

UNIVERSITY OF PUERTO RICO  
SEA GRANT COLLEGE PROGRAM

# Implementation Plan

2006

2008



  
**Sea Grant**  
University of Puerto Rico

  
**UPR**

---

## INDEX

	Page
Introduction .....	2
Strategic Goals .....	3
Functional Areas .....	4
Administration .....	5
Research .....	8
Outreach .....	11
Thematic Areas .....	11
Water Quality .....	12
Fisheries and Mariculture .....	14
Coastal Communities Economic Development .....	20
Coastal Hazards .....	22
Marine Education Component .....	27
Communications Component .....	30



# Implementation Plan 2006-2008



**Puerto Rico Sea Grant  
is based at the  
University of Puerto  
Rico . . . our key  
institutional partner is  
VIMAS at the  
University of the  
Virgin Islands.**

## Introduction

The University of Puerto Rico Sea Grant College Program is based at the University of Puerto Rico in the western municipality of Mayagüez. The program also has offices at the Department of Natural and Environmental Resources in San Juan, and at the UPR-Humacao, in the east coast.

Our program is one of the key programs and research institutions of the UPR-Mayagüez Research and Development Center. Administratively, Puerto Rico Sea Grant responds to the R&D Center, the UPR-Mayagüez chancellor office, and to the president of the UPR system. The University of the Virgin Islands, and its Center for Marine and Environmental Studies, is our key institutional partner housing the Virgin Islands Marine Advisory Service (VIMAS).

National Sea Grant College Program Implementation Plan Guidance recommendations have been incorporated to the UPRSGCP Implementation Plan 2006-2008. Our program's contribution to the Ecosystem Research Program (ERP) performance measures, have been incorporated to our Implementation Plan by classifying projects according to the measure we considered more relevant. 1) Return on investment from the discovery and application of new sustainable coastal and ocean products; 2) cumulative number of coastal, and marine issue based forecast capabilities developed and used for management and 3) percentage/number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem based management, are the three ERP measures that capture our program's efforts regarding research, outreach and education subprograms.

This Implementation Plan presents the main goals and objectives that we will accomplish, and the milestones we will reach during the 2006-2008 biennium.

# Implementation Plan 2006-2008

This Implementation Plan presents the main goals and objectives that we will accomplish, and the milestones we will reach during the 2006-2008 biennium.

UPR Sea Grant's functional areas are: Program Administration, Research, and Outreach.

## Strategic Goals

Our Program efforts will be devoted to the development and implementation of projects and activities that help us address our mission, and contribute to continue building the program along those lines.

We have the challenge of growing as 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.

A key goal is to strengthen our information and technology transfer program to educate and change the attitudes, perceptions and practices of elected officials, resource users, resource managers, and the general public.

Sustainability is our major goal, which permeates our functional areas (Program Administration, Research, and Outreach), as well as our thematic areas: Water Quality, Fisheries and Mariculture, Coastal Communities Economic Development, and Coastal Hazards.

Our functional areas will engage in a number of operational strategies to reach our goals. These strategies are: communications, extension, educational activities, and program evaluation methodologies. In addition, our program engages in actions (tactics) to achieve our objectives.

The most prominent tactics are: development of conservation projects (such as Marine Protected Areas), projects on sustainable development, marine policy debates, propositions, assessment of needs, information transfer, and capacity building.

In general terms, our Implementation Plan is devoted to guide us through the following pathways: program administrative capabilities, research efforts, improve communications at all levels of program effort, continue our excellence in outreach efforts, develop effective mechanisms for

# Functional Areas

\* Program Administration

\* Research

\* Outreach

the assessment and accountability of all our efforts, and to actively engage in activities that promote sustainability. These pathways lead to the following coordinates:

***A program of excellence  
The region's foremost educational program for  
conservation and sustainability  
A leader in research and marine outreach***



## Functional Areas

### Administration



Photo Carlos Díaz

The main tasks of the University of Puerto Rico Sea Grant's administration team, for 2006-2008, will be to maintain the level of excellence in connecting Sea Grant with users, continue improving the management of the program, and bring our research efforts to be well balanced and address relevant marine resources issues and opportunities. Prepare UPR Sea Grant's proposal, and its Institutional Plan 2006-2008, included funding allocation for all the activities conducive to reaching the goals, and achieving the objectives of this implementation plan.

#### Strategic Goal:

Strengthen the administrative, managerial, and operational capabilities of the Program.

#### Objective 1:

To complete the selection process for a program director in order to provide UPR Sea Grant with a formal and functional administrative structure within the UPR system to manage for success.

#### Action:

Coordinate the activities to establish the Program's Executive Council (composed by the President of the UPR, UPR-Mayagüez Chancellor, the director of the Center for Research and Development, a member of the Advisory Council, and one representative of the Director's Consultative Board)

***The Executive Council creation is pending the designation of a Program Director.***

#### Projection:

The executive council will guide our efforts to incorporate NSGO's and NOAA's strategic goals and priorities, as well as integrate the issues and priorities pertinent to Puerto Rico and the Caribbean.

