Florida Sea Grant College Program Strategic Plan 2002 - 2005

Sea Grant
Florida

Science Serving Florida's Coast

a statewide program based at the University of Florida that partners NOAA Oceanic and Atmospheric Research with Florida universities, marine research organizations, businesses, governments and citizens

TP-108

Cover Photos

Top to Bottom, Left to Right

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Science Serving Florida's Coast

Florida Sea Grant's Strategic Plan addresses issues that are important both nationally and in Florida, and reflects the input of hundreds of Floridians representing academia, government, industry and citizens. This plan defines Florida Sea Grant's strategic issues within the context of a number of strategic planning activities. First, it builds on seven Florida Sea Grant statewide workshops in 1996, involving hundreds of faculty, agency, industry and citizen participants. The priorities developed through this process were updated for this 2002-2005 strategic plan. They are presented within the context of the National Sea Grant Network Plan: Coastal and Marine Resources for a Sustainable Economy and Environment 1995-2005, which in turn defines overall Sea Grant issues at the national level within the context of NOAA's Strategic Plan: A Vision for 2005. The plan also considers Florida Sea Grant's role in Florida through participation in the development of Florida's Ocean Strategies, a 1999 planning process completed by the Florida Governor's Ocean Committee, and a follow-up Florida ocean research priority agenda being developed in 2000-2001. Finally, the plan also considers Florida Sea Grant's role in research, education and extension through participation in the Florida FIRST strategic planning process of the Institute of Food and Agricultural Sciences (IFAS) at the University of Florida in 2000 and beyond. This latter involvement allows Florida Sea Grant priorities to consider land-based actions that affect the coast, activities along the shoreline, bays and estuaries, and ocean priorities in planning its research, education and extension goals.

SFWMD

HBOI

Tunicates, or sea squirts, commonly found in the shallow water mangroves of South Florida and artfully captured here with a flatworm, yield a compound that a Spanish pharmaceutical company has licensed as a tumor-fighting drug. The extensive and highly diverse biological resources of Florida's ocean have only recently been explored as a source of pharmaceuticals, and other novel chemicals. Marine biotechnology is a viable candidate for the investment of intellectual and financial capital as a way to develop exportable products and stimulate technology in international trade and export manufacturing.

Florida has over 1300 miles of coastline and over 20 percent of the state's residents participate in saltwater recreational angling. Another three million tourists participate each year. The overall annual economic impact of recreational fishing to Florida is about $4 billion.

FSG

Mission

"Science Serving Florida's Coast"

Florida Sea Grant's mission is to enhance the practical use and conservation of coastal and marine resources to create a sustainable economy and environment.

Florida Sea Grant operates through a statewide university-based research, education and extension partnership of state and federal agencies, businesses and citizens. This partnership involving university faculty and the public was created nationally in 1966 with the passage of federal legislation that created the National Sea Grant College Program. The U.S. Secretary of Commerce designated the State University System of Florida as a Sea Grant College in 1976, and the program is hosted by the University of Florida. Today, 30 Sea Grant programs, based within the academic structures of their states, together form the national program.

PROCESS

The Florida Sea Grant College Program focuses on marine and coastal issues across research, education and extension activities. Florida Sea Grant programs are also multi-disciplinary in nature. Research is funded on a statewide, competitive basis. Education programs focus on funding graduate students using public and private funds. An organized extension outreach program, using both on-campus and off-campus faculty, combines faculty and student research results into formats the public can use, and it provides stakeholder needs in research to the faculty and students. No other academic department or single university has this breadth and depth of focus on multi-disciplinary marine and coastal issues statewide.

APPROACH

Using research, education and technology transfer to address societal needs requires a strategic approach along with tailored tools and techniques designed to solve specific problems. One problem may require a substantial research effort. Another may need the transfer of existing information. The solution to a third problem may depend on an intensive educational effort to develop a new source of human capital. Solving other problems may require substantial extension networking with agencies, industries or communities to bring people together in a common activity. The successful solution to some problems may require some combination of all these elements. Florida Sea Grant has a demonstrated record of success in designing the best possible approach to solving the problems resulting from human interaction with the state's coastal environment.

Values

Every Florida Sea Grant activity must satisfy three simple but tough criteria: 1) be based on a strong rationale; 2) demonstrate scientific or educational merit; and, 3) produce results that are clearly useful and applicable in industry, management or science. A number of core values allow Florida Sea Grant to deliver results based on these criteria.

Excellence. Research is funded on a competitive basis, with scientific merit as the most important criterion. Extension programs are based on reviewed faculty plans of work. Communications efforts use the latest technology to achieve maximum output, visibility and citizen receipt of our science-based information.

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

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

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

Partnerships. Faculty, students, and citizens all benefit when functioning in a partnership mode. Scientific results and education projects reach greater success levels and are implemented when partners, from agencies to businesses, provide financial support to an activity. Greater emphasis will be placed on developing partnerships.

SFWMD

Tracks etched on Florida's coast, one set natural, the other man-made, vividly illustrate the increased competition for the state's coastal resources. Above, an endangered sea turtle has left evidence of her trip ashore to nest and lay eggs. Below, boat propellers have cut scars through beds of seagrass, destroying habitat critical to many species of fish and shellfish.

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Florida's Coastal Wealth

For Florida's 15.5 million residents and about 50 million annual visitors, the coast and its resources are a major attraction and an important part of their environment. Nowhere else in the United States are so many people so close to such an extensive and economically valuable coastline.

Florida's population in the "coastal corridor," the 35 counties that touch the coastline, was 11.9 million in 2000. This represents 77% of the state's 15.5 million residents. By 2010, an additional 1.7 million people will live in the coastal counties, or the equivalent of about one new city of Orlando each year. The 35 coastal corridor counties (of 67 statewide) create nearly 80 percent of the state's economic output, its jobs and value-added income.

A visit to Florida's shore reveals incomparable natural beauty. It also reveals a set of resources for which intense competition exists. Sport and commercial fisheries, recreational beach activities, boating, marinas, unique ecologies, productive wetlands, scenic views, urban and rural development, heavy and intense industrial use, and the amenity-based economic and social lives of our coastal communities have all combined to place Florida's development and management in a fragile balance.

Working together, all Floridians must find a socially acceptable way to satisfy the demand for these resources while protecting their ecological integrities. The economic value of just a few of Florida's coastal resources is startling. Remarkably, it is only as a result of Florida Sea Grant research that an economic database exists for some of these resources.

Vision

The Sea Grant Association strategic planning retreat in mid-2000 developed a common vision on which all 30 Sea Grant programs can build a stronger national network and presence. Florida Sea Grant strongly supports that view, adapted below to Florida Sea Grant's visionary role for work in Florida.

FORCES OF CHANGE

Concentration of population along the coast; increasing dependence on coastal waters for food, employment and recreation; and a host of other socioeconomic changes are making Florida Sea Grant's role in advancing understanding and sustainable use of coastal resources more critical. Looking ahead, population increases will continue to tax the efforts of coastal planners and community leaders. Anticipated economic and environmental impacts on the coastal environment will continue to be well-served by Florida Sea Grant and its partner institutions through science-based research and information outreach.

The nature of the coastal economy is changing. Development pressures are increasing and adequate models to promote sustainable economic development in coastal communities are lacking. Recreational fishing has grown dramatically in relation to commercial fishing. The gentrification of coastal communities is making water access difficult for some water-dependent businesses, such as marinas, fishing and aquaculture.

Managing coastal resources is becoming increasingly complex. It requires more effective communication among all stakeholders. A more informed public and a workforce prepared to help manage these complex and inter-related problems and resources are critical.

KERR

Major Strengths

- Florida Sea Grant is a science-based statewide network embedded in the major research universities and laboratories in the state.
- Florida Sea Grant offers an integrated program of research, outreach and technical assistance that allows it to link the high quality science-based information it develops with local management structures to provide real solutions to real problems.
- Florida Sea Grant can identify issues as they emerge at the local level and bring the best scientific minds to bear on these problems.
- Florida Sea Grant has a comprehensive network of partners, and extensive experience interpreting research and scientific information to a broad public.
- Because Sea Grant is nonregulatory, and focuses on understanding the science of coastal resources, it serves as an "honest broker" among a wide range of constituencies.
- The stability of Florida Sea Grant over the past 30 years has enabled it to make long-term commitments to coastal problems and programs, and to develop a highly skilled workforce.
- Florida Sea Grant is multidisciplinary and can draw from many different kinds of expertise to develop solutions for specific problems.
- Florida Sea Grant is also tied to a national network, allowing it to access science-based information from 250 universities nationwide.
- Florida Sea Grant is a statewide leader in providing educational opportunities for marine oriented graduate students.

