

# PIER 2012 Annual Report

## Puerto Rico Sea Grant

### Official Level of Effort - Only Approved Funding

Report Generated by YULISSA GARCIA on 12/13/2021

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### 2012 Level of Effort

<a href="#">National Focus Area Name</a>	<a href="#">SG Federal</a>	<a href="#">Match</a>	<a href="#">Pass Thru</a>	<a href="#">Federal+ Match + Pass Thru</a>	<a href="#">LOE without Leverage (%)</a>	<a href="#">Leveraged (Managed)</a>	<a href="#">LOE with Leverage (%)</a>
Healthy Coastal Ecosystems	\$596,534	\$402,003	\$0	\$998,538	48 %	\$362,163	53 %
Safe and Sustainable Seafood Supply	\$0	\$0	\$0	\$0	0 %	\$0	0 %
Hazard Resilient Coastal Communities	\$359,151	\$205,186	\$0	\$564,337	27 %	\$35,171	23 %
Sustainable Coastal Development	\$288,281	\$233,603	\$0	\$521,884	25 %	\$77,035	23 %
Other	\$0	\$0	\$0	\$0	0 %	\$0	0 %
TOTAL ALL FOCUS AREAS:	\$1,243,966	\$840,792	\$0	\$2,084,759	100 %	\$474,369	100 %

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### 2012 Impacts & Accomplishments

#### Puerto Rico Sea Grant Develops International Sandwatch Videos

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Impact
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

Puerto Rico Sea Grant has completed a series of 30 educational bilingual videos (English and Spanish) through \$50,000 subvention from the United Nations Educational, Scientific and Cultural Organization (UNESCO), to train leaders and volunteers on the Sandwatch activities and methodology, provide them with a background on climate change and introduce them to data gathering and analysis. The videos are being used in the internationalization of the Sandwatch project in Pacific and Caribbean countries. UNESCO translated the videos to German and French to expand the educational efforts regarding the sustainable development of coastal and marine resources. With the utilization of these videos, volunteers will have available, an educational tool that provides access to detailed information and instructions about the technology and equipment utilized in the data gathering efforts, the application of science and mathematics concepts relevant to the Sandwatch activities, and goals and expectations of the project.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(s):**

COMMUNICATIONS AND PUBLICATIONS (2012 - 2013)

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### Coral reef monitoring and assessment

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Impact
- Approved

**RECAP:** CMES efforts have provided the local government with tools they need in order to protect marine resources.

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance:** Evaluating the effectiveness of government management plans at reducing the impact of anthropogenic activities on coastal resources is essential. The evaluation process requires an assessment of baseline conditions of those resources followed by a long-term monitoring effort.

**Response:** VIMAS has partnered with CMES researchers to conduct large-scale assessments of Virgin Islands reefs and has initiated a territorial coral reef monitoring effort of heavily impacted sites. These data, which are being provided to the VI Department of Planning and Natural Resources, will allow the Coastal Zone Management and Fish and Wildlife to establish benchmarks on the condition of coastal resources and to assess whether or not management regulations are effective at improving near-shore water quality and marine life. VIMAS also participated in one Federal initiative to assess benthic and fish communities around St. Croix.

**Results:** The CMES data provided to the Government of the VI has improved their ability to make sound decisions about that status of the coral reefs and associated biota in order to protect this ecosystem on an annual basis.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(s):**

USVI MARINE ADVISORY SERVICE (2012 - 2013)

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## **Legislative Environmental Briefing Book**

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Impact
- Approved

**RECAP:** Recap: Local legislators are better equipped to handle environmental issues.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance:** With the many issues facing the VI legislature, senators are expected to be able to make decisions on areas that may not fall into their expertise. Given the connectedness of the Virgin Islands ecosystem and economy, it is imperative that decision makers have the scientific knowledge necessary to ensure a sustainable future for the community. There is a need for a concise tool to give VI decision makers this scientific knowledge and resources for additional knowledge.

**Response:** In order to provide the legislature with the information needed to make complex decisions VIMAS is updating and expanding the Briefing Book as well as promote its use among the members of the legislature.

**Results:** The Environmental briefing book was updated, reprinted and distributed to local senators, and will be re-distributed to this year's new legislators.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(s):**

USVI MARINE ADVISORY SERVICE (2012 - 2013)

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## **Resisting Disasters: Coastal Communities against All Odds**

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Impact
- Approved

**RECAP:** UPR Sea Grant promotes and encourages coastal communities' residents to develop an education and outreach agenda on climate change adaptation, coastal hazards, and guidelines to develop resilient coastal communities.

## PROGRAM FOCUS AREAS: SUSTAINABLE COASTAL DEVELOPMENT

**Relevance:** The west coast of Puerto Rico comprises the municipalities of Mayagüez, Cabo Rojo, Añasco, Rincón, Aguada and Aguadilla. Most of the residents of these municipalities are settled on coastal areas, including those of several communities that historically established on beaches, wetlands and river basins and others that are migrating to the coast, attracted by the coastal natural attractions and economic and recreational opportunities. Little is known about the capacity of these coastal dwellers to take deliberate actions to reduce risk from coastal hazards in order to avoid disaster or to accelerate recovery in the event of a hurricane, earthquake, flood or tsunami.

