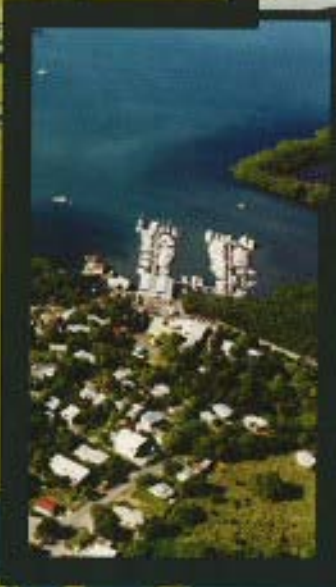


UNIVERSITY OF PUERTO RICO
SEA GRANT COLLEGE PROGRAM

Strategic Plan

2000

2010




Sea Grant
University of Puerto Rico


UPR

INDEX

	Page
Introduction	2
Mission	2
Vision	3
History and Context	5
Challenges for the Next Decade	8
Strategic Plan (2000-2010)	10
Strategic Goals	11
A. Functional Areas	11
A1. Program Administration	11
A2. Research	13
A3. Outreach: Marine Outreach Program and Communications	14
A4. Education	16
B. Proposed Program Structure	17
UPR Sea Grant Executive Council Diagram	18
UPR Sea Grant Consultive Bodies Diagram	19
C. Thematic Areas	20
C1. Water quality	20
C2. Fisheries and Mariculture	21
C3. Coastal Communities Economic Development	23
C4. Coastal hazards and safety	26
Final Words	27



Sea Grant promotes the conservation and sustainable use of coastal and marine resources



Photo Héctor Ruiz

Introduction

The University of Puerto Rico Sea Grant College Program is an educational program devoted to the conservation and sustainable use of coastal and marine resources in Puerto Rico, the U.S. Virgin Islands and the Caribbean region. This is accomplished through aggressive research and marine extension. The UPR Sea Grant College Program is part of the National Sea Grant network. Our mission is two-fold: to conduct scientific research of excellence in the thematic areas of: water quality, fisheries and mariculture, coastal communities economic development, and coastal hazards and safety; and to apply our scientific knowledge to solve a variety of problems our communities of users face every day. For over two decades the University of Puerto Rico Sea Grant College Program (UPRSGCP) has been working to promote sustainable development and the wise use of marine resources in the Caribbean region and Latin America.

This strategic plan describes our goals, challenges, and projected actions for the 2000-2010. It is organized to present our program's mission, vision and history as well as the challenges for the next decade. The Strategic Plan also discusses the functional areas of the program (Program administration, Research and Outreach); the proposed program structure and the key thematic areas which will be the focus of our work. This document is the product UPR Sea Grant College Program staff with the input from our collaborators and members of the clientele. In its preparation UPRSGCP solicited and received the advise and support of a diverse group of University officials, researchers, stakeholders, governmental agencies, non-governmental organizations, and educators. We appreciate the time and effort devoted to this document by each and every one of them. The result is a comprehensive document which shall serve as our blueprint for action over the next decade.

Mission

The mission of the University of Puerto Rico Sea Grant College Program (UPRSGCP) is to promote the conservation and sustainable use of coastal and marine resources through a strong educational approach based on research, outreach, and educational activities. Our mission is based on the multi cultural context of the insular tropical environs of Puerto Rico, the U.S. Virgin Islands, and other countries of the Caribbean region.

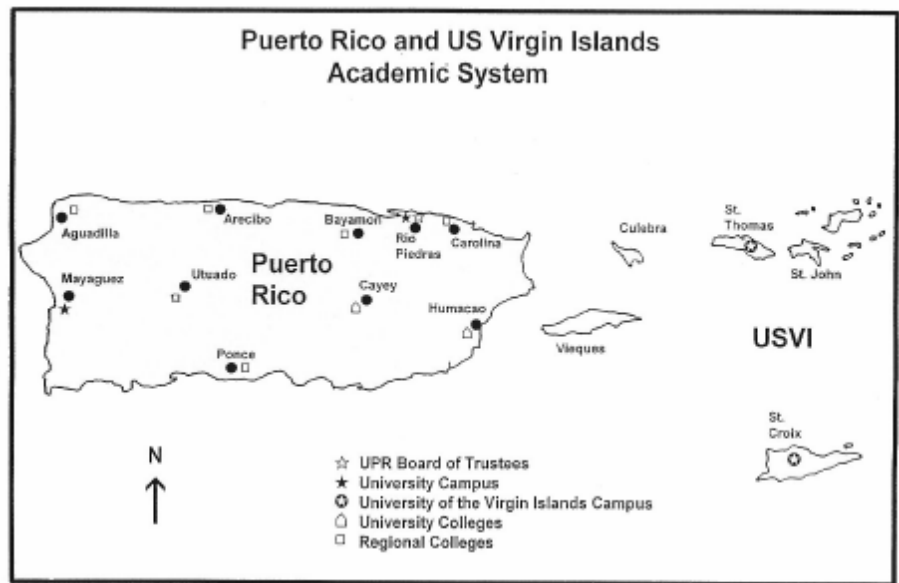


Our goal is to become an educational program . . . the foremost university organization devoted both to the innovation and implementation of sustainable practices in the use of coastal and marine resources.



A Caribbean Odyssey

By nature, history, culture, and design, our Program is simply different. With offices in Puerto Rico, St. Thomas and St. Croix (United States Virgin Islands), we face the problems and challenges of small tropical island ecosystems that are inextricably tied to diverse regional forces (from the Southeast of the United States to the Caribbean Sea and Basin Area). Set in a multilingual region dominated by Spanish and English, and including such other languages as Creole, French and Dutch, our program has the distinction of being at a cultural and educational crossroads. As such, we have a key role to play in technology and information transfer in the region. That is perhaps our greatest challenge, as well as our defining characteristic.