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Products, Programs and Markets

One of Florida Sea Grant's major products is research, provided on a rapid response schedule to address priority problems identified by faculty, agencies, businesses and citizens. Sea Grant's state and local network provides valuable access to grassroots constituencies and a way to get programs and solutions out to those who need them. Sea Grant can also use this network to form collaborations between local interests and researchers to see that the most pressing research questions are addressed.

Sea Grant has many markets and constituents, from state governments, to coastal environmental managers, to local fishing industries. It serves as a clearinghouse for the latest research results related to marine sciences, and as a neutral broker on marine related issues. Sea Grant's wide range of programs ensures that all constituencies have access to this information to help make policy and business decisions. It provides educational briefings and seminars for federal and state policymakers, as well as for the public at large. It helps local government officials, planners and developers integrate scientific information into practical decision-making in ways that promote sound resource use and sustainable development. Sea Grant's extension programs provide technical assistance to the full spectrum of coastal dependent industries –aquaculture, marinas, commercial and recreational fishing– to help them with product and market development.

As a consequence of the reach of its program, Sea Grant has become a training ground for skilled researchers and outreach workers in marine science disciplines. Sea Grant recruits, trains and employs graduate students, post-doctoral students, and senior researchers and professionals, helping to build a statewide "brain trust" for dealing with economic and environmental challenges and opportunities in the coastal arena.

Institutional Structure

The Florida Sea Grant College Program is based within the state's major research universities and laboratories, giving it strong state and local foundations. This ensures its eligibility to seek additional resources at the national, state, and university levels. The use of existing management infrastructure enables Sea Grant's cost effectiveness.

Sea Grant allows for and encourages collaboration across its individual projects and programs. Faculty can develop "intellectual" initiatives on issues such as marine biotechnology, where interests, not geographic location, or campus boundary is the common bond. This collaborative work is highly valued.

Regional, National and International Collaboration

Florida is one of the leading states facing both threats and opportunities from globalization. Its coastal industries and environment are greatly influenced by both economic and political activities in other countries. This ranges from the high levels of seafood imported into Florida for further processing to the potential impact on the coastal environment from aquatic non-indigenous species that enter the state and affect Florida waters. Many of these issues can only be addressed through research and education using regional, national and international approaches. Florida Sea Grant places a priority on regional, national and international work when Florida industries and the Florida coastal environment are impacted by activities outside state boundaries, and when the work can have an impact on other regions which will ultimately benefit Floridians.

The Future

These forces of change, major strengths, products, programs and markets, institutional structure and global perspective, are compelling Florida Sea Grant to:

- Strengthen its position as Florida's primary statewide university-based research, education, and extension program in support of coastal resource use, management and conservation.

- Assume a strong leadership role in helping Florida address critical issues like: protecting water quality and coastal habitat; respond to coastal hazards; ensure seafood safety; and develop coastal economies and communities.

- Provide a strong federal/state/local network that integrates research, education and extension to generate practical solutions to real problems and strengthen Florida's capacity to deal with coastal issues.

- Create an awareness of the need for resources to support the Sea Grant College Program to substantively increase over the next four years to adequately respond to major coastal challenges and opportunities, and to communicate science-based information for resource managers, policy-makers and citizens.

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Responding with Research and Education

Through "Science Serving Florida's Coast," Florida Sea Grant responds to the forces of change to help Florida provide economic leadership, sustain the quality of its coastal ecosystems and develop its human resources in order to create a sustainable economy and environment.

The pressures, wants, needs, and dollars represented by the huge numbers of people who "use" Florida's coastal resources all combine to make understanding and managing one of the most fragile environments on earth a difficult and often controversial undertaking. Florida Sea Grant has a vital role to fill in this complex endeavor. Through Sea Grant research efforts, the transfer of information via the Sea Grant Extension Program, and the outreach provided by Sea Grant educational efforts, Floridians and tourists can better understand the state's unique environment. They gain a better appreciation of how we use our coastal resources and learn about their impact on the quality of the environment. This understanding is essential for Floridians to rationally manage continued growth in the coastal zone, as well as to equitably resolve the ever increasing competition for coastal resources. Florida Sea Grant has assumed a leadership role in the creation of a better-informed and more responsible populace—one that recognizes the need for Sea Grant programs and uses Sea Grant findings to make Florida a better place to live.

Strategic Issues

Work to enhance Florida Sea Grant's mission focuses on three strategic issues:

Providing economic leadership for marine biotechnology, fisheries, aquaculture, seafood safety and water-dependent businesses;

Enhancing coastal ecosystem health and public safety related to water quality, coastal habitat and coastal hazards; and,

Creating a highly trained workforce and scientifically and environmentally informed citizenry.

These strategic issues include goals that are specific to Florida, and that represent a subset of those pursued nationally by the National Sea Grant College Program. They are the ones most critical to Florida, as determined by Florida's faculty, its government agencies, its industries, and its citizens. Specific objectives under each goal are outlined in the following sections:

ECONOMIC LEADERSHIP

1. Create and enhance products and processes from coastal resources using marine biotechnology.
2. Determine production and management techniques which make fisheries sustainable and competitive.
3. Develop the food and hobby segments of the marine aquaculture industry.
4. Improve the product quality and safety of seafood.
5. Increase the economic competitiveness and sustainability of coastal water-dependent businesses.

COASTAL ECOSYSTEM HEALTH AND PUBLIC SAFETY

6. Protect and enhance coastal water quality and safety.
7. Protect, restore and enhance coastal habitats.
8. Prepare for and respond to coastal storms.

EDUCATION AND HUMAN RESOURCES

9. Produce a highly trained workforce.
10. Create scientifically and environmentally informed citizens.

Economic Leadership

Marine biotechnology in Florida represents an opportunity for both university scientists and biotechnology-based companies to have an impact on the growth and duration of this field. Using natural products from the sea to create pharmaceutical compounds of commercial importance is just one example. Florida leads the nation in terms of the economic value from all uses of its marine fish and shellfish. However, Florida's fisheries are affected by multiple use conflicts, global trade, overfishing, and coastline development that contributes to habitat loss. Worldwide, aquaculture provides almost 30 percent of the fish and shellfish consumed by people. In Florida, aquaculture provides only a small amount of the state's total. The largest segment of the industry is freshwater tropical fish for the hobby aquarium trade. Growth potential exists for the food and hobby marine aquaculture industries. Florida's seafood processing plants and seafood firms range from the nation's largest firms to many small independents. Each is attempting to respond to seafood safety issues, increasing demand, shifts in seafood supply, increasing international trade and competition, new regulatory inspection mandates and environmental concerns. Managing coastal development is a critical challenge facing Florida water-dependent enterprises. Traditionally, small businesses engaged in tourism and the marine trade are at risk and need to increase productivity and efficiency by . adopting new technologies, adapting to regulatory changes, and maintaining access to coastal waters.

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

Marine biotechnology is a subject area with a set of tools that accelerates research to develop goods and services derived from marine organisms and processes. It encompasses the search for sustainable sources of pharmaceuticals and healthcare products, and seeks technologies for monitoring quality of seafood and coastal waters and enhancing aquaculture. Marine biotechnology provides the tools for scientific investigating that were not previously available to most researchers. The enormous biodiversity of Florida's coral reef, estuary and ocean ecosystems gives it a great geographic advantage for establishing commercial and environmental applications in marine biotechnology.

In turn, the opportunity to create "clean" industry and high-paying technical jobs is attractive to a growing academic-industry-legislative partnership. According to an Ernst & Young assessment, the overall U.S. biotechnology industry doubled between 1993 and 1999, and generates 437,400 jobs and $47 billion in revenues, directly and indirectly. Of that, agricultural biotechnology generated 21,900 jobs and $2.3 billion in revenues. But no succinct marine biotechnology sector yet exists for which comparable data are available, although numerous recent achievements are laying a foundation for it. For example, an anti-inflammatory agent (pseudopterosin) isolated from a coral has a market value of $3-4 million/year, while in Florida scientists are evaluating a marine-derived anti-cancer compound and the genetics of sea oats for beach dune restoration, among other activities. Further, there are numerous challenges to develop detection and remediation measures related to contaminants in seafood and coastal environments.