**Response:** Current efforts of this project integrated these five municipalities to consolidate a framework for community based programs and disaster management. A total of fifteen coastal communities are currently participating in the project. Efforts are aimed to enhance their resiliency capacities in the areas of community development, coastal management and disaster management. Our team held three (3) focus groups to gather information about the communities and conducted over 100 individual interviews with residents. Participants provided information about their knowledge and practices regarding socioeconomic and cultural conditions for resilience (old and sick residents, disabled persons, poor, religious), human uses of coastal resources in order to maintain environmental and ecosystem resilience (fishing villages, ports, marinas, airports) and preparedness, response, recovery and mitigation to reduce human and structural losses from coastal hazards (tsunamis, hurricanes, storm surge) and their response actions (evacuation routes, infrastructure and home safety protocols).

**Results:** Participants identified the following issues as points of concern: climate change, natural hazards and their resilience capacity. Specifically they now understand and are aware of hazards and know where to look for risk information to make appropriate decisions. Two of the communities are capable of receiving notifications and alerts of coastal hazards, reducing the impact of at risk population (old and sick). Efforts were made to establish and maintain mechanisms and networks to respond quickly to coastal disasters and address emergency needs at the community level. It was evident that plans to accelerate disaster recovery from hazard events are not in place and that communities need to be engaged in the recovery process in order to minimize negative environmental, social, and economic impacts. As part of this effort we coordinated a workshop at the UPR in Mayagüez where all the government agencies with responsibilities regarding emergency management for natural hazards were present and community leaders presented their communities (population, location, average age of residents, disadvantage populations), situations, problems, opportunities, needs and concerns and the agencies offered information about their responsibilities, services offered capabilities, contact information and willingness to collaborate with the communities. One important point brought by the agencies was that it is a big advantage to be able to meet with the communities out of an emergency, make connections, establish channels of communication and discuss problems beforehand with time to solve the problems.

Municipal and insular governments need to evaluate the relocation of some of these communities. Educational programs and outreach services from local and state agencies were also identified as a priority in order to conjointly develop future plans regarding relocation and evacuation routes based on their different needs and the socioeconomic and cultural characteristics of their respective communities.

**PARTNERS:** None listed in Database

### ASSOCIATED PROJECT(S):

CLIMATE CHANGE ADAPTATION CAPACITY BUILDING INITIATIVE (2012)

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## Sea Grant Aquatic Safety Project for Puerto Rico's Beaches

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Impact
- PO Review Complete

**RECAP:** No Recap in database

## PROGRAM FOCUS AREAS: SUSTAINABLE COASTAL DEVELOPMENT

An average of 30 drowning incidents are reported annually at the beaches of Puerto Rico, an unacceptable number compared with lifeguarded beaches. Our country lacks well-trained lifeguards and aquatic safety services at most of its beaches and coastal areas.

**Response:** The Aquatic Safety Project for Puerto Rico was developed by UPRSGCP to cope with this vexatious and unacceptable situation, which for the last 10 years has claimed the lives of 300 human beings (tourists and residents). For the period reported, UPRSGCP, in collaboration with the United States Lifesaving Association (USLA), offered two sessions of the Ocean Rescue Lifesaving Academy. This is the second time that Puerto Rican lifeguards had the opportunity to receive instruction and training from open water rescue professionals of the Florida USLA Chapter. In a collaboration with the USLA and the Puerto Rico National Parks Company (NPC) lifeguards were instructed and trained on several aspects of beach safety services including rescues, training, equipment, swimming techniques and responsibilities of the professional lifeguard. This effort resulted in the Second USLA Open Water Lifeguard Academy in Puerto Rico.

A total of 19 licensed lifeguards participated in the academy and approved the training. Under the Sea Grant leadership, Puerto Rican lifeguards organized the first USLA Puerto Rico Chapter which already has more than 50 members <http://uslapr.wix.com/uslapuertorico>. At the same time, due to UPRSG efforts in favor of ocean rescue services, the NPC adopted USLA standards for all their lifeguards. Two Sea Grant employees were recipients of a National Award of Merit from the USLA for their contribution to lifesaving in Puerto Rico. The United States Lifesaving Association is America's nonprofit, professional association of beach lifeguards and open water rescuers. USLA works to reduce the incidence of death and injury in the aquatic environment through public education, national lifeguard standards, training programs,

promotion of high levels of lifeguard readiness, and other means.

UPRSGCP's long-term goal is to have all the open water lifeguards of Puerto Rico certified under the standards of the USLA, identify a funding source to establish a budget to start a lifeguard program where USLA trained lifeguards are deployed and assigned to beaches identified to have rip currents, to reduce drowning incidents. UPRSGCP has already established itself as the primary source of information regarding drowning fatalities, beach safety, access services and beach management. Our program was recently contacted by the Secretary of Natural and Environmental Resources, on matters related to their need for advice on drowning incidents at the beaches, the installation of Sea Grant UPR/USLA rip current signs at beaches identified as hot spots, lifeguard services and beach management. Extensive media coverage has been given to drowning incidents on local newspapers and TV. Our next step is to develop actions directed at the reduction of drowning incidents and beach safety. As part of our educational efforts two (2) videos related to the aquatic safety project have been developed. Videos were published in Spanish with English captions and are available through our YouTube channel:

<http://www.youtube.com/user/programaseagrantpr>. For more information about the Aquatic Safety Project, please access:  
[http://www.seagrantpr.org/outreach/aquatic\\_safety/index.html](http://www.seagrantpr.org/outreach/aquatic_safety/index.html).

