Creating a Sustainable Coastal Economy and Environment Through Research and Education

FLORIDA SEA GRANT COLLEGE PROGRAM
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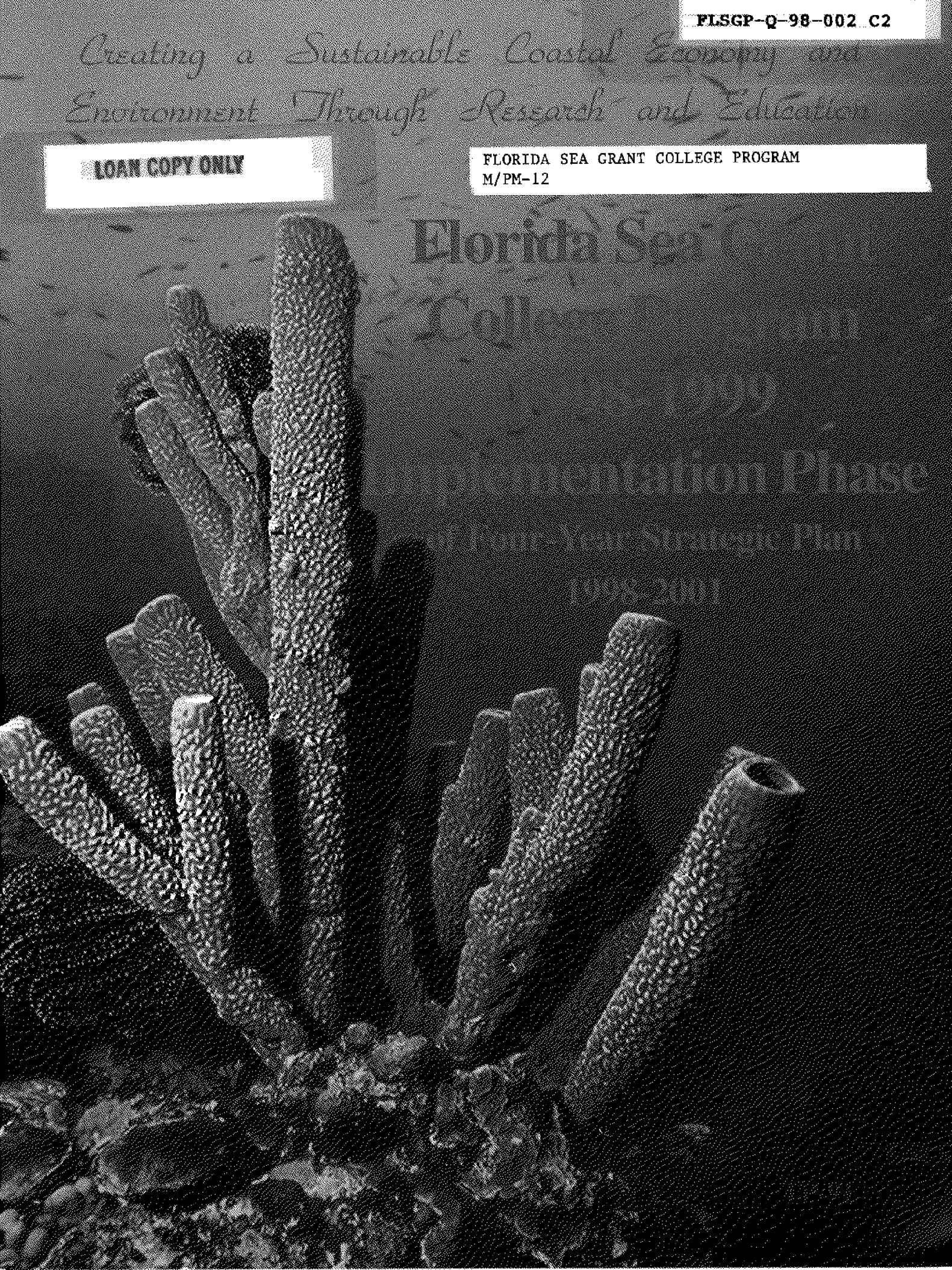
Florida Sea Grant



Creating a Sustainable Coastal Economy and Environment Through Research and Education

Florida Sea Grant College Program 1998-1999 Implementation Phase

of Four-Year Strategic Plan 1998-2001

A partnership program among the State University System of Florida
University of Florida

Oceanic and Atmospheric Research
National Oceanic and Atmospheric Administration

Florida's citizens, industries and governments

Technical Paper-91

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UNIVERSITY OF
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Introduction

The Florida Sea Grant College Program is committed to enhancing the practical use and conservation of coastal and marine resources for a sustainable economy and environment. Florida Sea Grant's Strategic Plan for 1998-2001 defines the purpose of the program; highlights Florida's coastal wealth; demonstrates the need for research and education; 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.