#### Action:

Coordinate the activities of the Director's Consultative Board with representatives from the University of the Virgin Islands (UVI), Department of Marine Sciences (DMS), an environmental NGO, Center for Applied Social Research

## Functional Areas

## Administration

(CISA), UPR-Humacao, School of Natural Sciences, a government representative and a member of the clientele.

***The Consultative Board creation is pending the appointment of a Program Director.***

***Action:***

Help UPR Sea Grant establish long term goals and short terms priorities which constitute the core of our program Strategic Plan including: the economic stability of coastal communities, healthier coastal ecosystems and the development of an informed citizenry and competent professionals.

***Projection:***

Convene three annual meetings of the Consultative Board.

***Action:***

Organize the proposed Director's Consultative Board with representatives from the University of the Virgin Islands, UPR's Department of Marine Sciences, an Environmental Non Governmental Organization, Center for Applied Social Research (CISA), UPR Humacao, School of Natural Sciences, a government representative, and a member of the clientele. This will be accomplished with the input from the Technical Review Panel, Advisory Council and staff.

***Projection:***

Document this process in a publication, and provide a formal agreement on the Program's structure, signed by UPR officials, by the summer of 2007.

**Objective 2:**

Integrate all program components

***Action:***

Promote active and continuous participation of research coordinator, extension agents, educators, and communicator in all activities of the program in order to develop a more coherent effort to encourage our clientele to make wiser use of coastal and marine resources to enhance their value and solve the problems that threaten their sustainable use.

***Projection:***

Encourage participation of extension agents, educators and communicator in all RFP procedures to start that basic research

## Functional Areas

program goals and priorities reflect those of leading scientific organizations and managers of the resource and identify outreach objectives and performance measures.

### *Projection:*

Encourage participation of research coordinator, educators and communicator in the design of extension projects providing outreach staff with easily accessed and up to date research project results, publications, dissertations and theses.

### *Action:*

Activate key thematic area steering committees to advise the research and outreach components.

### *Projection:*

Organize bi-annual meetings of each thematic area steering committee to evaluate research and outreach progress.

## Administration





## Functional Areas

## Research

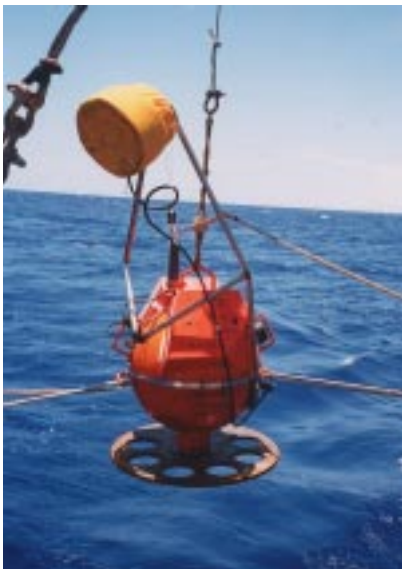


Photo courtesy P.R. Seismic Network

Each project in the research and outreach components, including education and communication programs, has been classified using the following performance measures.

**Measure 1: Return on investment from the discovery and application of new sustainable coastal, ocean, and Great Lakes products.**

**Measure 2: Cumulative number of coastal, marine, and Great Lakes issue-based forecast capabilities developed and used for management.**

**Measure 3: Percentage/number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management.**

## Research

### Strategic Goal:

Enhance research management and focus research efforts to an interdisciplinary, theoretical and applied strategy pertinent to the conservation of coastal ecosystems, and the sustainable use of resources.

### Objective 1:

Improve the quality, impact, and diversity of our research activities.

### Action:

Prepare and distribute a research protocol to guide research reporting process.

### Projection:

Improve accountability database regarding progress of research projects.

### Projection:

Develop an electronic database of research reports.

## Measure 3

# Functional Areas

## Research

### Objective 2

Conduct applied research to achieve strategic goals in the main thematic areas of the program.

#### **Action:**

Provide an opportunity for scientists to undertake original and creative research projects in the area of Coastal Habitats.

#### **Projection:**

Support the research project: *Coral Recruitment, thermal stress and coral reef community structure in St. John, US Virgin Islands* to contribute to contemporary and important scientific questions, addressing several key areas of the UPRSG Strategic Plan including: 1) maintenance of local fish habitats and the regional economy; 2) the promotion of coral reef monitoring programs; and indirectly, 3) promoting habitat mapping.

### Measure 3

#### **Projection:**

Support the research project: *Effects of water quality on sea grass community productivity and biodiversity* that will characterize near shore habitats and the accompanying watersheds to provide resource managers with policy recommendations based on scientific data, and establish a baseline data set.