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

[MARINE ADVISORY SERVICE \(2012 - 2013\)](#)

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## Public Policy Recommendations for Climate Change Adaptation in Puerto Rico

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Impact
- Approved

**RECAP:** Sea Grant Puerto Rico is a respected leader in climate change and coastal hazards adaptation strategies for Puerto Rico and is in a very good position to establish the Public Policy for Climate Change and Coastal Hazards Adaptation in Puerto Rico.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance:** This effort established a dialog with experts from different academic disciplines to generate recommendations for a climate change adaptation public policy for Puerto Rico.

**Response:** A roundtable of twenty-seven (27) experts on the fields of planning, economy, environmental sociology, agriculture, biology, ecology, engineering and the insurance sector participated in this process.

**Results:** As a result of Sea Grant's effort and leadership a meeting with the President of the Puerto Rico Planning Board has been scheduled for June 6, to present the climate change and coastal hazards adaptation recommendations to be adopted by the Puerto Rico Land Use Plan to be completed by October of 2013.

A draft document with the recommendations has been completed and is under review by the panel of experts. This document will be presented to the Puerto Rico Planning Board, the Department of Natural and Environmental Resources, the Puerto Rico Senate and the House of Representatives, to be considered and adopted as the Climate Change Adaptation Public Policy for Puerto Rico.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

[CLIMATE CHANGE ADAPTATION CAPACITY BUILDING INITIATIVE \(2012\)](#)

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## Rio Loco Watershed Conservation Buffers

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance:** The Río Loco/ Guánica Bay Watershed traverses the municipalities of Guánica, Yauco, and a portion of the Lajas Valley in the south coast of Puerto Rico. Current land uses of the approximately 57,000 acres of the watershed are agricultural lands (43%), forests (48%) and urban development (9%). The byproducts and impacts of agricultural production in the watershed are impacting the quality and the

health, of coastal and marine ecosystems, characterized by coral reefs and associated habitats.

Response: Based on the results of two focus groups with farmers and stakeholders in the watershed a capacity building program on Conservation buffers for farmers of the watershed was implemented. Two workshops were conducted to provide information about the importance and the impacts on the natural resources of the conservation buffers. Information regarding the development and construction of buffer zones was provided to participants. The training activities were attended by 28 participants, which included farmers, the Academia, and NGO's located at the watershed.

In addition Sea Grant Puerto Rico sponsored a workshop on Conservation practices applicable to the management of the Río Loco watershed. To facilitate the decision making process and management of the area, information regarding conservation practices in the farmlands, and current initiatives and projects in the Río Loco and Guánica Bay watershed were provided.

Results: Efforts to promote the implementation of conservation buffer zones at the Río Loco and Guánica Bay reduced sedimentation and erosion problems and improved the health of coral reefs and other coastal and marine resources at the watershed. The two demonstration projects developed with the farmers have reported a diminution of sediments from the site and other farmers are evaluating the adoption of this technique to reduce erosion and sedimentation problems in their farms. Both buffers are impacting approximately 50 acres of farmlands in the watershed. Farmers have realized that there are advantages for them in the implementation of the buffers zones, besides reducing landslides and the loss of fertile soil, actions that reduce damage and negative impacts to coral reefs.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

COASTAL COMMUNITIES DEVELOPMENT (2012 - 2013)

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## Characterization of Coastal Wetlands and Salt Flats in Puerto Rico

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

Relevance: Sea Grant Puerto Rico with the collaboration of the Caribbean office of Natural Resources Conservation Service and Hacienda Altamira in Cabo Rojo sponsored a workshop for decision makers, biologists, planners, and conservationists to facilitate the identification of plants, soil characterization, and hydrology indicators on the coastal wetlands and salt flats in Puerto Rico. The purpose of the workshop was to promote and provide information concerning characterization, mitigation, and the restoration of coastal wetlands and salt flats, and its importance with regards to the impacts associated with climate change.

Response: The activity was attended by 54 participants, including, representatives from the Puerto Rico Planning Board, the Department of Natural and Environmental Resources, USDA Natural Resources Conservation Service, the Academia, private consultants, and NGO's. The workshop included a field trip where the participants had the opportunity to identify and characterize a coastal wetland and its components.

Results: Sea Grant Puerto Rico in collaboration with the NRCS Caribbean Office are promoting the characterization, mitigation, and the restoration of coastal wetlands and salt flats, and its importance related to impacts associated to climate change. As a result of these efforts, 1,233 acres of conservation buffers to reduce erosion were implemented around the island of Puerto Rico.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

COASTAL COMMUNITIES DEVELOPMENT (2012 - 2013)

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## Community Education on Toxic and Hazardous Pollution Control Reaching the Marine Environment

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

The Environmental Quality Board of Puerto Rico reported in 2007 that Puerto Rico's rivers contained industrial and residential pollutants including: ammonia, arsenic, copper, and fecal coliforms. Besides the domestic contribution to these pollution sources there are many industrial and toxic wastes facilities on the North and West coasts of Puerto Rico that can be responsible for the water quality degradation of our rivers. The Community education on toxic and hazardous pollution control project capacitated residents that live along the Río Grande de Añasco and Río Caguaitas in topics related to toxic and hazardous pollutants that could reach the western and northern marine environments of the island and how to develop control strategies to reduce pollution sources. In alliance and collaboration with the NGO's CRECEMOS and Alianza Comunitaria y Ambiental en Acción Solidaria Puerto Rico Sea Grant organized two toxic pollution training sessions that capacitated community residents, teachers and students from the public schools near the Río Grande de Añasco and Río Caguaitas basins and coordinated six (6) workshops about toxic and hazardous pollution control.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

MARINE ADVISORY SERVICE (2012 - 2013)

