine agent of current problems/concerns and provide direction for programming. (Diller)

10.16 Fifty teachers and 4-H leaders will utilize marine information at the Escambia County website for educational purposes. (Diller)

10.17 Ten master gardeners, office assistants, extension agents, and the horticultural technician will be able to assist clientele in receiving current marine extension publications in a timely manner due to the updating of the Escambia County marine publications and files. (Diller)

10.18 Two hundred 4-H youth in Escambia County will improve their knowledge of endangered species utilizing local beaches and ways that they can help protect these species as measured by group projects designed to "Save our Species". (Diller)

10.19 Twenty-five teachers in Escambia County and 4-H leaders will utilize a "Sea Turtle Science" website monthly with their students to increase knowledge of and decrease human impact on turtles nesting in the region as measured by pre and post turtle quiz games with students. (Diller)

10.20 An annual "Take a Kid Fishing" Program, targeting minority and under-served groups will be held in Okaloosa and Walton Counties. Four sponsoring agencies and businesses will be obtained and fishing techniques, target species, fisheries licensing and regulations, and angling ethics will be taught to 100 attendees. (Jackson, S.)

10.21 At least ten public and private educators will be provided age appropriate materials and presentations to assist with the study of marine ecology and coastal resources stewardship in Okaloosa and Walton Counties. (Jackson, S.)

10.22 Several 4-H camps in Okaloosa and Walton County will be held during the summer months. Marine resources training will be provided to camp staff so that they can be more competent in this field. Camps emphasizing marine ecology will be held in July. (Jackson, S.)

10.23 After the completion of 4-H camp, a goal of establishing two new 4-H clubs in South Walton and/or Okaloosa counties will be pursued. (Jackson, S.)

10.24 Collaborative work with North West Florida Sea Grant agents will result in a quarterly newsletter devoted toward topics on sea turtles, hurricanes, marine debris, artificial reefs and other timely topics. (Jackson, S., Verlinde and Diller)

10.25 At least ten youth in Franklin County will be involved with at least one "environmental" community service project (i.e. Don't kill pelicans with kindness, Center for Marine Conservation's Annual Coastal Cleanup). (Mahan)

10.26 The Health & Human Resources Task Fore (Health Fair, Seafood Festival), Juvenile Justice Council and the WINGS (educational activities) programs will be assisted to offer Franklin County youth a variety of youth enrichment opportunities. (Mahan)

10.27 Sessions at the District I Marine Science Camp will be planned, organized and taught. (Mahan)

10.28 Teachers and students will expand participation in and the sophistication of the Franklin County High School Aquaculture programs. (Mahan)

10.29 A program that features proper seafood handling and safety for the Franklin County FCE Club will be held. (Mahan)

10.30 Assigned projects by the Board of Franklin County Commissioners will be planned and implemented (i.e., Clam Aquaculture Task Force & DEP Liaison to the Board). (Mahan)

10.31 One thousand residents in Southwest Florida will be taught about local fishery resources and how they are harvested. (Stevely)

10.32 Sponge research results will be presented by a poster exhibit at the Florida Bay Science and Adjacent Ecosystems Science Conference. (Stevely, Sweat)

10.33 One-hundred Pinellas to Citrus County coastal residents will receive science -based informational materials through seminars, workshops, and mass media channels that will teach them the importance of the fragile marine and coastal ecosystem. (Sweat)

10.34 Two hundred youth and their adult sponsors will receive an introduction to conservation and fishing ethics, and provide marine educational materials and information at an Annual Kid's Fishing Tournament at the St. Petersburg Pier. (Sweat)

10.35 Two hundred 4-H members and school children will learn about marine resources, their value and sustainable use through environmental fairs and workshops. (Tavares)

10.36 One hundred and fifty 5th Graders will increase their knowledge about the beach ecology system along the Santa Rosa Sound and Gulf of Mexico in Sea Grant sponsored field trips. (Verlinde)

10.37 Two hundred and fifty Santa Rosa County residents will increase their knowledge of local river and estuarine ecology, history, management issues, and protective measures by attending the 2001 Rivers Symposium. (Verlinde)

10.38 One hundred homeowners will increase awareness of shoreline protection and enhancement practices, recycling, household chemical use reduction and non-point source pollution prevention by attending coastal living seminars in Santa Rosa County. (Verlinde)

10.39 The Florida Marine Mammal Stranding Network – Southwest Region will be assisted to develop educational materials and assist in stranding events that involve rescuing injured or entangled marine mammals. (Wasno)

10.40 A brochure on manatee biology and life history that targets the recreational boater in Brevard County will be developed. (Combs)

10.41 A three-year grant proposal with Alabama, Louisiana and Mississippi to conduct regional teacher training programs on aquatic nuisance species will be completed. If funded, project will begin in 2001. (Spranger)

10.42 Co-sponsorship and participation will occur for an Environmental Education Institute for 40 Florida 4-H agents that will be held at Camp Ocala. (Spranger)

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