This document highlights the "action" elements designed to achieve the goals and objectives of the strategic plan. Each action element is listed with the expected year of completion shown in parentheses. Copies of the Strategic Plan can be obtained from the Florida Sea Grant College Program.

Economic Leadership

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

1.1 Certain natural tunicate products have potential for use as pharmacological anti-viral products. Natural supplies are low and methods will be examined to increase their supply synthetically. (1998)

1.2 The presence of carcinogens in the environment is a serious health and social problem. A method to detect carcinogens in Florida's coastal marine waters will be developed as a way to reduce human exposure to these agents. (2000)

1.3 Marine microbes associated with invertebrate species are relatively unexplored and an exciting potential new source of disease-fighting substances. Microbes will be collected, cultured and bioassayed to determine if they are potential anticancer and antibiotic substances with new drug potential. (2000)

1.4 Marine invertebrate cell culture technology can be used to produce useful natural marine products. Sponges and tunicates will be used to identify, clone, and express growth regulating genes to enhance the production of compounds with therapeutic potential. (2000)

1.5 Preclinical and clinical development of promising pharmaceutical agents is frequently compromised by inadequate supplies. Novel techniques will be used to develop production methods for two groups of bioactive marine alkaloids in sustainable supplies necessary to produce sufficient quantities of new drugs and protect the marine environment. (2000)

1.6 Discodermolide is a potent anti-proliferative compound similar to but more potent than Taxol®. Supply for ongoing preclinical evaluation is a critical issue. It will be determined if discodermolide is produced by a microorganism associated with sponges as a renewable resource. (2000)

1.7 A compound from a marine tunicate shows potent anti-tumor activity and has recently entered clinical trials in the U.S. and Europe for the treatment of cancer. The compound is limited from natural sources and work will be completed to determine if the source organism can be produced through cell culture. (1998)

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

2.1 A bioeconomic analysis will be conducted on the Florida spiny lobster fishery. This will include developing production and cost models for the fishery and for vessels in the fishery. The volume and price of transfers between certificate holders under the Trap Certificate Program will be determined. The number of traps to achieve maximum economic yield in the fishery will be determined. (1998)

2.2 The impacts of the 1995 Florida Entanglement Net Ban on commercial fishing families will be determined. Data from a 1991-1993 Sea Grant study (before the ban) will be compared to

1997 data (after the ban) on approximately 90 fishing families as a way to determine the impacts of future regulations. (1998)

2.3 Fish abdomen deflation as a means of enhancing the survival of undersized catch released in the reef fish fishery will be evaluated. Red and gag grouper and red, vermillion, mangrove and mutton snapper will be studied to determine if this management technique can increase fish survival. (1998)

2.4 The use of baited traps for catching rock shrimp as an alternative to bottom trawls will be evaluated. The goal is to reduce habitat destruction. (1998)

2.5 The overall management impact of using Turtle Excluder Devices (TEDs) and Bycatch Reduction Devices (BRDs) on overall finfish bycatch reduction will be evaluated for the shrimp fishery. The goal is to help manage the Spanish and king mackerel and red snapper and red drum fisheries in a way that maximizes resource utilization and conservation. (1998)

2.6 Turbulence, upwelling, water masses and suspended sediment concentrations between large and small artificial reefs in the Suwannee Regional Reef System will be examined to determine the plankton and baitfish abundance differences. The goal is to determine which reef designs are most productive. (1998)

2.7 The contribution of seagrass habitat to juvenile spiny lobster recruitment in Florida Bay will be measured. This information will contribute to a predictive model to generate population estimates which can ultimately guide the setting of harvest levels under specific environmental conditions in Florida Bay. (1998)

2.8 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. (2000)