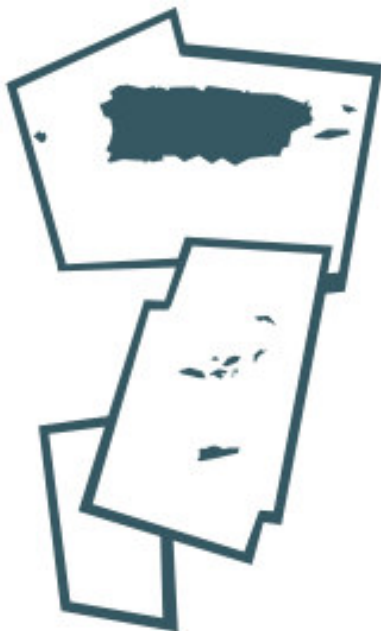


Vision

The challenge that our program faces is to educate our current and potential constituents about appropriate alternatives for conserving our coastal and marine resources in a context marked by increasing development. Our program's vision is to strengthen our leadership role in research, outreach and education, and to become the foremost university organization devoted both to the innovation and implementation of sustainable practices in the use of coastal and marine resources, and to the conservation of critical habitats, biodiversity and the integrity of human



Our vision is to have a Caribbean program able to maintain and improve its leadership in marine education and conservation.



communities. Guiding that vision is our desire to encompass in our program the belief of the President’s Council on Sustainable Development, that “citizens must have access to high-quality and lifelong formal and non-formal education that enables them to understand the interdependence of economic prosperity, environmental quality, and social equity – and prepares them to take actions that support all three.”

In terms of programmatic efforts, our goal is to become an educational program with the capacity to acquire, learn and transfer appropriate information and technologies, using interdisciplinary educational activities, outreach (marine advisory services, publications and the use of electronic and mass media) and research.

Our vision is to have a program able to:

- ❖ Become the region’s foremost educational program for the conservation and sustainable use of coastal and marine resources.
- ❖ Maintain and improve our leadership in marine education and conservation.
- ❖ Improve our investigative efforts to become a promoter of research in all disciplines related to the sustainable use of marine and coastal resources.
- ❖ Develop and strengthen the knowledge and skills our personnel and constituency need to influence policy development for the sustainable use and management of marine and coastal resources in Puerto Rico, the U.S. Virgin Islands and the Caribbean.
- ❖ Establish, maintain and improve linkages and partnerships with universities, research centers and non-governmental organizations throughout the Caribbean to improve the quality of our efforts.
- ❖ Establish a comprehensive assessment program for the evaluation of our education, outreach and research efforts.
- ❖ Expand our information dissemination efforts through innovative outreach methods and technologies.
- ❖ Develop a regional programmatic effort, offering services of excellence to our constituency.



In the 1970's Puerto Rico took the necessary steps to protect coastal resources . . .



Photo Héctor Ruiz

- ❖ Promote interaction and cooperation with local/state and federal agencies as well as citizen groups and non governmental organizations.

History and Context

In the late 1970s, Sea Grant started the **Marine Advisory Project** in Puerto Rico. The project was based at and managed from an undergraduate marine biology program at the University of Puerto Rico at Humacao, on the east coast of the island. It was established as an outcome of public policy and University intervention and participation in the planning of the coastal zone, a process associated with the publication of the landmark text **Puerto Rico and the Sea** (1974), a document that established the standards by which coastal and marine resources were to be managed and used in what is known today as a sustainable manner. At this crossroads, Puerto Rico made a commitment to the conservation and wise use of its marine resources, the protection of the health and integrity of its coastal ecosystems, the appropriate management of its fishery resources, and the planning of the development of its coastal zone.

At the time a society devoid of appropriate conservation and management institutions, Puerto Rico took the necessary steps to protect coastal resources: the development of the Department of Natural Resources, and the incorporation of various federal programs, most notably the Coastal Zone Management Program, NOAA's National Estuary Program, and the Caribbean Fishery Management Council. Sea Grant carried out collaborative projects with these agencies and other Sea Grant Programs (North Carolina, New Jersey, Louisiana, Texas and Florida) in the United States. We will continue to increase our capacity to develop partnership projects in order to protect and maintain our natural resources.

Despite a recession in the construction sector, Puerto Rico experienced in the late sixties and into the seventies a major population increase due to natural growth, and to the process of return migration from the Frost Belt of the United States. The changing economies and demographics of Puerto Rico and the U.S. Virgin Islands (USVI) resulted in increased development, and in urban growth in particular, in the eighties, with devastating effects on those islands' wetlands and coastal ecosystems. Demand for seafood products created many problems, mostly due to an unprecedented effort by local small-scale fishers to satisfy the demand.

In 1980, the University of Puerto Rico (UPR) established, jointly with the National Sea Grant College Program, a



**Our
Communications
unit contributes to
dissemination
activities, through
the Marine
Education and
Information Center
(MEIRC).**



comprehensive project, that later evolved into a program and, in 1989, attained the status of Sea Grant College. Under the aegis of the Office of the President of the University of Puerto Rico (UPR), and linked to the Department of Marine Sciences from UPR-Mayagüez, UPR Sea Grant became a leading education and conservation institution in the Commonwealth. In 1981, in association with Farley Dickinson College and the University of the Virgin Islands, the UPR program developed a Marine Advisory project that became an essential outfit for information and technology transfer in the USVI, and a partner in many of the extension activities the program carries out today in Puerto Rico.

Outreach grew, evolving from an effort to educate primarily fishermen and seafood consumers, into a diversified program that now reaches recreational anglers, marine recreationists, planners, marina operators, boat owners, coastal communities, municipal governments, educators and students (K-12, and college level), health professionals, legislators, resource managers and policy makers. Those outreach efforts led to the development of a strong Marine Education component, which has become one of the defining aspects of our program. The publishing component of our program, which began with the translation of information from English to Spanish for the production of fact sheets, has grown into a small publishing house that produces books, posters, videos, booklets, and newsletters in Spanish and English, reaching a wide readership in Puerto Rico, the United States Virgin Islands and throughout the Caribbean, and a growing number of readers around the world. Our Communications unit contributes to dissemination

From Marine Fishery Reserves to Essential Fish Habitats

Marine fisheries reserves (MFRs) now known as Marine Protected Areas (MPA), as management tools hold the potential to solve many problems that contribute to the declining status of reef fisheries in tropical-insular areas. Their success depends on design, location, their role in the conservation of local fisheries and the participation of local communities and stakeholders in their design and implementation. It also depends on understanding the reef fisheries' biology and ecology, as well as the socioeconomic and policy processes that provide the context for the establishment of an MPA.