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## **Estuary Conservation and Eco Tourism Initiative: "Reserva Natural Caño Boquilla" (RNCB)**

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

Puerto Rico Sea Grant facilitated the integration of many stakeholders (municipal employees, the Mayaguez-Las Marias Municipal Consortium, academia, local NGO's, residents and voluntaries) to the development of a sustainable-tourism and educational project for the restoration, protection and conservation of the "Caño Boquilla Natural Reserve" (a coastal- 120 acres - tropical wetland reserve, part of the Río Grande de Añasco Watershed). Results: Four (4) residents of Mayaguez were trained as environmental leaders and coordinated, in collaboration with UPR-SG, community meetings, field trips and conferences. The major of the Municipality of Mayaguez approved the Caño Boquilla Natural Reserve (RNCB) project and supported it by assigning two employees as well as fiscal resources to collaborate in the implementation of the project.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

MARINE ADVISORY SERVICE (2012 - 2013)

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**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

Five separate outer-shelf hummock reefs were cored to determine their age and accretion history. Radiocarbon ages of corals indicate that the upper 1-2 m of these reefs are recent (<1200 yr BP; yr BP = years before present) and actively accreting upward.

The primary frame builder of these reefs is the *Montastraea annularis* species complex, with secondary contributions from *Acropora cervicornis* and *Acropora palmate*

Internally, the reefs are poorly cemented and unconsolidated coral rubble is a major constituent within the framework.

Determining paleo-environmental conditions from stable carbon oxygen isotopes is complicated by bio-eroded, disrupted coral records. Recovery of cores from large, intact massive corals was problematic due to the nature of the reefs. Still, over the course of the coring several larger, massive coral samples suitable for paleo-environmental work were eventually recovered. These samples range in age from ~200 to 1200 yr BP.

The reefs are not relict, but, rather, are recent features that are actively accreting. Their recent upward accretion is consistent with the availability of accommodation space and minimal sea-level changes over the last millennia.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

**CHARACTER AND TIMING OF A REEF GIVE-UP EVENT ON THE SOUTHWEST PUERTO RICO SHELF (2008 - 2011)**

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## **Caribbean/NMFS Cooperative SEAMAP Program**

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** Fisheries independent data acquisition, educational workshops on sampling methodologies, and outreach on scientific data has been coordinated by MOP.

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance-** The SEAMAP-C program, contributes to the development of fisheries independent baseline data, standards, and indicators to support ecosystem-based approaches to land use, water, fisheries, and other resource management. The information obtained, is shared with a wide variety of constituencies in PR/USVI and the Caribbean.

**Response-** This program established a common forum plan and a coordinated evaluation methodology for fishery data collection, which is essential for management activities. Collected information include: bottom and marine habitat mapping, independent data from reef fish, conch (*Strombus gigas*) distribution, lobster (*Panulirus argus*) pueruli settlement and juvenile abundance, and the West Indian top shell (*Cittarium pica*) recruitment and abundance. The fisheries independent data obtained from this long-term program is being used by students, scientists, and state and federal managers to describe population trends; to explain responses to environmental factors; to estimate stock abundance; and to track reproduction, recruitment, and yields. This information is essential for establishing regulatory programs for sustainable fisheries in PR and the USVI.

**Results-** MOP fisheries liaison activities include effective and efficient data collection during surveys, management and dissemination of fishery-independent data. As an example, CFMC and PR-DNER Management Plans for conch and reef fish have been based on population data obtained by SEAMAP-C. MOP supervision, directed by the coordinator, has improved precision and accuracy of the long-term reef-fish data collected through quality control evaluation.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

**MARINE ADVISORY SERVICE (2012 - 2013)**

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## **Blog, Facebook and Twitter Pages: Increase of Presence of UPRSGCP in Social Networks**

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance:** During 2012-2013, our education and information efforts continued through Facebook and Twitter with a reported increase in our website traffic. For the period reported, UPRSGCP reached more than 1,000 likes in Facebook and close to 400 followers in Twitter. One of our publications Marejada's blog (<http://seagrantpr.org/marejada/>) is responsible for part of this communications success.

**Response:** Sea Grant staff members, researchers, and collaborators write articles for our blog, Facebook and Twitter pages in an effort to promote conservation and sustainable development of Puerto Rico's marine and coastal resources. Simultaneously, these electronic media tools facilitate the process of sharing information with government agencies, managers of the resource, newspapers and environmental electronic magazines and blogs.

**Results and Accomplishment:** Through the blog, Facebook and Twitter pages, Puerto Rico Sea Grant has been able to promote successfully, conservation and sustainable use of marine and coastal resources among a clientele that previously we could not reach.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

**COMMUNICATIONS AND PUBLICATIONS (2012 - 2013)**

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## Ocean Chats

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance:** Contribution of the UPRSGCP applied research projects needs to be disseminated among resource users, coastal and marine resource managers, students and the general public.

**Response:** Ocean Chats encourage networking among researchers, students, coastal and marine resource managers, government representatives, and community leaders. During 2012, two Ocean Chats were coordinated. Sea Grant sponsored researchers presented results for the projects: Probing for Antibiotic Resistance Genes as Molecular Indicators of Wasteland Pollution in Coastal Habitats and Developing a Protocol to Use Remote Sensing as a Cost-Effective Tool to Monitor Contamination of Mangrove Wetlands.