2.9 Managers of the Florida spiny lobster fishery will be provided with a model that accurately predicts adult spiny lobster stocks based on ecology and biology characteristics of the Florida Keys primary spiny lobster nursery area. (2000)

2.10 An ongoing survey of commercial sponge species within three miles of the Florida Keys will be continued and the results made available in report form to Florida Sea Grant, the Florida Marine Fisheries Commission, and the multi-agency task force studying Florida Bay. (1998, 1999)

2.11 Twenty commercial and recreational fishermen and the two party boat operations in Sarasota and Manatee Counties will adopt proper procedures for venting swim bladders in order to increase the survival of undersized reef fish. (1998)

2.12 Reef coordinators from an eight-county region in Florida (Pasco to Collier counties) will increase their ability to properly plan, build and monitor artificial reefs. (1998)

2.13 An artificial reef committee will be developed in Manatee County to assist the county staff in the construction of two new Gulf artificial reef sites and in permitting two new artificial reef sites. (1998)

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

3.1 A minimum of 50,000 juvenile bay scallops will be grown in cages offshore of Crystal River, Florida. The economic and financial characteristics of bay scallops will be determined as well as the market acceptability and marketing strategy for cultured bay scallops. Ten individuals will be trained in bay scallop culture techniques. (1998)

3.2 The aquaculture potential of the Gulf of Mexico short-spined sea urchin will be determined cooperatively with Mississippi/Alabama Sea Grant. (2001)

3.3 Diets will be formulated which will improve the growth and development of cultured ornamental fish and red drum. Texas Sea Grant will participate. (2000)

3.4 A baseline economic analysis will be completed to define the demand for Florida marine ornamental fish, trade patterns, and to determine industry outlook and regulatory needs. This analysis will specify research needs which will lead to the growth and development of the Florida ornamental fish industry. (2000)

3.5 Atlantic surgeonfish are routinely collected off the Florida coast for sale through the aquarium trade and for display in oceanaria. The anatomy, histology, blood history, and diet of these fish will be determined in order to respond to specific diseases, nutritional studies and reproductive problems experienced by the handlers of these fish. (2000)

3.6 Ten representatives of public and private lending institutions will gain a better understanding of the risks and earnings associated with small-scale hard clam culture in Florida. (1998, 1999)

3.7 One hundred small scale hard clam growers will gain an understanding of the benefits associated with dry storage tempering to extend the shelf life of hard clams in wholesale storage. (1998)

3.8 One hundred and fifty Florida fishermen affected by the 1995 ban on the use of entanglement nets will be taught the techniques to produce softshell crab in cooperation with the Bureau of Seafood and Aquaculture of the Florida Department of Agriculture and Consumer Services. Sea Grant will focus on production techniques and DACS on marketing. The production of softshell crabs will increase in Florida by 10 percent. (1998)

3.9 Fifteen fish growers in Palm Beach and Dade counties will be taught enhanced technologies associated with fish health and waste water management. Water quality related mortality in their ponds will be decreased by 50 percent through continued fish health management training. (1998, 1999)

3.10 The development of live rock culture industry will be enhanced by conducting a workshop on live rock production and harvesting, in which 15 potential growers will gain a better understanding of rules and procedures for live rock culture. (1998)

3.11 Eighteen cichlid fish growers in Dade County will be taught how to maximize production efficiency via feed trials. (1998)

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

4.1 Florida Sea Grant will continue to provide leadership to the nationwide Seafood Alliance seafood hazard analysis critical control point (HACCP) education project which began in 1995. (2000)

4.1.1 A revised training manual will be issued as a third edition. (1998)

4.1.2 A Spanish-language version of the manual will be completed. (1998)

4.1.3 Subcommittees will supervise the completion of: (1998, 1999)

4.1.3.1 Compendium of Methods
4.1.3.2 Correspondence courses
4.1.2.3 HACCP models for various species
4.1.3.4 Model development and reviews
4.1.3.5 International courses and translations
4.1.3.6 Additional trainer courses
4.1.3.7 Course audits

4.1.4 Two train-the-trainer courses will be held each year. (1998, 1999)

4.1.5 Fifteen basic training courses per year will be held with the goal of training 6,000 students (since project began) by end of project. Two-thirds of students will be from industry and one-third from regulatory agencies. (1998, 1999)