Our program continues to focus on scientific and outreach efforts for the design and establishment of MPAs in the Caribbean. Sea Grant sponsors multi-disciplinary efforts to study the questions surrounding MPA's, and facilitates communication among scientists, resource managers, fishermen, local communities and stakeholders. This research initiative, started in 1994, has evolved into a rich variety of projects related to the health of coastal ecosystems, such as coral reefs, population dynamics, and habitats. Those projects will lead us to a comprehensive and practical knowledge of Essential Fish Habitats (EFH). Appropriate design and implementation of an MPA hinges on effective EFH identification and selection, for the recovery and conservation of habitats and fish resources. EFH, borne out of our MFR endeavors, is one of areas in which our program will invest effort and resources in the coming years, in order to determine the impact of MPA's and their effectiveness as management tools.



How we are perceived by the public:

- * Expertise
- * Excellence
- * Collaborative efforts with a diversity of partners
- * Impact within the community
- * Impact in the media
- * Effective interaction with the clientele
- * Credibility
- * A culture of service
- * Knowledgeable staff

activities, through the Marine Education and Information Center (MEIRC), which provides needed information to the general public, including the University community, the press, and the international community, by means of a library, information services and linkages through our web page.

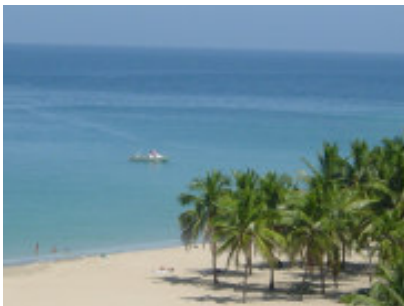
Equally important, Sea Grant has become a critical source of funding for large and small research projects that produce information needed for the development of sound resource management plans and decision making in the Caribbean archipelago. Faithful to both the goals of Sea Grant and the University's mission, our program has opened doors to a diversity of projects and academic endeavors equally germane to, although traditionally detached from, the institutional context of the conservation and wise use of marine resources. Unlike any other local or regional program, UPR Sea Grant has fostered a broad range of innovative projects in architecture and design, anthropology, history, sociology, environmental education, ethical issues in science, plastic arts, and literature (poetry and fiction).

Growing from its original scientific expertise and interest in fisheries biology, aquaculture and related fields, UPR Sea Grant has expanded its educational, outreach and research activities into fields such as biotechnology, marine toxicology, marine geology, hazards mitigation, computer simulation models, physical oceanography, seafood sciences, social sciences, and history, among others. However, we have not sacrificed depth for breadth; in the area of our initial focus, fisheries biology, our program has continued to contribute to innovation and the leading edge of science. An example of this is the **Marine Fisheries Reserves (MFR) Research Initiative** that was started in 1994, and still thrives as one of our key programmatic areas. In the next decade, MFR, now MPA, will be enhanced and included as an **Essential Fish Habitat** key area of our program. In addition, our efforts in aquaculture will be oriented toward exploring mariculture as a potential industry in the Caribbean region.

In response to the needs and challenges we face, the growth of our program over the next decade will be characterized by the following: a strong research agenda, a commitment to sustainability and public participation, an integrated outreach strategy, and programmatic emphasis on policy issues related to conservation and sustainability. In particular, we intend to develop stronger projects and programs related to public policy and to the legislative and legal aspects of the use of marine and coastal resources. The UPR Sea Grant College Program has an institutional culture and integrity that will make us capable of facing the challenges that lie ahead and of garnering support by our constituencies as we take on those



Caribbean societies are constantly confronting the impacts of increased coastal and tourism development, increased population, including the temporary population of tourists and visitors . . .



challenges. We are perceived by the general public and by colleagues as a professional team with exceptional communication skills and products, an innovator and leader in conservation initiatives, an institution that provides guidance and cohesion to existing efforts, a credible and reliable group of experts, a strong and reliable collaborator and, overall, a program of excellence.

Challenges for the next decade

Since its inception, the program has effectively responded to the many and varied challenges it has faced in Puerto Rico and the U.S. Virgin Islands. Over the last twenty years, UPR Sea Grant Program has built a constituency, developed an array of extension activities, and has been the principal source of public education on the conservation and wise use of marine and coastal resources. At this juncture, our program is preparing to face the complex hurdles born of unsustainable practices, and the need for economic growth and development without environmental degradation.

Caribbean societies are constantly confronting the impacts of increased coastal and tourism development, increased population, including the temporary population of tourists and visitors, increased solid waste and disposal problems, an increase in coastal erosion induced by sand extraction from beaches and dunes for construction, decreased water quality and availability, increased demand for fresh water, overfishing (including coral extraction), coastal gentrification and the pervading urbanization process that has increased pressures on coastal habitats throughout the region.

These island-nations and territories are resorting to services and manufacturing in an effort to modernize and strengthen their

The challenge of beach management in the Caribbean

Tourism is the fastest growing sector in Caribbean economies, and in some countries is the sector contributing most to the GDP. Sandy beaches, clear waters and coral reefs are vital parts of the overall tourism product. Before the advent of tourism in the 1960's, many of the islands had undeveloped coastlines, with the exception of the main towns which tended to grow around the ports. However, in the past thirty years, many islands' coastal areas, particularly those situated immediately behind beaches or cliffs, have undergone intense development, with resultant impacts on the beaches. As coastal areas have been developed, coastal erosion has become a serious problem. Erosion is not the only concern for beach managers. Other problems abound; chief among them are a lack of public access and parking areas near beaches, conflicts between different user groups, the safety of beach users, non-point source pollution, unsustainable construction and agricultural practices, and jurisdictional boundaries, which are difficult to determine.



In oceanic, regional and geopolitical terms, our program is at the crossroads of many international activities.



economies. At the forefront are Puerto Rico, with an aggressive industrial economic strategy, and the U.S. Virgin Islands, with an equally aggressive tourism development strategy, both more appropriate for continental areas than for insular environments. It is within these environmental and socioeconomic contexts that our program finds its challenges and opportunities.