**Results/ Accomplishment:** Thirty persons, including graduate and undergraduate students, resource managers, and professors, joined the Oceans Chats, which have proved to be an excellent tool for the dissemination of information for UPRSGCP's research projects.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**  
COMMUNICATIONS AND PUBLICATIONS (2012 - 2013)

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## Sea Grant Center for Information and Marine Education

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance:** UPRSGCP is the primary source of information related to coastal and marine resources in Puerto Rico. An average of 150 persons are using the resources and services of our Sea Grant collection and information center monthly.

**Response:** Printed and electronic resources are available through the UPR-Mayagüez Library Catalogue, which facilitates the process of searching for information and increases access to our collection. Resources are cataloged under the Library of Congress Classification System.

**Results and Accomplishments:** Our librarian opened an email account with chat capabilities (criem.seagrant@gmail.com) to increase and make resources more accessible to remote users. To enhance access to information sources, thematic guides are available through the Web (<https://sites.google.com/site/criemguiastematicas/>). PRSG is constantly promoting and posting email communications including lists of new resources of our collection.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**  
COMMUNICATIONS AND PUBLICATIONS (2012 - 2013)

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## Encuentro con el Mar en Culebra (Encounter with the Sea in Culebra)

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** Workshop Encuentro con el mar (Encounter with the Sea) broadens ocean literacy, environmental stewardship and affinity among schoolteachers, community leaders, and tourism operators in Culebra.

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS



**Relevance:** The dissemination of information related to our coastal and marine ecosystems is part of our mission specifically to coastal residents and resource users of small island municipalities.

**Response:** Encounter with the Sea is a UPRSG workshop, designed for school teachers and environmental leaders, that has been adapted to encompass community leaders and tourism operators of the island municipality of Culebra. This workshop covers a broad range of topics including but not limited to education, sustainable development, mangroves, sea grass beds, coral reefs, coastal land use and anthropogenic impacts. We also acquaint volunteers and other participants to use and apply the information and educational materials offered in the workshop to their daily life activities.

**Results/Achievement:** The Encounter with the Sea workshop was coordinated for twenty-two (22) local teachers and community leaders, NGO volunteers, municipal employees and tourist service operators of the island municipality of Culebra. Activities started with a pre-test and concluded with a post-test and evaluation, to measure the impact and effectiveness of the workshop. Test results indicate a 72% knowledge gain among participants. The workshop promoted group discussions among different points of views from resource users. Specifically, discussions encompassed the use and management of coastal and marine resources. Resource users were able to discuss delicate and conflicting issues, learn about the needs and preferences of distinct groups and were able to establish collaborations to improve environmental education and affinity among residents of Culebra. Partners in this effort included: NOAA, Puerto Rico's Department of Natural and Environmental Resources, and the Collaborative Project of the Northeast Coast

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

COMMUNICATIONS AND PUBLICATIONS (2012 - 2013)

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## Wide distribution of Puerto Rico Sea Grant publications

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

**Relevance:** Education through publications has been one of our programs' preferred methods of disseminating information related to our coastal and marine resources.

**Response:** During this report period, UPRSGCP distributed copies of Marejada (our official emblematic magazine), Fuede y Verguilla (our magazine for artisanal fishermen), 201 PRSG's calendar, A Glimpse into the World of Fishermen (public policy paper on fisheries), and books such as Encuentro con el mar (Encounter with the Sea), Cartilla de la Zona Marítimo Terrestre (guide for understanding maritime zone), Arrecifes de coral (Coral reefs) to: government agencies, legislators, media people, university and school libraries, chancellors, deans, professors and the general public. Two new publications Behind the Waves (a bilingual book that includes an underwater collection of high quality photographs published on glossy paper) and the Pelicano Cano (a children story book with colorful illustrations) have also been published and distributed by our program and are already preferred by our clientele. Our program also has established various collaborations with Insular and Federal government agencies to promote the wise use and conservation of coastal and marine resources.

**Results:** Fuede y Verguilla is distributed among 324 different addresses, which include fishermen, fishing villages, government agencies and managers of the resource. Teachers, university professors and librarians are using UPRSGCP's publications as complementary material for their courses, workshops, and activities on science and environmental education. A Glimpse into the World of Fishermen (public policy paper) was widely commented in Internet, radio and TV, and was also used by political candidates during the political campaign period, including the now governor Alejandro García Padilla who publicly expressed that his fisheries program used the publication as a reference. Fuede y Verguilla, since its first issue on 2007, has been an excellent tool where managers of the resource can share recent information with artisanal fishermen regarding closed seasons, laws and regulations, invasive species, environmental problems and social issues. Fishermen regularly react to information posted in Fuede y Verguilla.

In collaboration with NOAA's Caribbean Fisheries Council, the Interdisciplinary Center for Coastal Studies and Casa Paoli a calendar inspired by artisanal fishing activities in Puerto Rico was designed and published by our program. The calendar contains information about marine and coastal resources, fishing laws and regulations, fishing villages, and fishing practices. It also includes the moon phases, the dates of important cultural and traditional activities and festivals celebrated at local beaches and fishing villages in Puerto Rico. UPRSGP distributed 1,000 copies of the calendar to promote conservation, sustainable fisheries.

In collaboration with the US Fish and Wildlife Service, our program is developing the illustrations, graphic art and edition for the emblematic endangered species fact sheets of the Service. The Endangered Species Fact Sheets will be completed on 2013 and published electronically. The fact sheets will contribute to environmental literacy efforts and to the development of a sharper comprehension of natural resources, especially those in coastal areas.