4.2 A computer based shrimp quality evaluation system for ammonia content and texture measurement has been developed. The system will be expanded to include odor evaluation and will be tested in shrimp processing plants. (1998)

4.3 Countries around the world are implementing seafood safety programs. A cooperative project with the Food and Agriculture Organization of the United Nations will be completed to determine the economic effects of these programs on international trade and other issues. (1998)

4.4 The University of Florida has a new Aquatic Food Products Laboratory (1997) and is renovating a seafood pilot plant (1999). Education and training programs including blue crab school, tuna decomposition school, and shrimp school will be developed to utilize these facilities. (1998, 1999)

4.5 A biannual Aquatic Food Products newsletter will be developed and distributed. (1998, 1999)

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

5.1 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. (2000)

5.2 As part of a nationwide project, a national strategic planning meeting of marina industry and academic partners will be convened to plan research and education activities that relate to marina technologies. (1998)

5.3 Best management practices for marinas will be developed in cooperation with New Jersey Sea Grant. (2000)

5.4 Three environmental groups, 350 citizens, 90 community leaders, 50 elected/appointed officials in state and local government, and 10 businesses will be taught through one state-wide conference, 14 workshops, five seminars, and 50 individual consultations to promote wise development and economic growth, sound resource management, rational waterway use, and coastal ethics in Palm Beach, Pinellas, Pasco, Hernando, Citrus, Levy, Manatee, Sarasota, Lee, Collier, Charlotte, Dade, St. Johns, Duval, Nassau and Clay counties. (1998)

5.5 Six thousand boaters and recreational fishermen will be provided eco-tourism materials (2 brochures, 1 Extension bulletin, 14 large-scale maps) which will promote environmentally-compatible recreational activities in Manatee, Sarasota, Collier, Charlotte, Lee, and Palm Beach counties. (1998)

5.6 Boaters and shore residents will be aided in the development and implementation of regional waterway systems management through five workshops that will contribute to ten local government strategies. This effort will involve five citizen groups and two regional management agencies. Forty percent of the participants will alter their waterway management operations as a result of this work in Manatee, Sarasota, Collier, Charlotte, and Lee counties. Those benefitting will include five citizen groups and two regional planning agencies. (1999)

5.7 Local, state and regional governments will be assisted in formulating and adopting guidelines and/or use-zones for the protection of critically endangered resources. Educational materials will be developed for boaters to comply with such guidelines and use-zones in Charlotte county. Two government agencies will adopt at least 20 percent of the new guidelines recommended. (1998)

Coastal Ecosystem Health and Public Safety

Goal 1: Protect and Enhance Coastal Water Quality and Safety

1.1 Possible sources of nutrient enrichment to coral communities of Southeast Florida will be identified. This will determine if harmful algal blooms which are affecting coral reefs come from natural sources or are from people-induced sources. (1998)

1.2 The factors which control blue green algal blooms and the way blue green algae dominate Florida Bay food webs will be determined. This will contribute information which helps managers determine the correct level of freshwater flows to Florida Bay. (1998)

1.3 The effect of variations in water quality in Florida Bay on the growth of coral reefs will be documented over the most recent 10-year period as a way to manage Everglades water flows to minimize coral reef damage. (1998)

1.4 An organized outreach program on Florida Bay water quality and quantity will be continued (begun in 1997) as a part of the overall NOAA South Florida Ecosystem Restoration Prediction and Modeling Effort and under the direction of the Florida Bay Program Management Committee. (2002)

1.4.1 All organizations and agencies currently working in education, research and public awareness programs targeted at Florida Bay will be identified. (1998)

1.4.2 A Florida Bay Outreach/Advisory Committee will be established. Two planning meetings will be held including 80 percent of the organizations identified in 1.4.1. (1998)

1.4.3 A quarterly newsletter will be developed. (1998,1999)

1.4.4 One public workshop will be targeted to audiences in Monroe, Dade, Collier, Brevard, and Palm Beach counties. (1998)

1.4.5 The news media will be used to reach 20 percent of Monroe County residents and 10 percent of the residents in Dade, Collier, Brevard, and Palm Beach counties with information on issues regarding Florida Bay and actions that can be taken to address the issues. (1998,1999)