### Measure 2

#### **Projection:**

Support the research project: *Endophytic microbial diversity in seagrass beds of *thalassia testudinum* and *Syringodium filiforme* from Cabo Rojo, Lajas and Vieques, Puerto Rico* that proposes an interdisciplinary approach to understand the role and importance of endophytic microorganisms in the health and survival of *T. testudinum*. The project will provide new tools for appropriate management of fisheries, planning of the development of the coastal zone and can be integrated into the region's decision and policy making processes.

### Measure 3

## Functional Areas

## Research

### **Action:**

Carry out research projects in the area of fisheries to develop an ecosystem perspective for resource management.

### **Projection:**

Support the research project: *Determining the minimum size fishery closures for protecting grouper spawning aggregations* that has as a goal to provide fishery managers the minimum area required to properly protect 3 commercially important grouper species (red hind, Nassau and yellowfin) during their spawning aggregations. The data generated by this research project will greatly benefit the fishery management agencies with the responsibility for designating fishery closures in an effort to protect the vulnerable grouper spawning aggregations and critical fishery habitats.

### **Measure 1, measure 3**

### **Projection:**

Support the research project: *Assessing essential fish habitat and connectivity of reef fish Otolith Microchemistry* that will increase knowledge of biology and ecology of commercially and recreationally valuable species. It will identify habitats considered essential for the survival and subsequent recruitment of marine fish increasingly important given the pressures of land use, rise in invasive species and decline in endemic aquatic fauna.

### **Measure 2**

### **Action:**

Carry out a research project in the area of Environmental Technology to apply cutting edge technologies and open new realms of possibilities for marine resources management research.

### **Projection:**

Support the research project: *Developing a protocol to use remote sensing as a cost effective tool to monitor contamination of mangrove wetlands* that aims to develop a protocol that will help monitoring agencies determine the health or possible contamination of a mangrove wetland applying remote sensing techniques that are currently used in mineral exploration.

### **Measure 2**

## Functional Areas



## Outreach

### Objective 3

Increase the dissemination of research findings through program publications, the media, peer reviewed journals as well as extension activities.

#### *Action:*

Support the effort of researchers to publish in peer reviewed journals through editorial assistance and funding.

#### *Projection:*

To actively help at least one researcher per year, in publishing in peer reviewed journals.

#### *Action:*

Encourage researchers to publish research results in Sea Grant publications, “translating” research reports into publications of wider reach.

#### *Projection:*

Develop one manuscript for a Sea Grant research compilation by the spring of 2008.

### Measure 3

## Outreach

According to the evaluation of the Program Assessment Team, all of our efforts in “connecting Sea Grant with users” were assessed as excellent. At the core of those efforts is the Marine Outreach Program.

The presentation of the objectives, actions, and projections of the Marine Outreach Program follow the outline of the Program’s four thematic areas, and the key topics under each one. The core of the Marine Education, and the Communications projects are presented at the end.

### Strategic Goals:

Strengthen the information and technology transfer projects and activities to educate, change attitudes, and transform practices of coastal and marine resource users, in relation to the sustainable use of resources in Puerto Rico, the U.S. Virgin Islands, and the Caribbean. Increase effective and appropriate liaisons with the research community, government agencies, private industry, resource users, and the general public.



## Thematic Areas

### Water Quality



### Water Quality

\*Watersheds

\*Non-Point Source  
Pollution Control

\*Sustainable water  
use

\*Community Capacity  
Building

### Strategic Goals in Water Quality:

Reduce the levels of contamination in rivers, estuaries, bays, beaches and coastal waters through public education campaigns, changes in policy, demonstration projects, and changes in practices.

### Water quality

#### Objective 1:

Promote Non Point Source Pollution control in the island of Culebra encouraging the adoption of simple household practices to improve and optimize on site wastewater disposal systems (OSDS).

#### Action:

Train users of On Site Disposal System (OSDS) on the island of Culebra.

#### Projection:

Identify, visit and evaluate 50 families from Culebra's special communities Barriada Clark and Villa Muñeco with OSDS problems, and conduct 2 OSDS workshops.

#### Projection:

Develop an easy-to-use spread sheet computer program to calculate OSDS capacity, construction alternatives and dimensions. This technological tool will be disseminated among Health Department inspectors of the metropolitan area.

### Measure 2, measure 3

#### Objective 2:

Collaborate with the Puerto Rico Non Point Source Pollution (NPSP) Committee in the implementation of the NPSP Control Plan in Culebra.

#### Action:

Promote *Non Point Source Pollution* Education in Culebra, in collaboration with the Department of Natural and Environmental Resources.

## Thematic Areas

### Water Quality



#### **Projection:**

Conduct non-point source pollution workshops, one on one consultations and meetings with the general public and governmental officials.

#### **Measure 3**

#### **Objective 3:**

Promote sustainable management policies regarding coastal and water resources.

#### **Action:**

Disseminate information related to coastal and water management and policy issues.

#### **Projection:**

Submit oral and written statements at public hearings and conferences to promote sustainable management policies.