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A. Develop Marine Bioproducts and Sustainable Sources of Supply

1. Determine the mode of action of compounds derived and isolated from marine organisms, and with apparent applications in medicine, non-toxic control of biofouling/corrosion and other commercial/industrial applications.

2. Develop either biological routes for synthesis, or culture procedures for production of compounds of commercial, health and environmental importance.

3. Define the chemical, physical and biological properties of marine materials such as biopolymers in terms of their applications as industrial chemicals.

4. Create novel methods for marine byproducts utilization.

5. Isolate, identify and determine the function of enzymes controling processes of potential commercial benefit.

B. Improve Health and Production of Marine Organisms

1. Improve the size characteristics, growth rate, disease resistance, survivorship and reproductive yields of aquacultured organisms, particularly through the use of cell and molecular techniques.

2. Promote the health of cultured and collected captive marine plant and animal species through attention to pathogens, diagnostics, treatments, drug delivery systems, immunology, physiology and pharmacology.

3. Develop technology to culture cells of marine organisms with desirable properties to produce useful biochemicals such as enzymes, pharmaceuticals and agrochemicals.

C. Promote Human Health and Environmental Quality

1. Develop habitat restoration and remediation techniques, using molecular and cellular approaches to improve coastal plant strains, hybrid development and production technology for coastal aquatic vegetation.

2. Develop diagnostic tools and biosensors to assess seafood pathogens and waterborne pathogens and pollutants, and evaluate and predict human and environmental health risks.

3. Develop forensic and monitoring practices for taxonomic identification in situations including either possible economic fraud involving seafood or species of endangered/threatened status, for consumer, conservation and regulatory applications.

D. Facilitate Informed Consumer, Business and Technical Decisions

1. Identify economic, social, ethical and regulatory issues, constraints and opportunities to further the development of marine biotechnology as a viable commercial and environmental management effort.

2. Train students in technical subjects in areas of reasonably demonstrated employment opportunity, and promote scientific/education career opportunities in order to retain Florida-trained students in the state. Extend research results to industry, media, specific audiences and the public; explore opportunities and issues related to the responsible, sustainable application of marine biotechnology; and strengthen scientific networks and academic industry partnerships for public and consumer benefit.

GOAL 2: Determine Production and Management Techniques That Make Florida's Fisheries Sustainable and Competitive

Recreational and commercial fisheries represent a multi-billion dollar industry in Florida. High diversity of finfish and shellfish species and habitats characterize the complexity of Florida fisheries management. Rising demand for fish has increased pressure on Florida's limited fishery resources and interrelated natural resources, with adverse impacts on user groups, and has spurred the need for improved management. Past focus has been on the allocation of fishes between recreational and commercial users. Of growing significance is the distribution of fishery resources between consumptive and non-consumptive users. Effective management will require more complete knowledge about the biological, economic and social dynamics among resource user groups and managers. It will also require better assessment of resource abundance, stock health and habitat quality. New and innovative ways are needed to maintain critical habitats, manage resources, and evaluate the effect of management decisions on resources and user groups.

HBOI

A. Develop Models and Related Information to Improve Management and Fishery Forecasts

1. Determine critical biological structure and processes controlling the abundance, distribution, and replenishment of fishery resources on recreational, food and marine ornamental trade species.
2. Measure multi-species and multi-gear interactions and how these interactions can be modeled and considered in management strategies.
3. Define responses of fishery populations to anthropogenic stress and how these responses vary with environmental conditions.
4. Predict the effect of ocean and atmospheric processes on stocks and management of the stocks.
5. Assess and contrast new stock assessment models with older models including those used for stock complexes.
6. Provide new and more accurate stock assessment models to fisheries managers and decision-makers.

B. Determine Social and Economic Impacts of Fishery Management Strategies

1. Determine preferences and acceptability by individuals, industry groups, and communities of various regulatory techniques.

2. Document economic and social impacts of regulation and policy, including effective methods for education and enforcement, on both consumptive and non-consumptive users of marine resources.

3. Create methods for implementing adaptive management strategies.

4. Define innovative economic and social management strategies and determine how these strategies would cause change in participants among fisheries, including the effects on the commercial and the recreational for-hire charter, for-hire headboat and individual fisher sectors of controlled access to a fishery.

5. Conduct demand and supply analyses to measure changes in economic values resulting from alternative uses of fisheries resources.

6. Measure the effects of new management strategies on fishing behavior.

7. Refine empirical techniques that can measure the value of fish stocks allocated to alternative uses.

8. Develop coupled regional growth and fishery utilization models that consider environmental quality, technological change and regulatory policy to predict the structure, conduct and performance of fisheries utilization over the next decade.

9. Evaluate the precautionary approach, the burden of proof and the use of ecocertification as an incentive for fishermen.

10. Develop collaborative projects with stakeholders within the fishing community that extend innovative management plans.

FSG

Sea Grant extension faculty demonstrate venting, one technique that assists anglers in successful catch-and-release practices. When deep water reef fish are brought quickly to the surface, gases in their swim bladder can overexpand and fill the body cavity. Venting

C. Minimize Bycatch

1. Identify, evaluate and extend fishing behaviors that will reduce bycatch and bycatch mortality, including mortality from catch-and-release fisheries.

2. Assess the impact of bycatch on stock-recruitment (e.g., assessing shrimp bycatch effects on recruitment; the impact on recruitment of undersized catch in hook–and–line fisheries; and similar impacts of ornamental and other fish species in trap fisheries).

3. Develop bioeconomic models including demonstrating savings resulting from economic incentives, better technology, and effort allocations to bycatch reduction.

D. Define the Role of Essential Fish Habitat in Ecosystems and Their Management

1. Define and develop quantitative measures for habitat assessment, comparisons and monitoring related to fish stocks.

2. Develop models that can be used to determine the impact of potentially damaging fishing practices and the level of the damage.

3. Compare the impacts on fish stocks of non-fishing control areas and fishing areas.

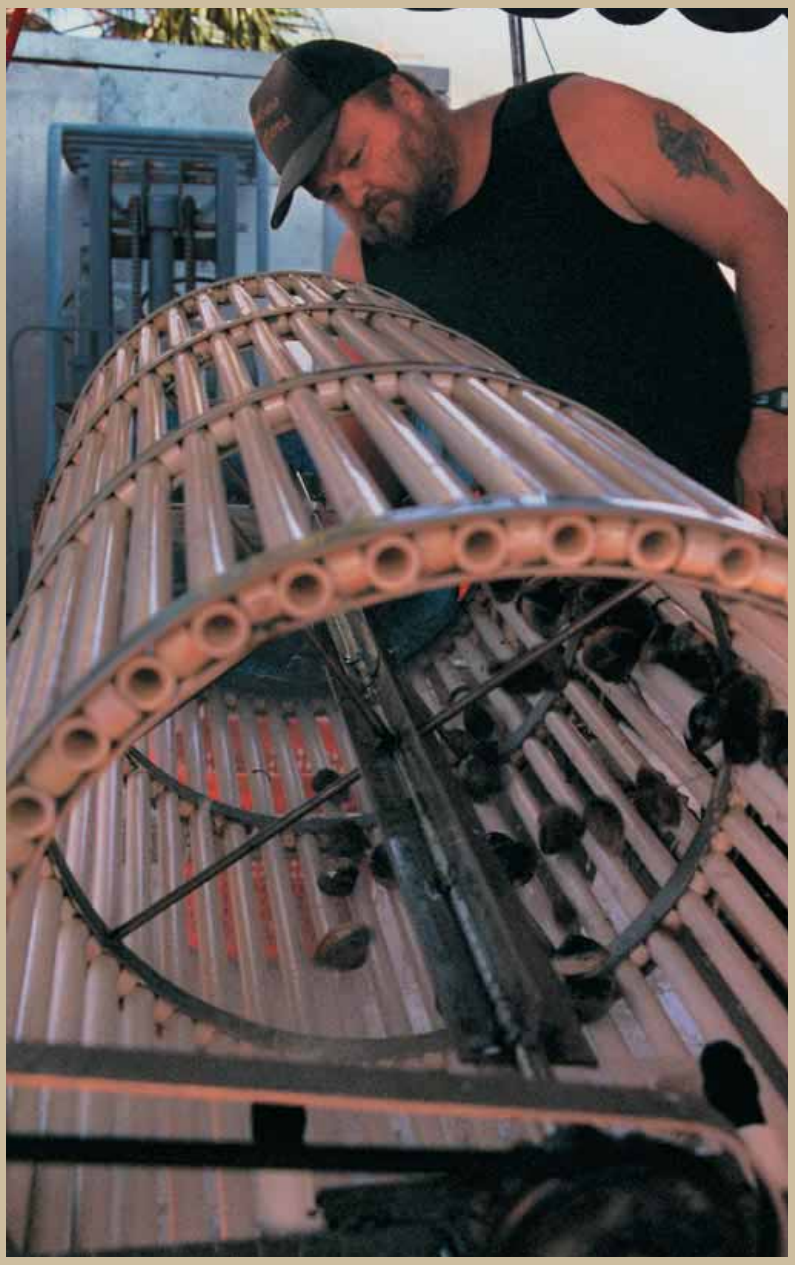
4. Determine recovery rates and stages for stocks in disturbed and undisturbed areas.