1.4.6 Abstracts for the 1998 Florida Bay Science Conference will be organized for printing in conference proceedings. (1998)

1.4.7 A Florida Bay Research Project Internet web page will be developed and maintained. (1998,1999)

1.4.8 The existing Florida Sea Grant Florida Bay Research Radio Station on US1 in Key Largo will be operational 90 percent of the time. Messages will be updated monthly in English and Spanish. Thirty percent of the 23,000 motorists that pass the site daily will increase their knowledge about Florida Bay water quality and quantity issues. (1998,1999)

1.4.9 Project profiles will be developed annually on one-third of the over 100 research projects underway in Florida Bay. They will be made available in published form and on the Florida Bay web page. (1998,1999)

1.4.10 Over 250 scientists will become familiar with the interagency research that is being done in Florida Bay and the known causes of the deterioration of Florida Bay environments. Florida Bay has become a focal point for research among state, regional and federal agencies and organizations. (1998, 1999)

1.5 Corals are known to be among the most sensitive of organisms to sedimentation and turbidity. The effect of turbidity on important coral species will be determined. (1998)

1.6 On a statewide basis, Florida Sea Grant will increase the knowledge of coastal citizens, professionals and agencies concerning coastal ecological systems, and motivate them to take action to reduce their impact on Florida coastal water quality. (1998, 1999)

1.6.1 Two thousand citizens in Florida will change an average of three yard maintenance practices to conserve Florida's coastal waters.

1.6.2 One hundred local decision maker/opinion leaders in 10 counties will use Sea Grant coastal ecosystem information in management and planning processes.

1.6.3 One thousand youth will develop knowledge and skills working in coastal ecosystems, 25 of whom will demonstrate these skills through public presentations (4H), displays and/or activities.

1.6.4 Fifty citizens will learn to gather coastal water quality and/or habitat data to increase the information base for education or management.

Goal 2: Protect, Restore, and Enhance Coastal Ecosystem Habitats

2.1 Nursery techniques for the cultivation of the three major seagrass species found in Florida will be developed. The goal is to ultimately develop seagrass transplants which can be used in seagrass restoration projects. (1998)

2.2 The genetic differences in populations of sea oats from Gulf and South Atlantic sites will be determined. This will assist in developing commercially viable alternative propagation procedures for selecting and producing sea oat varieties for revegetating coastal dunes. (1998)

2.3 Ground water seeping through the sea floor may affect the growth and distribution of seagrass. This effect will be examined in North Florida near the mouth of the Econfina River contrasted with selected sites in Florida Bay. (1998)

2.4 Seagrass, oyster and saltmarsh habitat required by blue crabs will be examined in Florida and North Carolina to determine which habitats are most productive for juvenile blue crabs in a cooperative Florida and North Carolina Sea Grant project. (2000)

2.5 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. (2001)

2.6 Florida Sea Grant will implement the following components of the Gulf of Mexico Sea Grant project to reduce the impact of the invasions of zebra mussels and other non-indigenous species.

2.6.1 A low power radio station will be established and maintained on I-75 at the Georgia/Florida border. (1998,1999)

2.6.2 A comprehensive list of growers and suppliers of exotic aquatic plants and animals will be developed. An advisory committee will be established. (1998)

2.6.3 A brochure on species dispersal through improper release and proper disposal will be developed and distributed to aquatic hobbyists and suppliers of aquarium animals. (1998)

2.6.4 Five non-indigenous species teaching trunks will be distributed to regional service centers for use in K-12 schools. (1998)

2.6.5 Over 150 agriculture inspection officers will be trained and 10,000 residents will be informed to recognize and provide control resources which delay or prevent the intrusion of zebra mussels into Florida. (1998)

2.7 On a statewide basis Florida Sea Grant will increase the knowledge of coastal citizens, professionals and agencies concerning coastal habitats, and motivate them to take action to reduce their impact on Florida coastal habitats.