#### **Projection:**

Offer advisory services and technical assistance related to development projects and their impact on watershed management, land use and water quality.

#### **Projection:**

Disseminate public information related to legislative projects and resolutions, recent judicial opinions and general environmental information in a timely manner and through a variety of means including the internet and Sea Grant bulletins.

#### **Measure 3**

#### **Objective 4:**

Promote community leadership, training and participation in water and land use issues, conflict management and sustainable development issues.

#### **Action:**

Collaborate with environmental and community organizations in managing their multiple water and land use issues.

## Thematic Areas



## Fisheries and Mariculture

\*Offshore aquaculture

\*Ornamentals

\*Marine Protected Areas

\*Seafood Safety

### **Projection:**

Assist community groups in developing a proposal for a Watershed Council which should include pertinent government agencies as well as community groups.

### **Projection:**

Capacitate and advise environmental and community groups throughout western Puerto Rico in strategies for managing multiple-user conflict.

### **Projection:**

Provide the environmental and community groups with technical assistance on regulations dealing with state and federal coastal water and land uses.

### **Action:**

Train community leaders in the use of effective leadership tools.

### **Projection:**

Publish and distribute a booklet: *Herramientas para un líder comunitario efectivo* (Tools for an effective community leader) in collaboration with the Agricultural Extension Service (AES) of the University of Puerto Rico.

### **Measure 3**

## Fisheries and Mariculture

### **Strategic Goals in Fisheries and Mariculture:**

To be at the forefront of the transfer of information and management technologies related to the sustainable use of fishery resources, including the identification and conservation of essential fish habitats, promotion of marine protected areas, conservation practices, and the participation of constituents in fisheries management.

Improve the quality and safety of the seafood products marketed and consumed. Promote the development of the mariculture industry in the Archipelago of Puerto Rico.

### **Objective 1:**

Create awareness about the importance of spawning aggregations in the Puerto Rican shelf in order to gain support for conservation and management initiatives.

## Thematic Areas

### Fisheries and Mariculture



#### **Action:**

Generate appropriate information to develop conservation-based management strategies.

#### **Projection:**

Document the main spawning aggregations sites of the grouper-snapper complex around the Puerto Rican waters.

#### **Projection:**

Gather critical information regarding the identification of aggregation sites that need to be protected in order to restore fisheries sustainable levels.

#### **Projection:**

Produce a summary report for Puerto Rico's coral reef fish managers.

#### **Projection:**

Conduct outreach workshops among fishermen around the archipelago of PR including Vieques and Culebra islands, to explain why during the selection of an effective "Marine Protected Area" (MPA's those multi-species reproduction sites) should be included to ensure management effectiveness.

### **Measure 3**

#### **Objective 2**

Provide more efficient and effective data collection, management and dissemination of fishery - independent data on marine resources and their environment.

#### **Action:**

Coordinate the Caribbean NMFS Cooperative SEAMAP Program.

#### **Projection:**

Coordinate activities related to the collection of information on EFH.

#### **Projection:**

Distribute available printed scientific literature needed by the committee and work groups to plan and evaluate surveys and other scientific activities.

### **Measure 2, measure 3**



## Thematic Areas

## Fisheries and Mariculture



### Objective 3:

Promote the development of Marine Protected Areas and Essential Fish Habitat as management tools for the development of sustainable fisheries.

#### *Action:*

Educate fishermen and the general public with respect to the importance of observing established conservation procedures which will result in the protection of the fisheries from overexploitation.

#### *Projection:*

Educate stakeholders through publications, newspaper articles, personal conversations and participation in public hearings and meetings on MPA's benefits and research findings.

#### *Action:*

Coordinate the Management Plans for the two Marine Protected Areas (MPA) of Puerto Rico: the Canal Luis Pena MPA and the Tres Palmas Marine Reserve in Rincón.

#### *Projection:*

Provide technical assistance to the Steering Committee and the Working Group of Rincón and Culebra, respectively.

#### *Projection:*

Gather vital information for the development of management plans for the Tres Palmas and Canal de Luis Peña marine reserves

#### *Action:*

Educate local communities on the importance of MPA's, based on the best scientific information available, some of which has been produced by UPR Sea Grant funded research.

#### *Projection:*

Coordinate the development of a Web Log (a *blog*) with information on the process to complete the management plan at Culebra, and to assist the Surfrider Foundation in their efforts to keep the community abreast on their efforts in Rincón. The *blog* for Culebra is already available at <http://www.amp-pr.org/culebra>. This is a joint effort between Sea Grant and the Interdisciplinary Center for Coastal Studies, at UPR-Mayagüez.

## Thematic Areas

### Fisheries and Mariculture



**Projection:**

Disseminate information on the sustainable uses and conservation of the coastal and marine resources of Culebra and Rincón through a bimonthly bulletin and a weblog.

**Measure 3**

**Objective 4:**

Provide guidance and advisory services to the artisanal fishermen of Puerto Rico.