5. Continue to develop and evaluate artificial reefs as a powerful management tool to enhance fish production and divert negative impacts from natural habitat.

E. Measure the Effects of Fishery Stock Enhancement Practices

1. Provide evaluations necessary to maximize successful hatchery releases into the wild considering optimal release tactics, effects of releases on catches, ecological and genetic effects of cultured organisms on wild stocks – especially protected species– and effects and contributions of released stocks on stock biomass and spawning potential.

2. Measure the success or test the concept of using marine protected areas to enhance habitat and stock enhancement techniques.



IFAS

Florida aquaculture's 1999 "farm-gate" sales were $86 million. Production of marine species actually is only a small part of Florida's aquaculture industry, which is dominated by freshwater tropical fish farming. However, commercial culture of hard clams is a recent success story, and a critical mass of effort is developing for the marine ornamental species sector. Culture of selected recreational species has been successful in contributing to stock enhancement.

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

Florida's aquaculture derives most of its value from freshwater species. Culture of marine species is limited for both stock enhancement and seafood production. Coastal land and labor costs have generally precluded culture of certain species for which rearing practices exist. Viable current efforts include rearing and release of recreational species including redfish and snook, and commercial production of softshell crabs, oysters and hard clams. Numerous species (e.g., scallops, snapper, sturgeon) are under study to resolve bottlenecks that may be biological, economic, technological or regulatory constraints . The burgeoning national and worldwide demand for seafood/protein and the U.S. $7 billion annual seafood trade deficit, as well as Florida's high biodiversity and favorable geographic setting warrant that it provide leadership in marine aquaculture, both onshore and offshore. Its existing freshwater ornamental industry, the nation's largest, clearly positions it to develop a marine species ornamental trade, which would have both economic and environmental benefits.

A. Foster Sustainable Ornamental Aquarium Species Culture, Collection and Conservation

1. Breed marine species whose economic value, hardiness in captivity and degree to which they are "highly prized" are demonstrated as viable.

2. Develop feeds suitable for the varying nutritional needs of aquacultured and collected ornamental species.

3. Enhance post-hatching and post-harvest survivorship of traded species from point of origin – whether from production facilities or wild collections – to the end consumer.

4. Promote higher survival of collected ornamental organisms and minimize impacts of harvest through practices to reduce mortality; determine sustainable long-term harvest.

5. Extend culture, collection and conservation techniques to the marine aquaculture industry.

B. Enhance Bivalve Molluscan Shellfish Production

1. Improve production practices for bivalve molluscan shellfish of demonstrated commercial viability, especially hard clams, ranging from life history manipulation to product quality, and provide such practices to shellfish growers.

2. Diversify bivalve molluscan shellfish production opportunities.

C. Promote Industry Development by Eliminating Technical and Non-technical Barriers Using Sustainable, Environmentally Responsible Practices

1. Determine the financial feasibility and market characteristics for species of greatest technical potential.

2. Evaluate the technical, biological and economic feasibility of innovative marine aquaculture operations in the nearshore/coastal region, on the seafloor, and in open surface and water column applications.

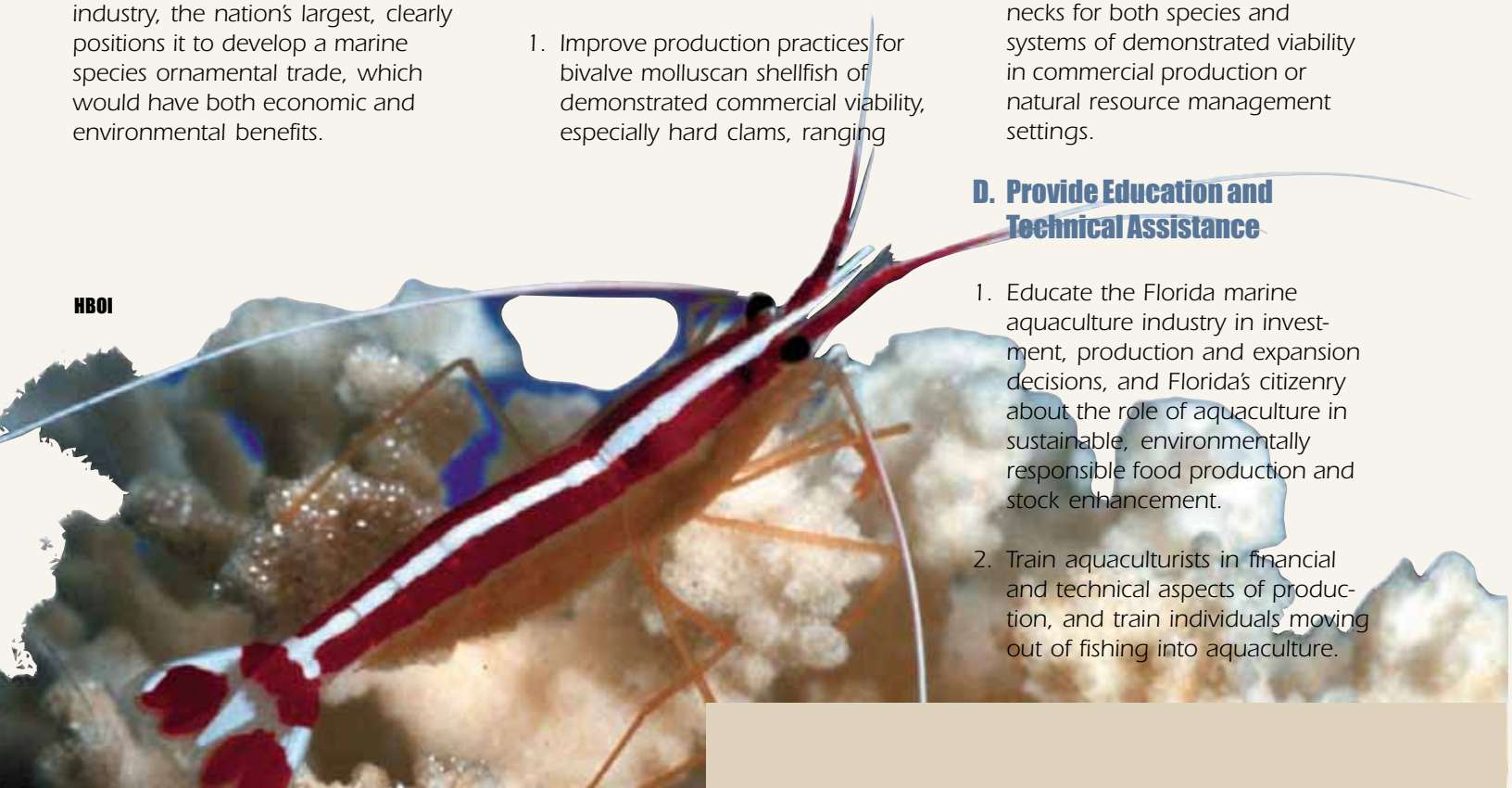
3. Help business and public interests understand regulatory and permitting processes, assist streamlining and development of best management practices, and provide guidelines for entry in commercial aquaculture.

4. Resolve constraints and bottlenecks for both species and systems of demonstrated viability in commercial production or natural resource management settings.

D. Provide Education and Technical Assistance

1. Educate the Florida marine aquaculture industry in investment, production and expansion decisions, and Florida's citizenry about the role of aquaculture in sustainable, environmentally responsible food production and stock enhancement.

2. Train aquaculturists in financial and technical aspects of production, and train individuals moving out of fishing into aquaculture.