Our greatest challenges are:

1. To address the serious water quality problems.
2. To promote reduction in the levels coastal marine pollution.
3. To promote recycling of solid waste.
4. To motivate the community to participate in our shared problem solving process.
5. To promote a public policy for sustainable development.
6. To reduce health safety risks in seafood technology.
7. To implement alternate technologies in managing fishery resources.
8. To protect essential fish habitats for the fisheries.
9. To establish a link between marine fisheries and essential fish habitats.
10. To design forms of sustainable coastal development that would benefit communities.
11. To mitigate the urban sprawl that is impacting our coastal habitats.
12. To increase the level of knowledge, critical thinking and action capacity of students, government officials and the general public with regard to the situation of our marine and coastal resources.
13. To help solve the socio-economic and environmental problems of beach management.
14. To apply simulation technologies to help predict and mitigate the impact of hurricanes and tsunamis.

An International Perspective

In oceanic, regional and geopolitical terms, our program is at the crossroads of many international activities. By design, and by sheer process, many of our activities and projects have an international outlook. In terms of the Sea Grant Network Plan, that international outlook increases the capability of our nation to assume an economic leadership role, but also to lead in information and technology transfer. While the conservation of marine resources in other countries is not inherent to the mission of UPRSGCP, it is in the interest of the Department of Commerce and NOAA that other nations achieve sustainable use of their marine resources, protect international resources, share information regarding the health of coastal ecosystems, and contribute to the sustainable development of the Americas. Our program will strive to play an increasingly active and important role in the international perspective of the National Sea Grant College Program. Our outreach and research projects in the Caribbean show that we are capable of assuming that role in the next decade.



Strategic Plan (2000-2010)



Functional Areas:

- Program Administration
- Research
- Outreach

Thematic Areas:

- Water Quality
- Fisheries and Mariculture
- Coastal Communities Economic Development
- Coastal Hazards

Strategies:

- Extension
- Communications
- Marine Education
- Program Evaluation

Tactics:

- Conservation projects
- Sustainable Development
- Marine Policy
- Capacity Building
- Needs Assessment
- Information Transfer



Functional Areas

*Program Administration

*Research

*Outreach

*Education

Strategic Goals

The conservation and sustainable use of marine and coastal resources remains the fundamental goal of our program. For the next decade our efforts toward achieving that goal will focus on the following key thematic areas: water quality, fisheries and mariculture, coastal communities economic development, and coastal hazards and safety. These strategic areas of effort will be fully integrated in a program designed to achieve effective regional impact through the program's functional components: Program Administration, Research, Outreach (Marine Advisory Services and Communications), and Education.

A. Functional Areas

The UPRSGCP has four main components or functional areas. These areas represent the day to day activities of the program and although they are presented as individual components, in practice they are interdependent. Our outreach and educational efforts are supported by our research projects, and all three rely on an effective administrative and management structure.

AI. Program Administration

The main concern for this component is to provide the program with an agile and innovative administration that successfully faces the challenges presented by the unsustainable economic activities that pervade our region. Our program administration must also make optimal use of the available funding and networking opportunities. The program needs to be administratively sound, innovative, aggressive, and scientifically based. It must have a strong educational orientation, be supported by an aggressive communications strategy, and maintain a strong and consistent regional outreach component. Such a complex and interdisciplinary program presents an administrative challenge. Consequently, we propose to:

- Strengthen the management capabilities of our program administrators and staff to better manage the fiscal, human and information resources of our program.
- Improve and strengthen our planning process to identify opportunities and needs, to provide the means for increasing the productivity and accountability of the program's efforts, to assess priorities, support innovative responses, develop proactive planning endeavors, and to integrate Sea Grant management activities with those of the University of Puerto Rico and the University of the Virgin Islands.



Functional Areas

Administration



Photo Carlos Díaz

- Coordinate the program assessment and evaluation process in order to evaluate the impact of the Sea Grant program on our clientele.
- Develop an activity and achievement accountability form to be used by Sea Grant components.
- Develop and implement strategies to improve communication within the UPR Sea Grant Program and between the University of Puerto Rico, and the University of the Virgin Islands.
- Continue to integrate coordinators and staff into the overall decision making process, through the use of participatory approaches, and of Total Quality Management (TQM) procedures and practices in line with UPR's strategic planning.
- Develop creative, sound and appropriate partnerships with other Sea Grant programs to provide an effective response to regional and international issues, and problems affecting the coasts and marine environs of the region.
- Design and implement procedures for the effective and integrated management of a multi-island (Puerto Rico, and the U.S. Virgin Islands) program, with a regional perspective and an international scope.
- Formally establish and improve the structure of our program and its relation with the University of Puerto Rico, and its dependencies.
- Become a leader in the establishment and improvement of interdisciplinary solutions to research problems, outreach projects, and educational perspectives.
- Develop an aggressive, well informed, problem-driven research agenda useful for decision making, public policy, education, and capacity building.
- Incorporate private sector involvement into research and outreach efforts. Develop strong links with university programs dealing with industry and commercial endeavors.
- Continue and increase partnership projects with the UPR campuses, governmental agencies and the private sector that will promote a better utilization of the resources.



Functional Areas

Research

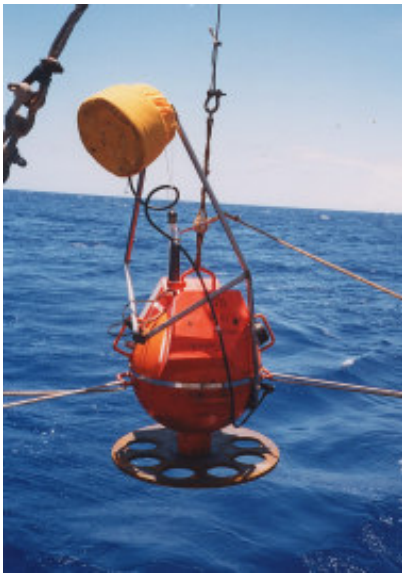


Photo courtesy P.R. Seismic Network

- ❑ Provide the program with a formal administrative structure within the UPR-Mayagüez and the UPR University system. This new administrative structure must allow the program to grow, to have relative autonomy in decision making, and to be consonant with our mission, as well as with the guidelines of the strategic and implementation plans.