**Action:**

Coordinate two (2) meetings with the two main Puerto Rican fishing organizations in order to help set priorities and develop a long-range strategic plan.

**Action:**

Produce and distribute educational materials among fishermen.

**Measure 3**

**Objective 5:**

Educate and change attitudes, perceptions and practices among resource users, resource managers, and the general public in relation to the sustainable use of four underutilized species.

**Action:**

Promote appropriate management policies and strategies for the growing sport fisheries and the existing commercial fisheries of these underutilized species among resources managers and the scientific community.

**Projection:**

Coordinate meetings and workshops with resource managers and the scientific community.

**Projection:**

Conduct structured field visits and interviews at all fishing villages in Puerto Rico to identify resource users and disseminate information regarding these fisheries to support local management efforts.

**Measure 3**

## Thematic Areas

### Fisheries and Mariculture



#### **Objective 6:**

Promote the adoption of safer diving and effective early management of injuries to reduce the number of fatal and non-fatal diving accidents.

#### **Action:**

Offer capacity building opportunities related to diving safety and diving related injuries to AFD, EMT, hospital personnel and emergency room doctors.

#### **Projection:**

Conduct workshops for AFD in collaboration with personnel from the Hyperbaric Medicine Services of the Puerto Rico Medical Services Administration.

#### **Projection:**

Conduct a workshop for EMT, hospital personnel and emergency room doctors in collaboration with personnel from the Hyperbaric Medicine Services.

#### **Measure 1**

#### **Objective 7:**

Influence public policy and legal issues related to the development of the aquaculture and mariculture industries to generate economic opportunities and provide a safe seafood source to Puerto Ricans.

#### **Action:**

Promote the adoption and implementation of legislation in support of the aquatic farming and mariculture development.

#### **Projection:**

Educate legislators on the need to develop, implement and enforce marine aquaculture policies for the establishment of a viable coastal and offshore industry.

#### **Action:**

Promote mariculture and the development of an inland hatchery for marine species, to support the growing Offshore-Cage aquaculture Industry in Puerto Rico.

#### **Projection:**

Provide technical support and expert advice to at least (2) two mariculture projects and one marine spawning and larval

## Thematic Areas

## Fisheries and Mariculture



rearing fish larvae project, for commercial mariculture offshore purposes.

### Measure 1 and 3

#### Objective 8:

Promote international Sea Grant outreach efforts in Latin American countries.

#### Action:

Transfer relevant technology to extension personnel in Latin American countries.

#### Projection:

Recruit key aquaculture research and extension personnel within the Mexican university system as well as in other organizations to establish a Center for Aquaculture Technology Transfer (CATT) in Mexico.

#### Projection:

Collaborate with New York Sea Grant in the organization of the 1<sup>st</sup> Annual Sustainable Aquaculture Technology Transfer Workshop in Mexico.

#### Projection:

Collaborate with UNESCO in the Caribbean projects Small Island Voices. Community visioning and SIDS Universities Consortium.

### Measure 3

#### Objective 9:

Improve the quality and safety of seafood products in the Archipelago of Puerto Rico.

#### Action:

Educate and create awareness of potential health risks associated with seafood for individuals to make informed choices.

#### Projection:

Conduct a workshop on current and basic topics and hands-on training for regulatory inspectors and agriculture service specialists about histamine, ciguatera and shellfish poisoning.

## Thematic Areas



## Coastal Communities Economic Development

\*Sustainable Development

\*Smart Growth

### **Projection:**

Assist the Puerto Rico Health Department in the FDA's initiative to reduce oysters related illnesses in the Island by actively collaborating in the establishment of a program to ensure the safe harvesting, processing and distribution of molluscan shellfish.

### **Action:**

Transfer complete and updated information about potential health risks associated with the consumption of seafood.

### **Projection:**

Transfer information about both ciguatera and the "Hazard Analysis of Critical Control Point" techniques and regulations.

### **Projection:**

Produce educational materials about the risks of consuming raw shellfish as well as about allergies related to seafood consumption.

### **Measure 1 and 3**

## Coastal Community Economic Development

### Strategic goals in coastal community economic development:

The primary goal of the CCD program is to continue advising and enhancing capacity building efforts in coastal communities regarding sustainable economic development, value and conservation of natural resources, impact of urban sprawl and smart growth. The CCD also wants to work as a facilitator and link between coastal community residents, NGO's, government agencies, and the private sector.

### **Objective 1:**

Enhance access to information related to sustainable development and smart growth, among coastal communities, NGO's, stakeholders, government agencies, the private sector and the general public.

### **Action:**

Increase the number of coastal communities engaged in CCD projects and continue education efforts in the coastal communities of Lajas, Vieques and Rincón.

## Thematic Areas

# Coastal Communities Economic Development

\*Economic Development

\*Coastal Ocean Observing System



### **Projection:**

Identify additional coastal communities and conduct the needs assessment process in order to design and implement CCD projects in those communities.