HBOI

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

Florida's seafood industry, consumer demands, demographics and related environmental concerns are typical of the challenges facing the nation's seafood and aquaculture industry, particularly in semitropical and tropical regions. The State's aquatic food products industries and agencies are experiencing more dramatic changes in production, processing, trade, regulation and public perception than in any previous decade. Florida's tropical waters and production areas create significant and recurring aquatic food product safety and quality concerns. Florida also plays a leading international role in satisfying emerging markets and elevating worldwide standards.

A. Develop and Enhance Production and Processing of Seafoods

1. Improve manufacturing and processing innovations to enhance and prolong product quality and/or add value to products.

2. Create techniques and practices to control or eliminate biological hazards.

3. Create techniques and practices to control or eliminate chemical hazards.

4. Provide training programs and materials for the seafood industry on new techniques and practices that enhance quality, and control or eliminate biological and chemical hazards.

5. Design and deliver seafood safety programs based on Hazard Analysis and Critical Control Point (HACCP) concepts and teach methods to improve sanitation in seafood harvesting, processing and retailing.

Florida is a major seafood import site for processing and distribution, and has more processing and wholesaling facilities than any other state except California. The annual economic impact of the value-added component of Florida seafood is $900 million plus $600 million in wages and salaries.

6. Utilize the University of Florida Aquatic Food Products Lab as an international center of education and technical support.

B. Enhance Trade

1. Develop procedures that detect and eliminate economic fraud.

2. Determine the impact that international trade and trade agreements have on the integrity and quality of Florida seafood imports and exports, including the use of safety and quality as non-tariff trade barriers, and provide findings to federal/state decision-makers, seafood industry, and consumers.

3. Determine risk, risk assessment and risk management procedures and tolerance levels of chemical and biological agents associated with seafood consumption.

4. Estimate the willingness-to-pay by consumers for reduced risk of contracting seafood-borne illness in products of importance to Florida.

5. Concentrate on the issue of safety and quality of seafood from foreign markets sold in supermarkets, restaurants and similar levels of commerce.

Florida is the number one dive destination in the United States, and it is one of the five most popular dive destinations in the world.

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

The present and future economic well-being of Florida is inextricably linked to its coastal and marine resources. Florida's coastal communities face difficult, yet critical management challenges: how to balance development with the maintenance, and enhancement of coastal environmental quality. Strong population growth, declining natural environments, and coastal and marine resources (in many cases overburdened) complicate the task. These factors create a compelling need to foster coastal business growth and community development strategies that are compatible and sustainable. Water-dependent enterprises – traditionally small businesses engaged in tourism and the marine trades – are at risk and need to increase their productivity and efficiency by adopting new technologies, adapting to changes in the regulatory environment, and maintaining access to coastal waters. Coastal communities are experiencing greater competition for limited near-shore resources and a corresponding increase in the number and intensity of conflicts over waterside and waterfront use patterns. For sustainable local development to succeed, all stakeholders, including users, decision-makers, regulators, and resource managers, need new methods and information sources with which to assess the individual and cumulative links between industries and communities and their physical, economic, and environmental impacts.

A. Foster Economically and Environmentally Sustainable Business and Community Growth

1. Evaluate the social and economic benefits derived from the optimal use of waterfronts, examine the causes of decline or growth in working commercial and recreational waterfronts, and propose or analyze incentives that focus on retention of water-dependent and water-related facilities that serve public needs and reflect social values. Extend research findings to community decision-makers.
2. Analyze which economic strategies – such as free trade zones, restrictive trading options on coastal environmental quality, or tax incentives – might affect or encourage future public facilities and water access.
3. Create and extend new technologies and products that meet emerging business opportunities, ranging, for example, from concepts that improve charts for recreational boaters, to equipment modifications for vessels that reduce or eliminate environmental impacts.

B. Develop Decision Support Systems, Planning Models and Visualization Techniques to Manage Natural Resources and People

1. Determine the relationship between people and their changing environment, and on stressed ecosystems and Florida's waterways.
2. Document the bio-physical effects that boating activity has on bay waters and adjacent habitats.
3. Define marine environmental education strategies, particularly those that are non-regulatory and citizen driven, that improve boating behavior and increase boater awareness and values.
4. Link new decision concepts, such as place-based management, growth management, and water surface zoning, with the application of geographic information systems (GIS) to plan for optimal waterside infrastructure and use.

5. Use new technologies, such as GIS to establish or validate "virtual reality" systems for decision-making.

6. Examine and quantify the inter-connectivity between the economy and the environment for critical coastal "natural capital," and how this can enhance decision making at the local and state level.

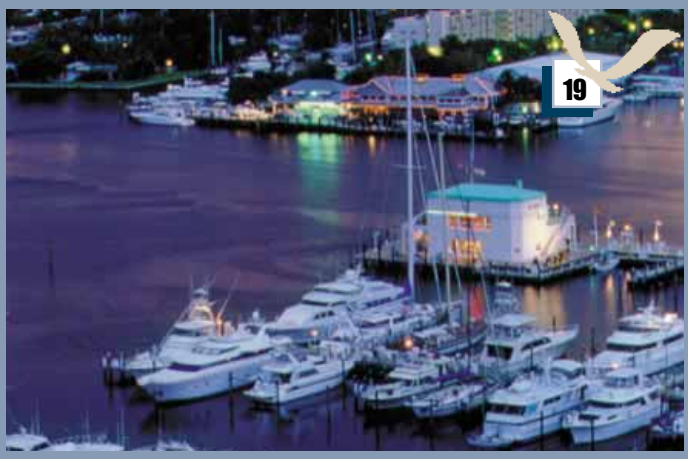
C. Create a Regulatory and Non-regulatory Framework for Sustainable Community Development and Business Growth

1. Determine how new technical methods and decision concepts that pertain to near-shore waters fit into the complex federal, state and local jurisdictional framework for marine waters.

2. Develop a legal concept on the most common issues that give rise to coastal and marine conflicts, and evaluate alternative dispute resolution mechanisms.

3. Create innovative ways that communities can develop economic, environmental and social indicators that track community sustainability goals as a way to measure progress towards those goals.

4. Assist coastal communities that have endured declines in their economic bases to refocus and utilize existing resources to their economic and environmental advantage.



GFLCVB

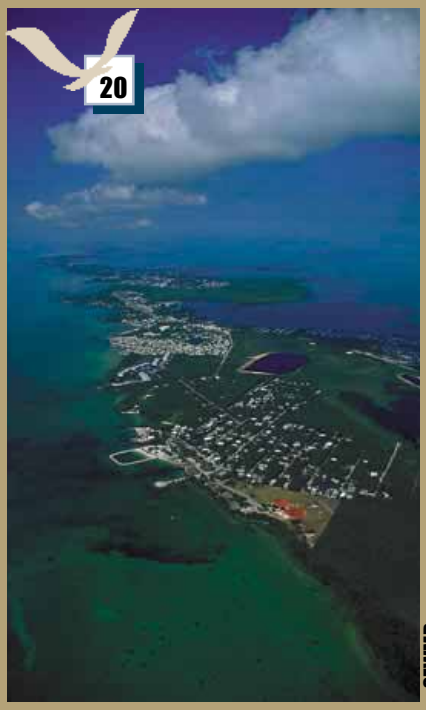
Boat registrations in Florida have approximately doubled in 15 years, a rate three times greater than the population increase. Florida's 830,000 motor craft represent one for every 19 residents or one for every eight families. Add a large number of tourist boats, and Florida's waterways are navigated by over one million boats, generating $10.2 billion in economic activity each year.

FSG

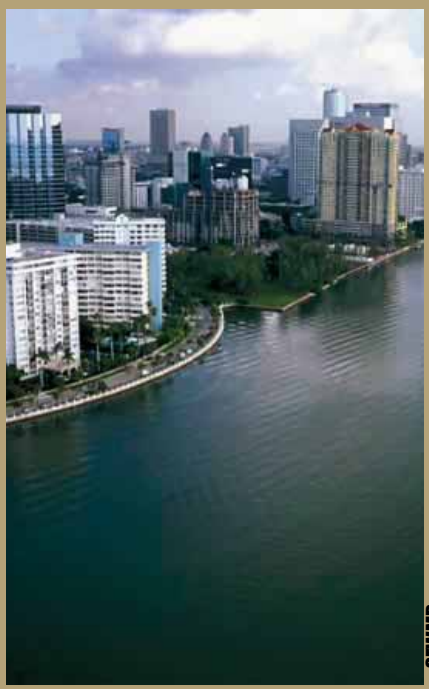
Florida's beaches host about 23 million tourists annually, and the annual economic impact is about $19 billion.