A2. Research

For the coming decade Sea Grant will strive for our research component to become the prime source of knowledge, technology transfer and guidance in research activities related to the conservation and sustainable use of our coastal and marine resources. Future Sea Grant research must be focused on key action areas identified by researchers, resource users, resource managers, constituents and MOP staff. Our research agenda must also be interdisciplinary and innovative, in order to face the challenges that lie ahead. We propose to:

- ❑ Increase the number of research activities, and of funding opportunities, by identifying and tapping new funding sources, developing partnerships with other agencies, and stimulating the design and implementation of research projects in such new areas as mariculture, GIS applications to fisheries and coastal zone management, and coastal community development.
- ❑ Stimulate the development of regional research projects, to increase the capabilities of Caribbean researchers to deal with issues germane to the region, to improve the quality of shared marine resources, and to develop international research cooperation.
- ❑ Incorporate more MSc., and Ph.D. students from all pertinent disciplines into our research component. Stimulate student theses and dissertations which tackle problems related to marine and coastal resources.
- ❑ Strengthen our research agenda through the integration of projects and researchers into the goals and objectives of the outreach and education components.
- ❑ Increase the output of research findings in program publications and the media, and integrate these results into the region's decision-and policy-making processes.



Functional Areas

Outreach



A3. Outreach: Marine Outreach Program (MOP) and Communications

The outreach component will integrate the former Marine Advisory Service (MAS), and Communications in order to develop an information and technology transfer program designed to educate and change the attitudes, perceptions and practices of resource users, resource managers, and the general public in relation to the sustainable use of coastal and marine resources. The program will be developed based on the use of Sea Grant's research activities and projects, and on information generated by the program's specialists and agents regarding the insular / tropical environment of the Caribbean region. This process will integrate aspects of all our components into a rejuvenated Marine Outreach Program (MOP) that aims to:

- Improve beach management by addressing safety issues such as: water quality, beach services and access, deaths by drowning, marine debris, conflicts between swimmers and boaters.
- Promote beach conservation addressing issues such as beach erosion, deforestation and coastal construction impact.
- Propitiate the reduction of pollution to improve the quality of water in coastal and marine ecosystems.
- Promote sustainable activities that increase economic and recreational opportunities for coastal and marine resource users.
- Continually assess our priorities through the Advisory Committee and program assessment procedures.
- Develop mechanisms for the appropriate transfer (to policy makers) of information on the key target issues, to garner local and regional attention.
- Develop and publish public policy documents related to our key thematic areas to generate discussion. Develop programs and activities to stimulate discussion of public policy, change attitudes of decision makers, and affect policy changes aimed at replacing unsustainable practices with sustainable ones.
- Inform the public policy development process with accurate, unbiased information on conservation and sustainability.



Functional Areas

Through the use of more interactive and education oriented electronic information technologies, we will be able to reach a larger audience in all our pursuits, including effectively and efficiently disseminating research findings.

- Educate the public, industry, and health professionals in nutrition and safety issues related to seafood, giving special attention to HACCP capacity building.
- Develop marketing strategies to increase our effectiveness to transfer information and management technologies related to sustainable use of fishery resources, including identification and conservation of essential fish habitats, marine reserves, results of independent fishery monitoring programs, conservation practices, and the full participation of constituents in fisheries management.
- Incorporate research findings into an array of outreach activities and publications.
- Improve the formats of our publications (chiefly Boletín Marino and Sea Grant in the Caribbean) and include them in our Internet home page.
- Increase the number and quality of partnerships, especially with non-governmental organizations, devoted to the conservation of coastal resources, resource management programs and agencies, and the private sector throughout the region.
- Expand our capabilities to inform the public in relation to key issues and problems affecting the marine environs of the Caribbean region. This includes the development of an effective public relations strategy.
- Strengthen and expand our electronic information capabilities in order to reach a diverse clientele. Internet and web users have increased in Puerto Rico, the U.S. Virgin Islands, and throughout the Caribbean. One of the tools for the education of our existing constituents, and the cultivation of new ones, is the World Wide Web. Through the use of more interactive and education-oriented electronic information technologies, we will be able to reach a larger audience in all our pursuits, including effectively and efficiently disseminating research findings.
- Develop public policy documents related to our key areas.
- Increase MOP staff participation in the development of applied activities.
- Incorporate MOP specialists and agents in all aspects of the program's research agenda.



Functional Areas

Education



- ❑ Increase public awareness and understanding of natural coastal hazards through effective outreach and education.

A.4 Education

Of vital importance for the next decade is a mandate for our program to concentrate on educating the public. The primary goal of our education component is to turn education into a key strategic area defining our program in the next decade. This will require going beyond the traditional realm of the Marine Education component of our program. It requires redirecting the joint efforts of education, outreach and research toward the education of the private and public sector to attain sustainable development, sound management decisions, personal choices and conservation practices. Specifically, we aim to:

- ❑ Increase the number of environmentally responsible and scientifically literate resource users in Puerto Rico and the U.S. Virgin Islands.
- ❑ Expand the number of teachers and educational programs in Puerto Rico and the U.S. Virgin Islands capable of transferring interdisciplinary approaches to science education and conservation.
- ❑ Develop strong links with students, colleagues, and other programs throughout the Caribbean region, sharing our expertise and experience in beach management programs, education, and outreach activities, as well as our research findings.
- ❑ Increase the number of formal educational programs in the region. Those programs will be based on the transfer of our outreach and marine education experiences in the U.S.A., P.R., the U.S.V.I. and the Dominican Republic.
- ❑ Develop an educational base through the aggressive integration of research and outreach activities to direct public decision making, policies and behaviors.
- ❑ Become a leader in the use of electronic media in marine education.
- ❑ Assist government agencies with the design, preparation and implementation of appropriate regulations and law, as well as with policy decision-making, related to the sustainable use of our coastal and marine resources.



Program Structure

The proposed program structure serves as a platform for the evolution of the program into a University Institute.