**PARTNERS:** None listed in Database

## Communicating Ocean Literacy

NATIONAL FOCUS AREAS: Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

RECAP: No Recap in database

PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

Relevance: Environmental fairs, exhibitions, field trips, visits to schools workshops and talks are some of the educational activities coordinated by our program as part of our efforts to increase ocean literacy among K-12 students, coastal residents and marine resource users.

Response: For the period reported, UPRSGCP Communications Section participated in 6 environmental fairs and exhibitions, coordinated six workshops and lectures and three field trips to the Tres Palmas Marine Reserve in Rincón and the Canal Luis Peña Marine Reserve in Culebra.

Accomplishment: Educational materials were disseminated among more than 4,000 persons who attended these educational activities.

PARTNERS: None listed in Database

ASSOCIATED PROJECT(S):  
COMMUNICATIONS AND PUBLICATIONS (2012 - 2013)

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## Deciphering Phosphorescent Bay: New Approaches Towards the Understanding of this Unique Ecosystem

NATIONAL FOCUS AREAS: Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

RECAP: No Recap in database

PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

Objectives 1 and 2 were addressed in the first scheduled sampling corresponding to the wet season. This was conducted from November 5, 2012 to December 5, 2012. The nutrient analysis has finished and the dinoflagellate counts are in progress. The dry season sampling is scheduled for March 1, 2013. The ADCPs for current measurements were installed on February 27, 2013.

The assessment of natural and anthropogenic effects, objective 3, will utilize mesocosm bags. These are being setup for the experiments. This part of the proposal will be conducted after our second sampling scheduled for March, 2013.

Juan O. González, our collaborator, is still working with the data from November 2012 (objective 4)

PARTNERS: None listed in Database

ASSOCIATED PROJECT(S):  
DECIPHERING PHOSPHORESCENT BAY: NEW APPROACHES TOWARDS THE UNDERSTANDING OF THIS UNIQUE ECOSYSTEM (2012 - 2013)

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## Fisheries Electronic Portal

NATIONAL FOCUS AREAS: Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

RECAP: The MOP-fisheries electronic portal is available for public use. More than 5,500 visitor "hits" have been received at the electronic portal.

## PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

Relevance- In the present era with the World-Wide-Web expansion, instant access to information is available. PR-MOP fisheries is making science information available as an outreach product within the Web, promoting the wise utilization of coastal natural assets while increasing public awareness of the need to protect our local resources. The portal provides a local open forum for discussion and reporting on matters specifically related to fisheries and mariculture. Marine users from public and private sectors, receive direct support and advice while promoting collaborative ecosystem-based management.

Response- An electronic "blog" site administrated by MOP-fisheries was created and opened to the public access: <http://prsgfisheriesoutreach.wordpress.com/>. Relevant information related to fisheries and aquaculture outreach and investigations conducted by MOP has been summarized and posted for public information and forum discussions. A section in the portal includes an open archive for SEAMAP-C data downloading, and access to program publications. Other sections include applied fisheries studies and mariculture outreach projects.

Results- The web-portal provides detailed information of the works conducted by the MOP fisheries/aquaculture specialist, access to fisheries studies, their results and reports, including fishery independent studies, and relevant marine advisories. The site also promotes the aquaculture/mariculture development in Puerto Rico. All information provided is oriented to increase the public's awareness on maintaining a sustainable fishery and to ensure responsible and productive use of the resources.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**  
**MARINE ADVISORY SERVICE (2012 - 2013)**

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## Aspergillosis of Sea Fans in a Global Context

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

## PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

Six study sites have been established for the demographic study, two in the north coast (Dorado and Isla Verde), two in La Cordillera (Palominos and Cayo Ratones) and two in Culebra (Luis Peña and Carlos Rosario). The sites vary with respect to water quality and anthropogenic impact. The Dorado and Isla Verde sites are eutrophic reefs with poor water quality and the substrate dominated by macro algae. The two sites at La Cordillera are moderately impacted, and the two at Culebra are the sites with the best water quality and highest coral cover. One hundred colonies of *Gorgonia ventalina* have been tagged at each site, and two censuses have been completed at each site with the third one in progress right now.

Data has been analyzed for the first and the second censuses. During each census, a photograph was taken for each of the 100 colonies. The censuses together with the photographs allow the estimate of survivorship, score the health status of each colony, and measure their change in size.

The relative abundance of colonies with lesions (i.e. prevalence) between the two census periods increased in three sites (Carlos Rosario, Cayo Ratones and Dorado), did not change noticeably in two (Luis Peña and Palomino) and decreased in one (Isla Verde). Mortality was for the most part due to detachment and varied significantly among sites. Carlos Rosario and Isla Verde experienced the highest mortality, while Palomino and Dorado the least. We expected disease prevalence and mortality to be related to water quality - highest at Dorado and Isla Verde and lowest at the two sites in Culebra. The data however, does not support this hypothesis. There is no relationship between prevalence and mortality with anthropogenic impact.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**  
**SEA FAN ASPERGILLOSIS: DEMOGRAPHY, IMPACT AND STRESS (2010 - 2012)**

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## Character and Timing of a Reef Give-UP (Drowning) Event on the Southwest Puerto Rico Shelf

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

#### PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

No obvious marine flood deposits have been identified. However, the potential flood deposits are being investigated further. Describing the characteristics of flood deposits (objective 2) will receive most of the attention during the no cost extension to January 2014. Since no individual layers attributable to flood events were identified, objective three which requires the identification of individual flood layers and their correlation with historical flood events was not met.

The identification of an abrupt 1700-1800 yr BP transition from open marine to hypersaline (salinas) environment was shared with the NGO "Cabo Rojenos Pro Salud y Ambiente" who run a tourist center at the Salinas. They are interested in incorporating this information in presentations of this important coastal resource.