### **Action:**

Organize capacity building activities of the Jobos Bay National Estuarine Research Reserve Coastal Training Program.

### **Projection:**

Coordinate seminars for coastal community decision-makers on matters related to: sustainable development, coastal economic development, urban sprawl, conflict management, small business, smart growth and environmental legislation.

### **Measure 3**

#### **Objective 2:**

Produce a Compendium of Puerto Rico's Laws and Legislation related to Smart Growth.

### **Action:**

Disseminate information on smart growth laws and legislative measures under consideration for Puerto Rico, to help local communities address issues related to land development, and the planning process.

### **Projection:**

Publish a compendium of laws and proposed legislation related to smart growth in Puerto Rico to be posted on UPRSG and CCD web pages and distribute among communities and stakeholders who participate in CCD activities.

### **Measure 3**

#### **Objective 3:**

Evaluate the impact of Revitalization of Urban Center Projects in Coastal Municipalities in Puerto Rico.

### **Action:**

Conduct a study of economic impacts generated by the revitalization of urban centers in the coastal municipalities.

## Thematic Areas



## Coastal Hazards

\*Beach Management

\*Marine Recreation

### **Projection:**

Develop a questionnaire to measure the economic impact on commerce due to the Revitalization of Urban Centers in the municipalities of Cabo Rojo, Rincón, and Mayagüez.

### **Projection:**

Publish the data and its impacts, and present results and recommendations to the mayors of these municipalities, and other municipal government officials.

### **Measure 1 and 3**

### **Objective 4:**

Collaborate with the UPRM Department of Marine Sciences and the University of the Virgin Islands to establish an Integrated Coastal Ocean Observing System for the U.S. Caribbean Exclusive Economic Zone (EEZ)

### **Action:**

Establish and sustain an integrated ocean and coastal observing system serving the Caribbean EEZ of the United States.

### **Projection:**

Coordinate coastal and marine observing activities within the region among data providers and end users.

### **Projection:**

Promote the regional use of coastal and marine observing systems and associated products to address societal goals.

### **Measure 2**

## Coastal Hazards

### **Strategic Goals in Coastal Hazards:**

Reduce risk, loss of life and property through dissemination and transfer of information and technology to resource users, emergency personnel, and municipal, insular and federal government agencies. Promote beach management and erosion control practices among Caribbean communities.

## Thematic Areas

## Coastal Hazards

\*Human Vulnerability



### Objective 1:

Promote the sustainable development of our coastal resources via beach management and marine recreation advisory services.

### Action:

Advise the Department of Natural and Environmental Resources (DNER) and the P.R. Tourism Company (PRTC) on beach management and marine recreation matters.

### Projection:

Collaborate as a member of the National Board of Blue Flag Beaches.

### Projection:

Participate as the representative of the constituents and stakeholders of Puerto Rico in the Puerto Rico Beach Board under the management of the DNER.

### Projection:

Advise the Commissioner of Navigation of Puerto Rico, through a group of expert volunteers proficient in diverse marine recreation activities, Consejo de Recreación Marina (CREMA).

### Measure 1

### Objective 2:

Create awareness of the human vulnerability of coastal communities, with emphasis on identification of high-risk populations.

### Action:

Provide technical assistance on coastal hazards issues, and its implications, to coastal municipalities, NGO's, legislative bodies and coastal communities.

### Projection:

Technical consultations by e-mail and on the field for NGO's as well as government agencies.

### Action:

Develop material to disseminate information regarding coastal communities vulnerability to coastal hazards.



## Thematic Areas

### Coastal Hazards

\*Hazard Mitigation

\*UNESCO's Small Islands Voice



#### **Projection:**

Publish articles and reports on Boletín Marino and Sea Grant in the Caribbean, on topics of interest to the general public.

#### **Projection:**

As part of the UPR Sea Grant Center for Coastal Hazards, sponsored by NOAA, develop a tsunami forecasting model for Puerto Rico and the USVI. Create a computer-based tsunami modeling data bank from point sources originating in the tsunami-earthquake prone areas in the Atlantic Ocean and Caribbean Sea.

#### **Measure 2**

#### **Objective 3:**

Promote access to and use of coastal flood maps to be used for hazard mitigation.

#### **Action:**

Educate environmental groups and the concerned public about the availability of coastal flood maps and how they can be used for hazard mitigation, and for monitoring that all coastal construction is done in agreement with state and federal laws.

#### **Projection:**

Develop and deliver four coastal community workshops per year focusing on the use and interpretation of the coastal flood maps made available through the Internet, as part of 2004-2006' Project BMC-4: Coastal Hazards Research and Assessment.

#### **Projection:**

Participate in a workshop about the tsunami hazards in conjunction with the Puerto Rico Seismic Network.