2.7.1 One hundred persons will develop and use environmental values and ethics regarding sustainable lifestyles and habitat protection practices, and will apply them to day-to-day decisions while maintaining a sustainable economy and environment. (1998,1999)

2.7.2 One hundred and fifty scientists, native plant producers, resource managers and environmental regulators will increase their knowledge of plant genetic diversity concerns in regards to coastal habitat restoration and mitigation programs. This will enable the targeted audiences to improve their ability to develop relevant research projects, and improve native plant production practices. The result will be improved native plant production practices and better design and management practices for habitat restoration programs, and more highly focused academic research. (1998,1999)

2.7.3 One hundred and fifty youth will make presentations to an audience on coastal environmental topics and/or develop 4-H projects that are concerned with coastal waters and fish habitats. (1998,1999)

2.7.4 One hundred citizens will participate through the *Citizens In Science Program* in data gathering that will be made available to researchers. (1998,1999)

Goal 3: **Prepare and Respond to Coastal Storms**

3.1 A scientific framework will be developed to represent the full range of shoreline fluctuations in Florida due to the movement of sediments along the shore. This will allow a scientifically defensible basis of determining the need for coastal protection and other shoreline structures. (1998)

3.2 A method will be developed to predict the severity of the sea at 12 nearshore areas where hurricanes are reaching the Florida coast. This will help guide decisions relating to coastal construction, law, coastal planning and policy and insurance. (2000)

3.3 A method to guide the decision-making process for the reconstruction of storm-damaged coastal habitable structure in Florida will be created. This will result in improved, national and efficient decision-making by regulatory agencies, engineers, and coastal property owners. (2000)

3.4 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. (2000)

3.5 A Sea Grant HazNet Internet web page and list server will be created as part of the nationwide HazNet program. This will provide coastal residents easy access to research and education information on natural coastal hazard mitigation. (1998)

3.6 A model funding mechanism for use by local governments to assess coastal development on a risk-adjusted basis for public storm hazard management services will be completed in cooperation with Lee County. (1998)

Education and Human Resources

Goal 1: Produce a Highly Trained Workforce

1.1 A three-year industrial fellowship for one post-doctoral student to test the feasibility of using giant clams to remove the particulate and dissolved nutrients in effluent from an intensive aquaculture operation will be completed. (1998)

1.2 A two-year NOAA/NOS Coastal Services Center fellowship for a master's level student from Florida will be completed with the Maine/New Hampshire/ Massachusetts Coastal Management Programs. (1998)

1.3 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 25 nationally) will be from Florida. (1998,1999)

1.4 At least one national Sea Grant Industrial Fellow candidate (of 2-4 per year nationally) will be successful every three years. (1998,1999)

1.5 At least 25 percent of the annual Florida Sea Grant federal research budget will be used to support graduate students. (1998,1999)

1.6 A minimum of five graduate students will receive scholarship funding each year through private funds in cooperation with the Aylesworth Foundation for the Advancement of Marine Science, the Old Salt Fishing Club and the Bill Currie, Jr. Memorial Fall Ladies Fishing Tournament. (1998,1999)

1.7 One high school student will receive a college scholarship through the Chuck Skoch Florida Sea Grant Scholarship each year. (1998, 1999)

1.8 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 research. (1998, 1999)

1.9 Florida Sea Grant will participate in National Strategic Investment, National Outreach and National NOAA/Sea Grant proposal competitions when available. (1999)

1.10 At least fifteen 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. (1998, 1999)

1.11 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. (1998, 1999)

Goal 2: Create a Scientifically and Environmentally Informed Citizenry

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

2.1.1 High quality publications that effectively communicate the results of Florida Sea Grant activities to both general and specialized audiences will be produced. At a minimum, this includes the annual production of two issues of FATHOM magazine, two Sea Grant Reports, three technical papers, two bulletins, two fact sheets and one book. (1998,1999)

2.1.2 One video and 10 print news releases will be produced annually. (1998,1999)

2.1.3 The existing Florida Sea Grant Internet home page will be upgraded and maintained. (1998,1999)

2.2 Citizens will be educated in general about Florida's coastal environment.

2.2.1 One hundred teachers, naturalists, 4-H volunteer leaders, and other educators will be taught to organize and conduct environmental education programs. (1998)