**PARTNERS:** None listed in Database

#### ASSOCIATED PROJECT(S):

A SEDIMENTARY RECORD OF MARINE FLOODING EVENTS FROM COASTAL SALT PONDS, SOUTHWEST PUERTO RICO (2010 - 2012)

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### **Movement Patterns of Bonefish Inhabiting Reef Flats in Culebra, Puerto Rico: From Ecological Connectivity to Sustainable Use for a Recreational Fishery**

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

#### PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

In June 2012, a total of 48 fixed remote acoustic receivers (Vemco VR2Ws) were deployed to monitor broad-scale movement patterns around the island of Culebra. A total of 28 bonefish were caught between June 18 and August 14, 2012. All of these fish were successfully implanted with acoustic transmitters and released. A preliminary download of the receivers in shallow water was conducted in August 2012 to determine the suitability of the array layout. In January 2013, we completed a download of all receivers except for the two deployed along the north shore of Culebra could not be accessed because of high winds and heavy seas (i.e., unsafe conditions). From the 46 downloaded receivers, we obtained over 800,000 reliable detections from the bonefish tagged in the summer of 2012. A preliminary review of the data revealed that four of the bonefish were not detected after approximately one week at large, suggesting post-release mortality or movement away from the receiver locations. Two additional bonefish were detected from the date of deployment in late July until late November, and they were not detected from late November 2012 to January 2013. All of the remaining 22 bonefish (78%) were regularly detected by the receivers between their dates of deployment in the summer of 2012 until the January 2013 download. Preliminary assessment of bonefish movements indicates a relatively high degree of fidelity to the flat where individual fish were caught and tagged. This is the first time fine-scale movement patterns have ever been quantified for bonefish.

**PARTNERS:** None listed in Database

#### ASSOCIATED PROJECT(S):

MOVEMENT PATTERNS OF BONEFISH (ALBULA SPP.) INHABITING REEF FLATS IN CULEBRA, PUERTO RICO: FROM ECOLOGICAL CONNECTIVITY TO SUSTAINABLE USE OF A RECREATIONAL FISHERY (2012 - 2013)

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### **Ecosystem management and community awareness**

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** Recap: In response to efforts by VIMAS the community better understands how to protect the environment from land-based sources of pollution.

#### PROGRAM FOCUS AREAS: HEALTHY COASTAL ECOSYSTEMS

Relevance: Land-based sources of pollution are widely known to be one of the leading causes of coral reef degradation, both locally and globally. In 2007, St. Thomas Fishermen's Association (STFA) requested that an outreach campaign be devoted to non-point source pollution. In 2009, the National Oceanographic and Atmospheric Administration's Coral Reef Conservation Program (CRCP) realigned their focus areas to address the main threats to corals reef ecosystems: land-based sources of pollution, overfishing, and climate change. The UVI's CMES research program (Integrated Caribbean Coastal Ecosystems) also focuses on coral reef ecosystems, land-sea interactions and the development of an integrated ecosystems approach to managing our coastal environments.

Response:

VIMAS coordinated 16 cleanups on St. Croix for 2012 Coastweeks engaging 366 people. Five marine debris presentations were made to St. Croix school children including 233 students. Cleanups on St. Thomas were co-coordinated by VI Waste Management Authority due to STT Agent being on maternity leave; an estimate of 500 volunteers participated and 6 NPS presentations were made. A "ridge to reef" proposal based upon citizen science methods was submitted to EPSCoR/NSF in September 2012 for approval. VIMAS also partnered with US EPA to assist with the preparation of a document providing Best Management Practices for Marinas. These are being distributed and a regional workshop is being planned.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

USVI MARINE ADVISORY SERVICE (2012 - 2013)

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## Marine Protected Area

**NATIONAL FOCUS AREAS:** Healthy Coastal Ecosystems

- Accomplishment
- PO Review Complete

**RECAP:** Recap: VIMAS efforts were aimed at increasing local awareness of protected areas, and increasing the use for educational and research purposes at these areas.

**PROGRAM FOCUS AREAS:** HEALTHY COASTAL ECOSYSTEMS

Relevance: In 2002 the Virgin Islands Government passed into law Bill No. 24-0308 establishing a marine park on the east end of St. Croix. The East End Marine Park (EEMP) is intended to be a protected area managed mainly for the sustainable use of natural ecosystems. Although the EEMP boundaries have been established and the rules and regulations designating uses and restrictions have approved, the park has not yet been implemented. In addition, little public education and outreach for the park or an assessment of the marine resources within the park have been implemented.

Response: VIMAS efforts in this project was to assist the VI Government in further developing the EEMP and assisting with education, outreach and monitoring activities for the EEMP as well as to continue to perform outreach at other protected areas such as the UVI Wetlands, a 52 acre wetland preserve and wildlife sanctuary that the St. Croix VIMAS office has managed over the past 15 years.

VIMAS efforts are aimed at increasing local awareness of protected areas, and increasing the use for educational and research purposes at these areas.