#### **Measure 2 and 3**

#### **Objective 4:**

In collaboration with UNESCO work in the Small Island Voice initiative to ensure that the voice of the general public in small islands is heard loud and clear and that this voice becomes a driving force towards sustainable island development.

## Thematic Areas

## Coastal Hazards

UNESCO's

\*Community Visioning

\*Climate Change

\*Sea Level Rise



### **Action:**

Focusing on 'Communities in Action', Small Islands Voice works with villages, specific interest groups, and sometimes entire islands, by building capacity so that islanders can effectively plan and implement their own vision of sustainable development.

### **Projection:**

On-the-ground activities in thirteen islands covering eco-friendly practices, community and development planning (through a process known as community visioning), preserving and enhancing island culture; and youth-led activities.

### **Projection:**

Promote south-technical cooperation and undertake combined projects.

### **Projection:**

Share the experiences through internet discussion forums, one for the general public and one for school-aged youth.

### **Projection:**

Widen the impact of Small Islands Voice through media (press, radio, television); documenting the activities through a regularly updated website; partnering with other initiatives focusing on small island development.

## **Measure 3**

### **Objective 5:**

In collaboration with UNESCO expand the community visioning process to selected Caribbean islands.

### **Action:**

Develop Community Visioning pilot projects and participate in a proposed Community Visioning session at the Islands of the World Conference, scheduled for Maui in 2006.

### **Projection:**

Identify two interested communities in different Caribbean islands and undertake initial visioning activities – development of vision statements and assessment of community capacity.

## Thematic Areas

## Coastal Hazards

\*UNESCO's Sustainable Development



### **Projection:**

Sponsor a minimum of two persons from interested Caribbean islands to participate in the Islands of the World Conference in Maui and to benefit from experiencing the successful community visioning process that has been ongoing in the Hawaiian Islands since 1998.

### **Measure 3**

### **Objective 6:**

With UNESCO work on a program to explain the concept of climate change and sea level rise and their impact on Caribbean coastal communities.

### **Action:**

To assist communities in Caribbean islands working in Small Islands Voice understand and cope with the impacts of climate change and sea level rise.

### **Projection:**

Using a participatory approach, work with two communities to implement specific measures to reduce energy consumption and evaluate the results.

### **Projection:**

Conduct awareness seminars about conservation measures and responses to climate change and sea level rise.

### **Projection:**

Publicize the activities through press, radio and television and the Small Islands Voice Global internet forum.

### **Projection:**

Document and evaluate the results with a view to expanding the activities to other countries and other communities.

### **Measure 3**

### **Objective 7:**

Promote Education for Sustainable Development Utilizing the Sandwatch Approach in collaboration with UNESCO.

### **Action:**

Develop a partnership between the Sandwatch and River Care initiatives, so that River Care can be expanded to the Caribbean islands.

# Marine Education Component

\*Capacity building of teachers

\*Conservation of endangered species



## *Projection:*

Hold a workshop in the Caribbean with Sandwatch partners from 5 islands involved, as well as Ministry of Education representatives, and River Care partners, to explore the River Care methodology and develop a program to initiate River Care projects in the five islands represented.

## *Projection:*

Support five River Care projects in the Caribbean over a 2-year period.

## **Measure 3**

### Strategic Goals in Marine Education:

The Marine Education component will continue to be the foremost marine education resource for sustainable use of marine and coastal resources in Puerto Rico. Our educational activities are linked with the functional and thematic areas of the program. Education is a key strategic area which defines the very essence of UPR Sea Grant.

#### **Objective 1:**

Implementation of a Marine Science Course.

#### *Action:*

Develop a workshop to train teachers in the implementation of the marine science curriculum.

#### *Projection:*

Implement the Marine Science Elective course in at least twenty new schools each year.

## **Measure 3**

#### **Objective 2:**

Provide teachers with the educational tools needed to learn and teach environmental concepts.

#### *Action:*

Establish **MAREDUCA**: a clearinghouse that organizes useful electronic resources for marine education in a comprehensive and pedagogically appropriate manner.

# Marine Education Component



## *Projection:*

Promote the use of **MAREDUCA** among educators and train them to use it effectively as a tool for education and develop links with agencies, institutions, organizations and universities that collaborate in the project.

## **Measure 3**

### **Objective 3:**

Conduct educator workshops to increase the number of teachers capable of transferring interdisciplinary approaches to science education.

### *Action:*

Promote strategies that allow teachers to integrate coastal and marine concepts in the regular school curricula.

### *Projection:*

Recruit 300 new educators from different schools and disciplines throughout the island to participate in Sea Grant's MEC education activities.

### *Projection:*

Coordinate marine science workshops for elementary and secondary school educators in Puerto Rico.

### **Objective 4:**

Conservation of sea turtle nesting areas through a continuous monitoring process of sea turtle nests along the southeastern coast of Puerto Rico.

### *Action:*

Increase awareness in coastal communities about anthropogenic actions which degrade sea turtle' habitats.

### *Projection:*

Continue to monitor sea turtle nesting sites in Humacao, Maunabo and Patillas.