- ❑ Develop continuing education opportunities for the training of resource managers, planners, enforcers and policy makers on coastal and marine resources issues.
- ❑ Focus educational outreach activities on educating resource managers, planners, enforcers and policy makers about the legal and conservation challenges created by unsustainable development practices.
- ❑ Expand our strong, interdisciplinary educational program through partnerships with universities, non-governmental organizations, schools, the private sector, and local communities.

B. Proposed program structure

In order to give the University of Puerto Rico Sea Grant College Program a more formal structure, we suggest the following organizational format. Decision making in the program will be the responsibility of the director, associate director and program coordinators. Strategic decisions, structural arrangements and overall program guidelines in relation to University matters shall be the responsibility of the Program's Executive Council. The Executive Council shall be composed of the President of UPR; the UPR-Mayagüez Chancellor; the Director of the Center for Research and Development; one representative from the UPRSGCP Advisory Council (to be appointed by consensus of the Administrative Board), and one representative from the Director's Consultive Board (Fig. 3). This body must be democratic, participatory and work in line with UPR strategic guidelines, integrating the input of staff, constituents and the UPR administration. Following National Sea Grant Program requirements, it has to incorporate the input of program officials and, most importantly, the guidelines suggested by the program's Advisory Council and Technical Review Panel.

As part of this process, our program will explore the feasibility of becoming a University Institute. That administrative structure was designed by UPR Central Administration to increase the potential for success of research and service oriented programs. As a University Institute, our program would be eligible to receive a constant flow of funding, while retaining its autonomy.

Our program will also have three consultive bodies: a Technical Review Panel for research, an Advisory Council for programmatic planning (both of which have been requested by the National Sea Grant College Program), and a Director's Consultive Board. The latter will be a body of partners and constituents who assists with academic and operational matters, and offers advice to the director. Members of this Consultive Board will include

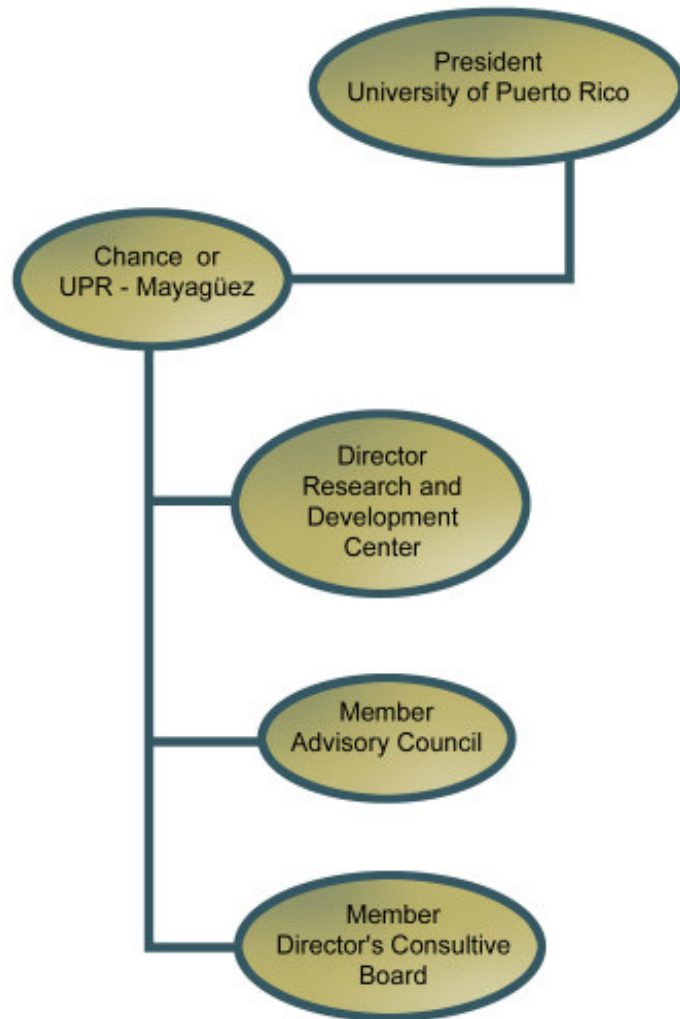


Program Structure

... structural arrangements and overall program guidelines in relation to University matters shall be the responsibility of the Executive Council