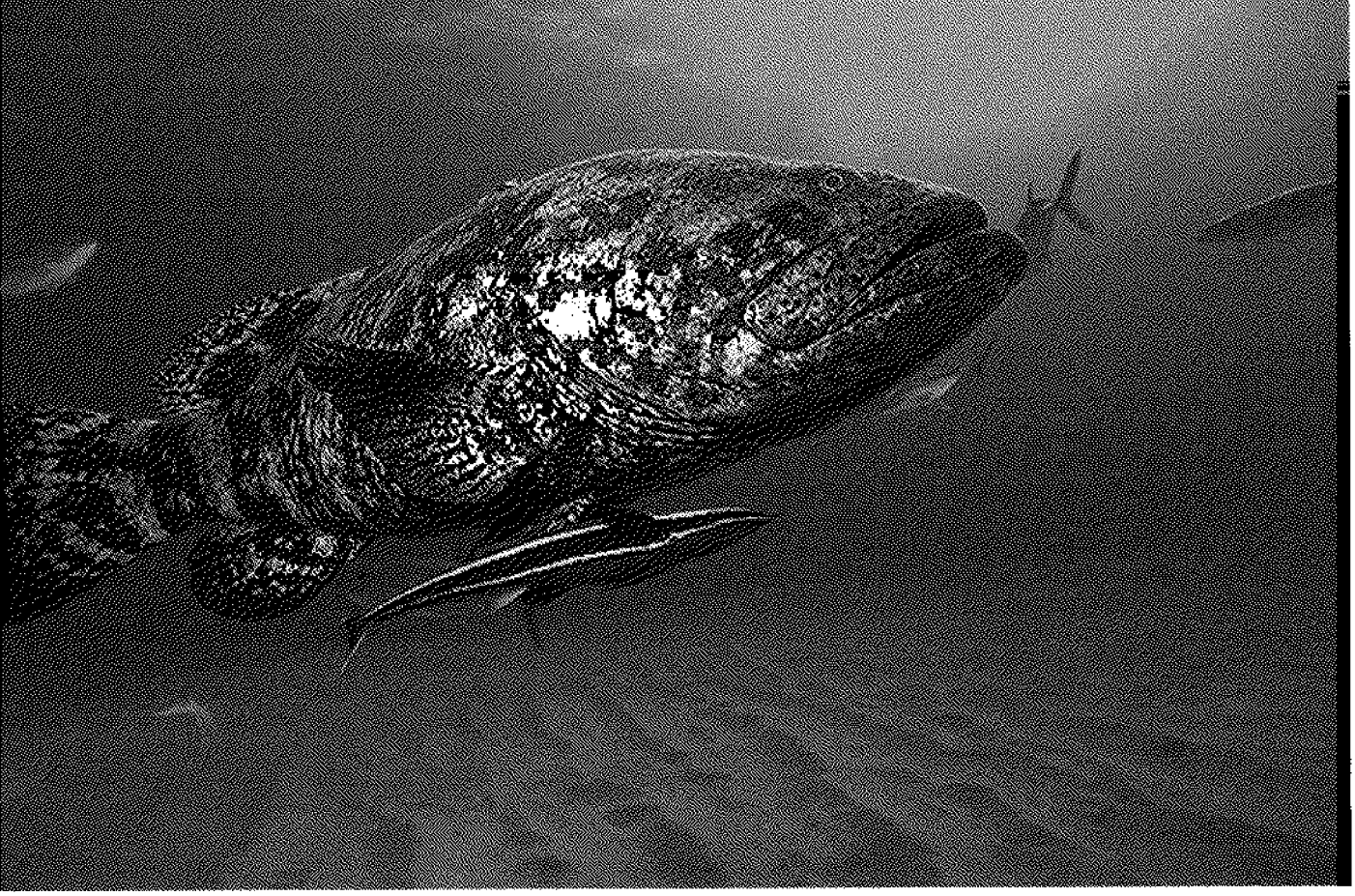
2.2.2 Fifty community leaders and involved citizens will use Sea Grant training to more effectively participate in decision-making activities. (1998)

2.2.3 Fifteen hundred members of Florida's coastal communities will develop greater coastal environmental awareness and knowledge. (1998)

2.2.4 One hundred and forty 4-H members and other youth will increase their knowledge about marine and coastal ecosystems and issues. (1998)

2.2.5 Thirty agencies and organizations will participate in Sea Grant education programs. (1998)

2.2.6 Seven hundred and fifty people will participate in the Adopt-A-Shore program, five marine mammal strandings networks, and clean-up programs on the problems of marine and coastal debris and its effects on wildlife, human health, and tourism. (1998)



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