### *Projection:*

Conduct Sea Turtles workshop at UPR-Humacao for educators, students and the general public.

## **Measure 3**

# Marine Education Component



## **Objective 5:**

Provide educational resources to coastal communities to increase awareness and knowledge of marine science, and conservation and sustainable use of marine resources among coastal communities, environmental organizations, and K-12 students and teachers.

### **Action:**

Provide formal education in marine science to K-12 students, teachers and coastal communities.

### **Projection:**

Coordinate and deliver talks related to marine science and the sustainable development of coastal and marine resources for schools around the island.

### **Projection:**

Collaborate with the South East Center of Ocean Science Education Excellence (SECOSEE) in the coordination workshops for teachers designed to help them integrate marine science into their curriculum.

### **Projection:**

Provide advisory services and education assistance to NGO's and government agencies on matters related to coastal and marine resources conservation.

### **Action:**

Identify educational needs in the schools, coastal communities, and environmental organizations.

### **Projection:**

Produce lesson plans for schools, participate in the organization of workshops and environmental fairs in Rincón about the Tres Palmas Marine Reserve in collaboration with the Surf Rider Foundation.

### **Projection:**

Coordinate with the UPRM Department of Marine Science trips to the mangroves, coral reefs and bioluminescent bay of La Parguera as part of the efforts to educate K-12 teachers and students.

## Communications Component

\* Magazines

\* Partnerships

\* Books

\* Promotional Material

\* Conferences

### **Action:**

Annual marine fair “Aventura Marina: de la escuela al mar” (“*Marine Adventure: from school to the sea*”) to expose 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> graders from public schools throughout Puerto Rico to basic ecosystem and marine conservation concepts.

### **Projection:**

Coordinate an annual marine fair for public school students from 4<sup>th</sup> to 6<sup>th</sup> grade and distribute UPR Sea Grant educational materials among participants.

### **Action:**

Develop with Casa Pueblo in Adjuntas a pilot project consisting of an educational exchange between coastal and mountain fourth and fifth graders to be known as “**De la montaña al mar**” (“*From the mountains to the sea*”).

### **Projection:**

Coordinate an exchange that will take students from Casa Pueblo’s Community Biodiversity Institute to a coastal ecosystem; and students from coastal communities in southwestern P.R. to a forest ecosystem in the mountains of Adjuntas.

## Measure 3

## Communications

### **Objective 1:**

Inform a wide audience about the work UPR Sea Grant outreach component performs to promote the wise use of coastal and marine resources.

### **Action:**

Develop publications and materials tailored to support the communication and dissemination needs of all UPRSG program components.

### **Projection:**

Publish Boletín Marino four times a year and Sea Grant in the Caribbean in electronic format four times a year.

### **Projection:**

Produce new marine fact sheets, posters, coloring book and promotional materials related to research and outreach

# Communications Component



efforts, and disseminate research results via the program's magazines as well as the web page.

**Action:**

Create new educational resources to educate about coastal and marine resources in Puerto Rico and the Caribbean.

**Projection:**

Publish a bilingual book about sea currents for use by decision makers, resource managers and the general public interested in this topic.

**Projection:**

Publish an updated version of the book Marine Mammals in Puerto Rico, in Spanish.

**Projection:**

Publish one new public policy paper about the need for a tsunami alert and mitigation system in Puerto Rico.

**Measure 3**

**Objective 2:**

Expand the outreach capabilities of our web page.

**Action:**

Design a new image for UPR Sea Grant web page.

**Projection:**

Make research abstracts available through web page in PDF format.

**Projection:**

Expand the links to include partners and specific pages related to our focus areas: water quality, fisheries and mariculture, seafood safety, coastal hazards, coastal community development as well as marine education websites.

**Measure 3**

**Objective 3:**

Support all areas of the program in the coordination of research, outreach and educational conferences, workshops and materials.



## Communications Component

### \*Public Policy Papers

#### **Action:**

Coordinate conference logistics, develop, produce and disseminate all conference materials.

#### **Projection:**

Develop, produce and disseminate all conference materials, including promotional materials for the Annual Science meeting in September 2006 and September 2007.

#### **Projection:**

Coordinate the annual meeting of the National Sea Grant Program Extension leaders and communication leaders meeting in Rincón, Puerto Rico, May 2006.

#### **Projection:**

Coordinate logistics for the annual marine fair “*Aventura Marina: de la escuela al mar*” (Marine Adventure: from the school to the sea) for elementary school children. Develop, produce and disseminate all fair materials, including promotional materials for the December 2006 and December 2007 fairs.

#### **Measure 3**

## **Credits**

### **Texts:**

UPR Sea Grant Administration Team

### **Editor:**

Dr. Aixa Rodríguez

### **Cover design and illustration:**

Kenneth Rocafort  
Jorge Montes Goñi

### **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-101

UPR Sea Grant Publications 2005