PORT OF CANAVERAL

Florida has 14 deepwater ports. About $44 billion in customs value of international goods is waterborne, or two-thirds of the state's total. The Port of Miami, Port Everglades and Port Canaveral are the world's three leading cruise ports, with Florida serving almost 80 percent of all North American homeport passenger movements. Over eight million cruise ship passengers embark or disembark at Florida cruise ports annually.



Environmental concern in Florida is at a high level, with the debate on the complete "replumbing" of the Everglades in the planning and funding phase. The Florida Keys National Marine Sanctuary was recently established. Both are true national assets and directly relate to the future of Florida Bay, which lies at the southern tip of Florida, between the Everglades and the Florida Keys. Florida is home to three of the nation's 24 National Estuarine Research Reserves.



Sixteen of Florida's 21 metropolitan areas are built around an estuary, or lie at the mouth of a river that flows into the sea.

Coastal Ecosystem Health and Public Safety

Florida estuaries, where freshwater from the land meets saltwater from the sea, are characterized by enormous ecological, social and economic diversity. Most of the species that support Florida's multi-billion dollar fisheries depend on estuaries to complete their life cycle. Meanwhile, most of Florida's urbanization is taking place alongside estuaries and placing stress on the quality and quantity of these valuable habitats.

The Florida shore and its coastal inhabitants are at risk from a variety of natural hazards, most notably the winds, waves, and floods generated by hurricanes. Risks to life and property from these recurring hazards can only increase, given the anticipated growth of coastal populations over the next several decades. There needs to be a dedicated effort to reduce the economic, social and personal losses due to natural hazards. All stakeholders share an interest in pursuing loss (or cost) control which is a proven risk management technique.

GOAL 6. Protect, Restore and Enhance Coastal Water Quality

In 1998 about 40% of the U.S. streams, lakes and estuaries that were assessed were deemed not clean enough to support uses such as fishing and swimming, due to a variety of contaminants. One of the major influences upon coastal ecosystem processes is the level of nutrients introduced from upland watersheds and the atmosphere. Excess nutrients introduced to estuaries are linked to problems such as harmful algal blooms, loss of seagrasses and marine benthic "dead zones." In seeking to protect and enhance coastal water quality, it is important to recognize the linkages of Florida estuarine functions to the broader hydrological system and be aware of the variability of these systems, cyclical and otherwise. In a survey of public concerns, Floridians ranked water quality as their second most important issue.

Florida Sea Grant criteria to guide its work in this area are: research must be at the site of existing management-based research being conducted by a partnering agency; non-point source contamination must be the focus; the way that the scientific results will be utilized must be specified; and, the work must be multi-disciplinary. Florida Sea Grant's role is to complement existing state and federal agency programs. Its strategy is to create greater faculty interest in management-oriented research, and build upon its academic strengths through emphasis on testing of hypotheses, innovative analysis of datasets, multi-disciplinary approaches, designed extension and communication programs, and student training.

A. Develop Science-based Management Practices for Coastal Water Quality

1. Determine the effectiveness of horticultural, yard maintenance and landscaping practices at reducing runoff and nutrient and pesticide contamination in estuaries.
2. Identify source, transport, fate and control of atmospheric contamination.
3. Determine methods to economically quantify and reduce impacts of contamination in watersheds.
4. Determine the function of coastal wetlands as non-point source buffer zones.

B. Promote Informed Decision-making

1. Educate coastal citizens, professionals and agencies concerning coastal water quality and the sources, impacts, costs and control of contaminants.
2. Provide opportunities to citizens to become involved in local coastal water quality activities.

GOAL 7: Protect, Restore, and Enhance Coastal Habitats

The appeal of Florida's increasingly urbanized shoreline is reflected in the concentration of nearly 80% of the state's population in its 35 coastal counties. There is strong demand for recreational, business and residential developments near the water. Communities must balance economic and environmental values, manage the impacts of nutrient runoff and waste disposal, and consider needs for transportation, recreation and commerce – while maintaining the integrity of coastal ecosystems that provide critical habitat and nursery areas for countless species. Such crucial decisions must be based on solid scientific data. In Florida, the outright destruction of aquatic habitat by physically dredging and filling coastal wetlands in earlier decades largely has given way to impairment of structure and function due to deteriorated water quality. Nutrient overenrichment is linked to harmful algal blooms and shifts in submerged vegetation species diversity. Another threat to estuaries is invasive (nonindigenous, exotic) species. Complementary to efforts that protect coastal habitats are their restoration and enhancement. Protection of the marine environment is the ninth leading concern of Floridians, as surveyed for public issues.

APIRS

Eighty-five to 95 percent of sport and commercially harvested shellfish and finfish species in Florida depend at some point in their lifecycle on estuaries, where freshwater from the land meets saltwater from the sea.

A. Develop Science-based Practices for Management of Coastal Habitat

1. Evaluate and improve efficacy of restoration of coral and other essential fish habitats, based on the understanding of the causes of damage and recovery.

2. Determine the role and contribution of marine protected areas to conservation and renewal of animal and plant species, essential fish habitat, and the overall ecosystem.

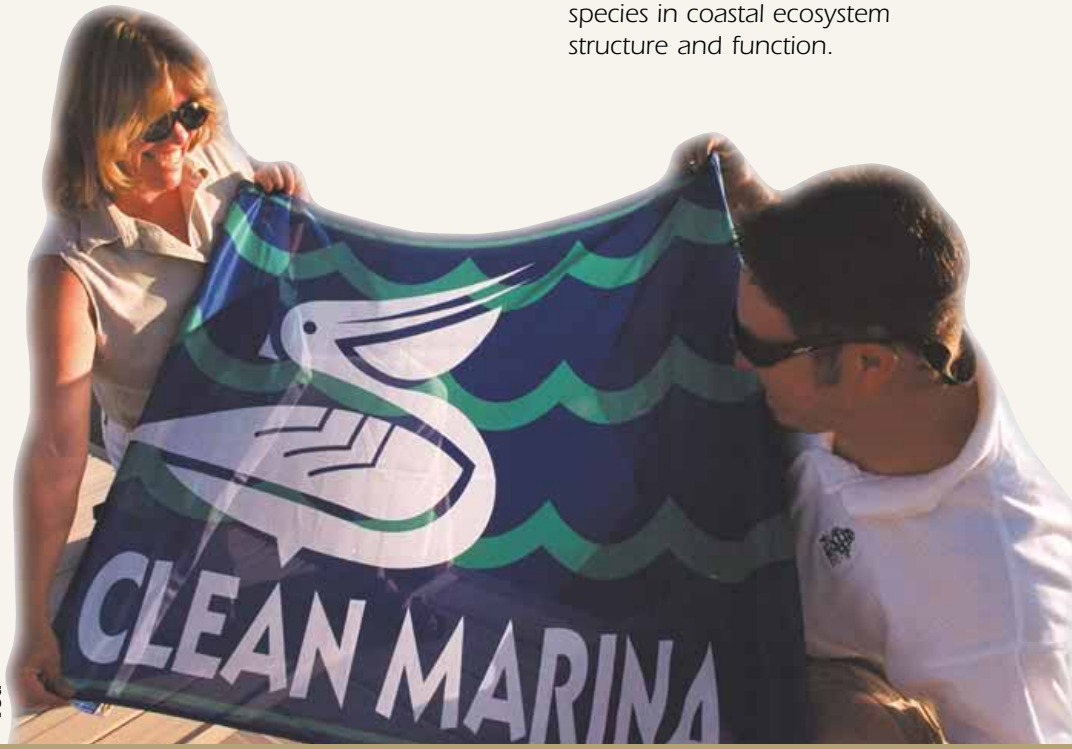
3. Guide the creation of artificial habitat (reefs) based on sound scientific principles.

4. Develop new scientific information on the role of aquatic nuisance species and how they can be prevented from entering coastal waters, or removed.

B. Promote Informed Decision-making

1. Educate coastal citizens, professionals and agencies concerning coastal habitat structure and function.

2. Explain the role of nonindigenous species in coastal ecosystem structure and function.



FSG

Hurricane Andrew, the most costly natural disaster in U.S. history, cost insurance companies $30 billion, mostly in Florida. Some homeowners are now paying 200 percent more for insurance.