Proposed Program Structure for 2000 - 2010

UPR Sea Grant Executive Council

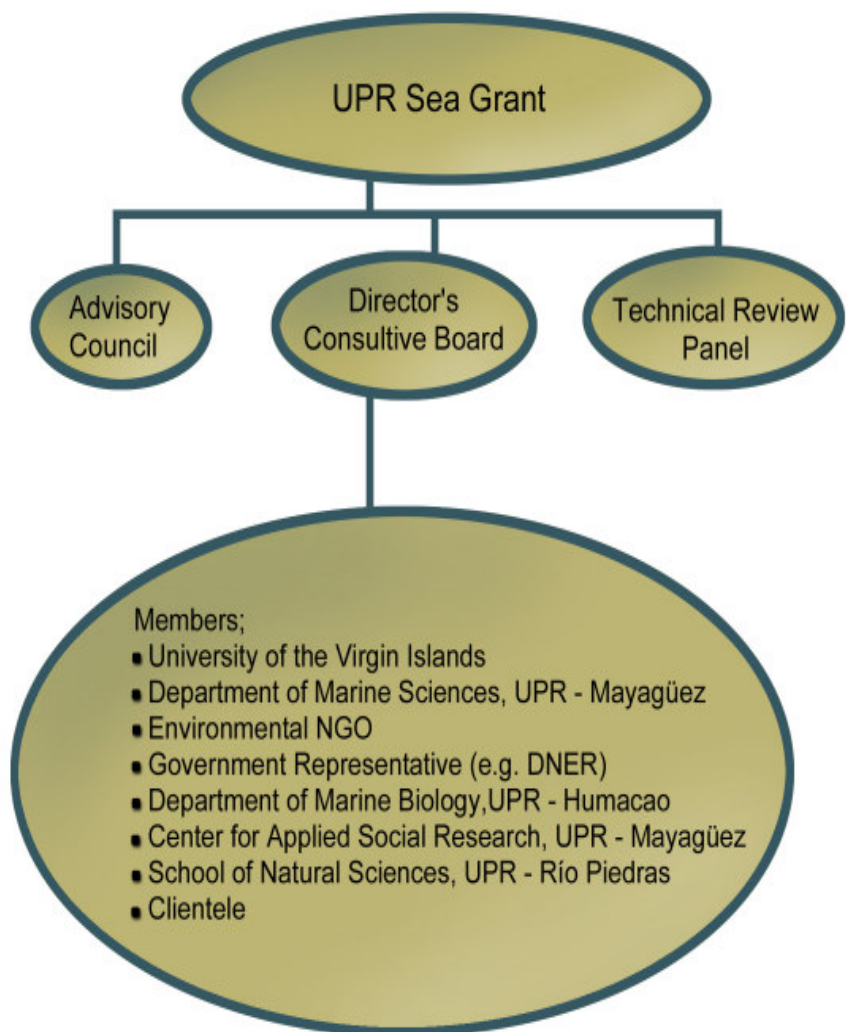


Program Structure

Our program will have three consultive bodies . . .

Proposed Program Structure for 2000 - 2010

UPR Sea Grant Consultive Bodies



Key Thematic Areas

representatives from: the University of the Virgin Islands, Environmental NGOs, the Department of Marine Sciences (UPR-Mayagüez), the Department of Marine Biology (UPR-Humacao), the Center for Applied Social Research (UPR-Mayagüez), the School of Natural Sciences (UPR-Río Piedras), a representative of the government, and a member of the program's clientele.

C. Key thematic areas

Our program faces unique challenges due to the multi-cultural, insular and tropical environment in which it is located. The following are key thematic areas and issues to which our program will devote effort and resources over the next decade.

C.1 Water quality

Challenges

- ◆ Improve water quality in coastal and marine environments.
- ◆ Promote the development of beach protection and conservation-related legislation.
- ◆ Coordinate the establishment of volunteer monitoring groups to test water quality.
- ◆ Contribute to the development and implementation of Puerto Rico's and the U.S. Virgin Islands' non-point source pollution control plan.
- ◆ Incorporate communities and stakeholders in the identification and solution of local environmental problems related to water quality.
- ◆ Review existing water quality standards and undertake the scientific research to develop tropical water quality standards.

Actions

- ◆ Establish water quality as a research priority in our program.
- ◆ Develop research projects with MOP staff in this specialization.
- ◆ Collaborate with governmental agencies in beach-related and water quality projects.



Key Thematic Areas



- ◆ Assist government regulatory agencies to establish guidelines for allowable water quality tolerances through applied research and monitoring.
- ◆ Advise the public and private sectors on strategies for implementing non-point source pollution control practices.
- ◆ Promote, assist and educate communities and non-governmental organizations in environmental problem-solving.

C.2 Fisheries and Mariculture

Challenges

- ◆ Reduce the trend in diminishing stocks and effects of overfishing.
- ◆ Increase the identification, mapping, and conservation of Essential Fish Habitats.
- ◆ Explore innovative fishery management techniques.
- ◆ Promote mariculture ventures of ornamental reef fish and other organisms, in order to provide economic opportunities for Puerto Rico and other Caribbean islands, while reducing the extraction of these organisms from their natural environment.
- ◆ Establish the UPRSGCP as a regional leader in the development of mariculture initiatives that will offer a seafood and economic alternative in Puerto Rico and the U.S. Virgin Islands.
- ◆ Establish mariculture as a long-term research and outreach programmatic area.
- ◆ Reduce health risks due to the mishandling of seafood, through HACCP training.
- ◆ Increase awareness of fishers and stakeholders on fisheries legislation, sustainable fishery practices, habitat loss and fishery management options including the function and value of Marine Protected Areas.



Key Thematic Areas



Actions

- ◆ Assess the effectiveness of Marine Protected Areas as a management option for protecting both the fisheries and essential fish habitats.
- ◆ Actively educate fishers and stakeholders on fishery legislation, catch reporting and management plans.
- ◆ Promote and support coastal, marine shelf and benthic habitat mapping and Essential Fish Habitat identification.
- ◆ Develop education and public policy strategies to reduce coastal habitat degradation sources.
- ◆ Develop efforts in habitat restoration.
- ◆ Increase public awareness of the critical problem of habitat loss.
- ◆ Promote coral reef monitoring programs.
- ◆ Establish mariculture as a research and outreach priority in our program, and promote mariculture as a significant source of quality seafood in the Caribbean basin.
- ◆ Educate the general public about mariculture and maricultured products; promote the nutritional benefits associated with the consumption of maricultured products, and the economic benefits associated with the development of the mariculture industry.
- ◆ Provide interested constituents with information related to the establishment of mariculture projects (laws and regulations, permits, targeted species, technical advisory services, loans, source of seeds, grants, and financial and business opportunities).
- ◆ Stimulate the local government to address stricter seafood regulations, inspection and reporting of illness caused by seafood consumption.
- ◆ Improve the overall quality and safety of the seafood products marketed in Puerto Rico.
- ◆ Expand the capabilities of our Caribbean colleagues to attain seafood quality and safety.



Key Thematic Areas



- ◆ Increase the number of HACCP trainees in industry and regulatory agencies with responsibility for implementing food safety regulations.
- ◆ Educate the general public about the importance of quality and safety problems.
- ◆ Assess the trends in seafood consumption, and market changes, in Puerto Rico and the U.S. Virgin Islands.

C.3 Coastal communities economic development

Challenges

- ◆ Establish sustainability as a fundamental principle for the development and implementation of policies related to the use and consumption of coastal resources and space.
- ◆ Promote the use, conservation and protection of coastal and marine resources in order to ensure long-term social, economic and environmental benefits in a sustainable way.
- ◆ Promote the development of integrated policies to achieve economic growth, environmental protection and social equity in coastal communities.
- ◆ Provide the technical expertise to help government establish policy and decision making processes based on the best scientific information available, supported by the findings of Sea Grant research and assessments in Puerto Rico and the U.S. Virgin Islands.
- ◆ Establish as a research priority the study of the effects of urban development and sprawl on coastal ecosystems, including beach erosion.
- ◆ Promote the establishment of a Department of Beach Management and Safety, with an assigned budget that bears relation to tourist and marine recreation related revenue.
- ◆ Encourage public participation in marine conservation activities while promoting a sustainable use of coastal areas.
- ◆ Encourage public participation in passive marine recreation activities (i.e. non-motorized watercrafts, snorkel trails, etc.) as a means to improve the quality of life of Puerto Ricans



Key Thematic Areas



and the sustainable development of our coastal and marine resources avoiding further damage to our fragile ecosystems.