Hurricane Floyd, pictured, created havoc in 1999, as Floridians prepared for a lucky near-miss.

NOAA

SFWMD

GOAL 8: Prepare and Respond to Coastal Storms

As coastal communities have grown, Florida has experienced higher property losses and relief costs, more business interruptions and failures, greater social disruption and dislocation, and more natural resource damages than perhaps any other state. In fact, the Florida coastal urban areas, Tampa-St. Petersburg, Miami and Fort Lauderdale are three of the top 20 "urban-sprawl" areas in America. Florida Sea Grant seeks to enhance preparedness and reduce losses of human life, property and environmental resources from coastal natural hazards along the 1,300 mile Florida coastline. Coastal storm response requires university cooperation with state and federal agencies in those tasks. It also requires both basic and applied multi-disciplinary research, education and technology transfer which will enable the contribution of Florida-based critical information and assistance to an overall national effort in this area.

A. Develop Mitigation Techniques and Products

1. Determine the potential for loss prevention including who pays and who benefits among the homeowner, insurance companies and public agencies.

2. Design retrofitting techniques for homes using a "systems" approach and the lowest-cost time for retrofitting older homes, and provide these techniques to home owners.

3. Develop new and innovative tests and models for severe winds that can determine the wind effort on structures and ground level wind fields near hurricane landfalls.

4. Evaluate the cost effectiveness of mitigation measures including retrofit measures beyond which risk damage is more economical than the retrofit.

5. Provide detailed and accurate characterization of the hurricane threat in terms of severity and recurrence interval to guide building practices and land use policy.

6. Estimate the physical, social and economic value of forecasting and improved forecasting services associated with hurricane warnings and recommended preventative measures.

B. Establish the Technical Basis for Risk Sharing, Pricing and Financing Programs

1. Develop public loss or risk vulnerability models or indices for coastal hazards that are useful to the financial markets.

2. Determine ways to set appropriate standards to rate dwellings in risk areas.

3. Determine market, tax and legal incentives that will create demand for retrofitting and mitigation.

4. Determine ways to use insurance copayments and deductibles to reduce risk and control losses, with emphasis on secondary market constraints.

5. Develop risk-based pricing insurance that considers community rates (lowering individual responsibility), multi-year policies in exchange for mitigation investment, and other creative techniques.

C. Incorporate Shoreline Process and Change Data into Coastal Planning

1. Develop coastal construction and design practices for both shorelines and buildings related to shoreline erosion, to provide planners, decision makers and contractors with science-based, management information.

2. Determine the role of the shoreline in reducing wave and flood damage.

3. Reduce the loss of life by improving prediction techniques that warn coastal resource users of dangerous conditions.

D. Refine Public Policy for Storm Mitigation and Preparation

1. Determine public cleanup costs, public infrastructure damage and replacement costs, business failure and job/loss interruption costs.

2. Create ways to involve and advise decision makers at all levels of government to develop public policy that reduces social and economic costs, including participation in the Sea Grant HAZNET program.

3. Design incentive and policy alternatives that encourage mitigation by creative building standards, development regulations, critical property acquisition and taxation and fiscal policy by government entities.

4. Develop community, university and web-based education programs on hazard mitigation.

Education and Human Resources

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

Through support to undergraduate and graduate education, and through skill-based training, Florida Sea Grant produces highly trained scientists, social scientists, engineers and other professionals that increase Florida's economic competitiveness both nationally and internationally, and who devise and lead creative management concepts to keep Florida's coastal environment sustainable for future generations. Florida Sea Grant also designs and implements education programs that utilize local concepts in youth education and, through its Sea Grant Extension and Communication Programs, creates changes in the informal education system as it interprets and delivers information for over 15 million residents and 50 million tourists.

Florida Sea Grant continues to recruit, hire and train high-quality faculty and staff that are committed to the research, education and technology transfer mission of the organization.

HBOI

GOAL 9: Produce a Highly Trained Workforce

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

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

A. Train Future Decision Makers and Scientists

1. Encourage and prepare student applications for national competitions, including:

   - John A. Knauss Marine Policy Fellowships
   - Sea Grant Industry Fellowships
   - National Marine Fisheries Service and Sea Grant Fellowships in Population Dynamics and Marine Economics
   - NOAA Coastal Management Fellowships

2. Solicit and use funds from private, state and federal sources to support graduate students, including:

   - Aylesworth Foundation for the Advancement of Marine Science Scholarships
   - Old Salt Fishing Club Scholarships
   - Skoch/Sea Grant Scholarships through the Florida Science and Engineering Fair

3. Involve graduate students as a priority consideration in funding research projects among successful peer-reviewed projects. At least 25% of Florida Sea Grant federal funds will be used for graduate student support.

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

B. Faculty and Staff Development

1. Enhance faculty and staff development through the statewide annual Elise B. Newell Seminar Series.

2. Encourage faculty and staff participation at in-service training workshops.

3. Support faculty and staff participation at appropriate professional association and industry association meetings.

4. Encourage sabbatical and/or exchange programs with other universities, agencies or industry.

HBOI

Eleven of the 15 Florida universities and laboratories participating as partners in Florida Sea Grant are located in coastal counties. Three of the remaining four have coastal laboratories or statewide research and education centers and/or extension offices in each coastal county. The 13 participating universities statewide contain over 50 academic departments that have marine and coastal priorities. These range from major oceanographic centers, colleges and departments that focus on coastal issues to a few courses in a particular degree program. All disciplines are covered.

Florida citizens ranked improving water quality as number two, and protecting the marine environment as number nine of the top ten educational needs in the state during a 1999 survey. Another 1998 survey indicated that 58 percent of Florida residents felt that state spending for environmental programs should increase. More than 75 percent felt that coastal habitats, coral reefs and sea turtle populations are worse now than before, and that more protection for them is needed.

AZEL

GOAL 10: CREATE SCIENTIFICALLY AND ENVIRONMENTALLY INFORMED CITIZENS

Virtually every serious study of national goals for the new millennium underscores the critical importance of education to national prosperity. In order to sustain a growing economy, people must also be stewards of the natural environment upon which all life depends. To that end, having a scientifically literate, environmentally responsible population is necessary for Florida to remain competitive in the national and world economy while conserving its coastal resources.

Educating the 21st century workforce toward literacy in the marine and aquatic sciences is integral to both the educational and scientific programs of Florida Sea Grant. Florida Sea Grant education efforts will contribute to improving marine and aquatic science literacy by enhancing education among formal K-12, informal public, post-secondary, and adult audiences. The challenge is to ensure an educational process that imparts knowledge to support development of values in an environmentally literate citizenry and to foster an environment wherein ocean sciences and education are recognized by the Florida public as being integral to national security, economic development, and the overall quality of life.

A. Formal and Informal Education

1. Develop partnerships that support programs and training opportunities for educators involved in formal (K-12) and informal (4-H, zoos, aquaria) education.

2. Support development of materials and programs that can be utilized in formal and informal education settings.

3. Develop internet linkages and support creation of other electronic technology products that can be utilized by formal and informal educators.

B. General Citizenry

1. Expand the use of the Internet as an educational tool to connect people, projects and information in Florida and around the nation and globe.

2. Identify research needs that can ultimately be incorporated into extension and communication programs to increase public understanding of marine and aquatic systems. Florida Sea Grant research and extension priority areas will continue to be aligned and complementary to increase the effectiveness of both.

3. Develop new marine and coastal communication products using existing media and emerging technologies.

4. Support citizen-based education programs that allow the public to become involved with coastal environmental stewardship and economic issues.

5. Create relevant communications products and outreach programs for use by state, national and international audiences.

6. Increase information transfer of marine research conducted by NOAA and other agencies with marine and aquatic interests.

7. Produce high-quality publications and productions that effectively communicate the results of Florida Sea Grant activities to both general and specialized audiences.

Implementation Process

Scientific discovery alone cannot ensure a viable economy for Florida or the sustained use of the State's coastal environment. Discovery must be accompanied by a speedy transfer of scientific results to the private and public sectors in a format they can use. Making the discovery and accomplishing this transfer of information is what the Florida Sea Grant College Program is all about. Only through being part of a national network, having a state-wide vision, being multi-institutional and multidisciplinary and having cooperative funding with a research, education, and extension focus can Sea Grant be successful.

Research and education priorities are set by widespread public input from research, extension and communications faculty, professionals in local, state and federal agencies, industry and individuals. This strategic plan results from that input. To implement the strategic plan, research projects are chosen through a stiff biennial peer review competition.

Extension major program educational areas are planned on a four-year basis, with annual adjustments. Research and extension priorities then drive the communications process, along with communications priorities derived on the basis of continuing input from the media sector. Not all the strategic planning objectives are implemented at one time. Only those research projects and extension program plans that make it through the review and program planning process are selected for implementation. They are then continuously monitored for results.

Results can only be achieved through the work of dedicated professionals and the support of the Florida academic institutions who participate as partners with Florida Sea Grant.

IFAS

IFAS

Florida Sea Grant's marine extension agents link high-quality science-based information with local communities. Craig Aubrey, above, inspects materials that will be used as an artificial reef structure; Maia McGuire surveys a waterway for debris as part of an environmental stewardship program.

IFAS

Building on the Past

Florida Sea Grant earned a rating of "Excellent" for its performance from a federally mandated review by the National Sea Grant College Program in 2000. This is the highest score possible. It positions Florida's program with the highest priority for any available merit budget increase in the Federal program. A few highlights of accomplishments are noted below.

- Science-based programs in anchorage techniques, small-craft navigation and waterway management have helped thousands of Floridians. A Leadership Award by the Council for a Sustainable Florida and recognition by Governor Jeb Bush and the Florida Cabinet honored this program in 2000.
- Florida Sea Grant provided leadership for the national Seafood Education Alliance from 1994-2000. Over 12,000 industry, regulatory and academic participants have been trained. The program received a 1997 national performance Hammer Award from Vice-President Gore for innovations in government, and the Honor Award for Excellence from the U.S. Secretary of Agriculture in 1999.
- Significant economic and biological Sea Grant research results have been used to manage the Florida spiny lobster fishery, one of the state's most valuable marine fisheries.
- A Florida Bay Education program has served as the outreach arm for nine state and federal agencies to facilitate information exchange among hundreds of researchers working in the Bay, and to provide educational information to five million people in South Florida about scientific research results in Florida Bay.
- Extension faculty have provided training to hard clam and bay scallop culturists and soft-shell crab producers. Over 100 new soft-shell crab producers are now in business.
- A "virtual" marine biotechnology academic department has been created statewide. New research projects are underway, meetings with industry have been organized and over 70 research faculty from 10 institutions have "signed-on" with expressions of interest.
- New sources of sediment supply have been found along Florida's northwest coast. This is critical to maintaining Florida's shoreline. These and other long-term research findings are now used by the Florida Department of Environmental Protection to evaluate permits for new coastal structures and establish long-term policies for beach management.
- From 1995-2001, eleven Florida Sea Grant students won prestigious John A. Knauss Marine Policy Fellowships. Since 1986, over 75 graduate students at nine Florida universities have received private funding totaling $403,000 from the Sea Grant/Aylesworth Foundation for the Advancement of Marine Science and the Old Salt Fishing Club Scholarship programs. Since 1972, a total of 909 graduate students have received some assistantship support from Florida Sea Grant federal funds.
- Literally thousands of Floridians have become better informed about Florida's coasts through Sea Grant. They attend workshops, they visit its website, they read its publications and well-placed media stories, they listen to its low-power radio stations and they contact Sea Grant Extension faculty to learn more about coastal issues.

PARTICIPATING INSTITUTIONS

Florida Sea Grant is a State University System Center with a statewide mandate. The University of Florida serves as the host campus for Florida Sea Grant, but fifteen core institutions actively participate in Florida Sea Grant programs and research, including public and private universities and research laboratories.

PUBLIC UNIVERSITIES

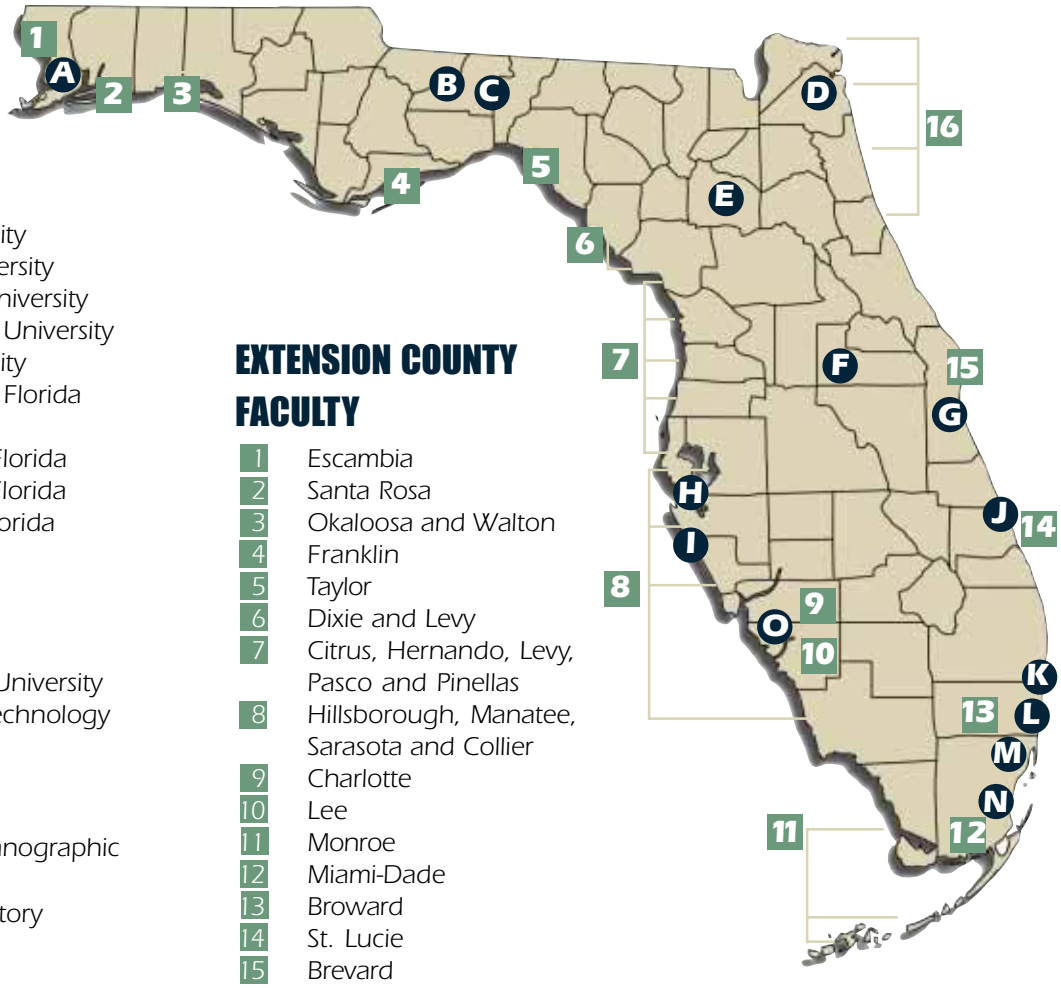
- B Florida A&M University
- K Florida Atlantic University
- C Florida Gulf Coast University
- N Florida International University
- C Florida State University
- F University of Central Florida
- E University of Florida
- D University of North Florida
- H University of South Florida
- A University of West Florida

PRIVATE UNIVERSITIES

- M University of Miami
- L Nova Southeastern University
- G Florida Institute of Technology

LABORATORIES

- J Harbor Branch Oceanographic Institution
- I Mote Marine Laboratory



EXTENSION COUNTY FACULTY

1. Escambia
2. Santa Rosa
3. Okaloosa and Walton
4. Franklin
5. Taylor
6. Dixie and Levy
7. Citrus, Hernando, Levy, Pasco and Pinellas
8. Hillsborough, Manatee, Sarasota and Collier
9. Charlotte
10. Lee
11. Monroe
12. Miami-Dade
13. Broward
14. St. Lucie
15. Brevard
16. Nassau, Duval, St. Johns and Flagler

PHOTO CREDITS

Bill Ahern
APIRS - Aquatic, Wetland and Invasive Plant Information Retrieval System
Jose Azel
FSG - Florida Sea Grant
GFLCVB - Greater Fort Lauderdale Convention and Visitors Bureau
HBOI - Harbor Branch Oceanographic Institution
IFAS - Institute of Food and Agricultural Sciences
NOAA - National Oceanic and Atmospheric Administration
Port of Caneveral
Russ Kerr
SFWMD - South Florida Water Management District

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Science Serving Florida's Coast

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