- ◆ Educate marine resource users as to the appropriate use of recreational vehicles near fragile ecosystems. Advocate for the development of marine recreation access facilities, services and infrastructure in harmony with conservation efforts.
- ◆ Advocate for the allocation of money earmarked for enforcement of the coastal marine navigation regulations.
- ◆ To promote the optimization of water treatment discharge infrastructure, the elimination of sand extraction from our dunes and beaches, and the reduction of marine debris, deforestation and sedimentation levels.
- ◆ To reduce the number of deaths by drowning at the beaches of Puerto Rico.

Actions

- ◆ Stimulate socioeconomic research on coastal resources valuation, land use analysis and the economics of coastal development to determine the value of beaches, opportunity costs and the impact of policy changes on the society, as well as on the economy, of Puerto Rico and the U.S. Virgin Islands.
- ◆ Increase staff capability to use analytical tools related to coastal land use, in particular, ensure that staff members become literate in GIS technologies.
- ◆ Educate the public about the value of wetlands and associated ecosystems such as coral reefs and seagrass beds, and about the adverse impacts associated with development activities in such areas.
- ◆ Initiate local and regional discussion of sustainability and coastal development, and incorporate hazard and risk assessment into this effort.
- ◆ Establish a Coastal Economic Development Initiative (CEDI) in Puerto Rico and the U.S. Virgin Islands through partnerships with governmental development programs, university programs (e.g., Architecture, Planning, Engineering, Business, Small Business Development), and the Sea Grant Network, in order to enhance sustainable economic opportunities for coastal communities.



Key Thematic Areas



- ◆ Promote research utilizing the resources available at UPR, such as remote sensing and GIS technology, that help municipalities in their planning efforts.
- ◆ Generate statistics and stimulate research on the number of deaths by drowning at our beaches, the number of visitors to our beaches (tourists and local users), and on motivations for participating in marine recreation activities.
- ◆ Compile the body of beach-related laws and regulations.
- ◆ Disseminate beach management information to legislators, politicians, municipal officials and resource managers.
- ◆ Educate the public on the value and economic importance of our beaches, and disseminate information regarding water quality, urban sprawl and sustainable development.
- ◆ Educate personnel from the Departments of Education, and Sports and Recreation about the urgent need to incorporate swimming lessons and water safety into our schools' curricula, and in our sport and recreation programs.
- ◆ Stimulate passive marine recreation opportunities and reduce the number of deaths by drowning at the beaches of Puerto Rico.
- ◆ Promote the establishment of lifeguard, first aid and other beach services in Puerto Rico.



Key Thematic Areas



C.4 Coastal hazards and safety

Challenges

- ◆ To continue and reinforce our commitment to the understanding of hurricanes, severe storms and tsunamis, and the effects of mitigation on associated hazards. Our program has invested substantial resources in research and outreach activities related to this key area. The main challenge remains to reduce risk, and loss of life and property, through the dissemination and transfer of information and technologies developed by those Sea Grant researchers involved in risk management and mitigation.

Actions

- ◆ Actively participate in the promotion and implementation of a Caribbean tsunami warning system, similar to the one in the Pacific Region. The first step in this direction was the coordination of the Tsunami Caribbean Expert meeting, followed by investments in research projects and tools on the simulation of time/wave sequences of tsunamis in Caribbean cities, and the flooding models and maps. The next step is to develop the warning system based on a regional network of sensors.
- ◆ Educate the public, government officials and constituents on the impacts of the tsunami hazard.
- ◆ Increase our participation in the Sea Grant Hazard Net (HAZNET).
- ◆ Stimulate and establish innovative research projects in coastal engineering and architecture related to the mitigation of the impacts of coastal hazards.
- ◆ Stimulate and establish socioeconomic research for the understanding of public perceptions of risks, economic impacts of coastal hazards and the effectiveness of mitigation strategies.
- ◆ Stimulate Caribbean-wide evaluation of coastal flooding and the hazards of short and longer-term coastal erosion.
- ◆ Promote the benefits of coastal construction set-backs.



We do not have any other option, but to protect our ecosystems and resources, and support policies and practices conducive to sustainable development.

Final Words

This Strategic Plan is a “live” and interactive document that will guide our programmatic efforts for the next decade. Our clientele, collaborators and researchers are encouraged to actively participate, jointly with our staff, in the process of refinement and enhancement of our mission, vision, goals and objectives. Changes and improvements will be reflected in the *Implementation Plan* that accompanies our biennial proposal —the Institutional Plan— presented to the National Sea Grant Program.

Collaborators and members of the clientele are welcomed to participate in the continuous process of needs assessment, as well as in the identification of critical problems affecting our coastal and marine ecosystems and valuable resources.

The coast is an essential landscape for the development of Puerto Rico and the U.S. Virgin Islands. The marine environment is an asset to our economic future. We do not have any other option, but to protect our ecosystems and resources, and support policies and practices conducive to sustainable development.

These final words are an honest invitation to join us in the fascinating process of discovery and dissemination of the information needed to make the appropriate decisions for the conservation of nature. It is also an invitation to maintain open lines of communication to expand the possibilities of our Program.



Credits

Writers:

UPR Sea Grant Administration Team

Editor:

Dr. Aixa Rodríguez

Proofreading

Andrea Torres

Cover design and illustration:

Kenneth Rocafort

Layout:

Delmis del C. Alicea Segarra

Design:

UPR Sea Grant Communications and Publications





This publication was produced by the University of Puerto Rico Sea Grant College Program.

UPRSG-Q-83

UPR Sea Grant Publications 2002