Results: VIMAS enhanced local awareness about the Park and other protected areas such as the UVI Wetlands Reserve by implementing tours for school groups and the public. During this period 2 tours with about 18 people were given. In addition, 2 classroom presentations were made on EEMP and marine habitat protection. In addition, VIMAS participated in four workshops in order to start the process of updating the EEMP management plan. VIMAS was successful in getting external funds in order to run an educational program at Salt River Ecological Preserve. This project has now started. One community outreach meeting was held and classroom presentations and kayak tours are being done. In addition, VIMAS has been involved with several (4) focus groups concerning the Salt River Bay National Historical Park and Ecological Preserve. VIMAS on STT co-coordinated and facilitated a Coastal Uses Mapping workshop for STEER stakeholders and participated in data collection for STEER Coastal Uses maps. VIMAS also assisted STEER team to collect and distribute watershed information for a contracted consulting agency (HWS via NOAA). Results of both the watershed delineation project and Coastal Uses Mapping workshop will be distributed by VIMAS.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

USVI MARINE ADVISORY SERVICE (2012 - 2013)

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## An Interdisciplinary evaluation of the fishery for *Cittarium pica*

**NATIONAL FOCUS AREAS:** Hazard Resilient Coastal Communities

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HAZARD RESILIENCE IN COASTAL COMMUNITIES

Surveys of summer 2012 partially accomplish objective 1 by revealing that the average body size and the population density of *C. pica* was significantly reduced in 2012, compared to previous surveys done in 2003/2004. Sizes of *C. pica* were lower at 6 of 10 Puerto Sites and 4 of 6 Virgin Islands sites, and abundance was reduced at 9 of 10 Puerto Rico sites and 3 of 6 Virgin Islands sites. Preliminary interviews with 1-2 fishers in each of 10 localities (8 in Puerto Rico and 2 in the Virgin Islands) indicate that few fishers target *C. pica* full-time. Instead the fishery consists mostly of part-time and occasional fishers of which *C. pica* is one of several species fished. More extensive interviews are in progress during February and March 2013 (as of 03/01/13 we have completed 45 additional interviews) and focus more intensively on 3 localities and their surroundings in order to successfully capture fishing pressure at shoreline sites in each locality. These localities are: the North Coast-near Cueva del Indio in Arecibo, the North East Coast- in Fajardo, and the South West Coast in Puerto Real.

Objective 2 was partially accomplished initiating a mark-recapture study in the British Virgin Islands to achieve this objective in July 2012. 1707 *C. pica* were tagged and released across 5 sites. We re-sampled tagged whelks within 2 weeks, and made a second visit to resight tagged individuals in late October 2012. Preliminary analyses suggest high site fidelity for most *C. pica*, and high rates of growth.

To accomplish objective 3, interviews were used to develop formal questionnaires that we are using to target distributors and vendors of *C. pica* from January-March 2013 (10 interviews conducted to date). A survey was developed for recreational whelk fishers and shared with DNER for ongoing MARFIN surveys.

Interviews with fishers contribute to objective 4. These reveal that they are knowledgeable regarding *C. pica* distribution and behavior even though the fishers are not aware of their reproductive biology. The commercial fishers also seem well-informed about current regulations though recreational fishers are not. The results of the MARFIN surveys, particularly with infrequent recreational *C. pica* collectors will test whether these are general findings. So far, shell remains left behind by fishers and comments from nearly all fishers interviewed indicate some illegal harvesting from protected sites as well as frequent collections of undersized individuals. Remote, inaccessible sites appear to have denser healthier populations of whelks than those easier for fishers to access, but interviewees report being able to access almost any site when weather permits. Newer fishing practices involve breaking the shells once fished, seen both in PR and the BVI. This is indicative of the lack of knowledge of the value of the shell and of the importance of the shell for the land hermit crabs (*Coenobita clieatus*).

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

AN INTERDISCIPLINARY EVALUATION OF THE FISHERY FOR *CITTARIUM PICA* (2012 - 2013)

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## Potential Future Land Loss of Small Islands of Puerto Rico and the United States Virgin Islands

**NATIONAL FOCUS AREAS:** Hazard Resilient Coastal Communities

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HAZARD RESILIENCE IN COASTAL COMMUNITIES

Results: A lidar surveying system has been developed and can serve as a model for high resolution coastal topographic surveys.

Accomplishments: No reports have been received related to the effects of raising sea level on small islands and associated habitats. The outreach goal was partially met by conducting a workshop at UPR Humacao with UPR Sea Grant for 22 teachers and students.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

POTENTIAL FUTURE LAND LOSS OF SMALL ISLANDS OF PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS (2010 - 2013)

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## Application of the Soil and Water Assessment Tool Model (SWAT) to Estimate Discharge and Sediment Yields from the Río Grande de Añasco Watershed

**NATIONAL FOCUS AREAS:** Hazard Resilient Coastal Communities

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** HAZARD RESILIENCE IN COASTAL COMMUNITIES



No model results have been generated. The preliminary evaluation of images for the Añasco watershed and marine environments show that sediments from RGA influence both Añasco and Mayagüez bays as well as coastal water up to Rincon.

The compilation of data required to run the SWAT model has been completed for the most part. These include watershed coverage, soils, DEM, Landcover, weather data, along with marine bathymetry, waves, tides and currents. Evaluation of these data sets is providing insight on sediment transport and behavior of sediment plumes within the Añasco Mayagüez bay. This partially fulfills the third project objective.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

**APPLICATION OF THE SOIL AND WATER ASSESSMENT TOOL MODEL (SWAT) TO ESTIMATE DISCHARGE AND SEDIMENT YIELDS FROM THE RIO GRANDE DE AÑASCO WATERSHED, PUERTO RICO (2010 - 2013)**

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## **Commercial and Recreational Fishermen Education**

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** With MOP advice, FEPDEMAR (Federación de Pescadores de P.R. y Defensores Del Mar, Inc.) has become the main recognized organization representing fishery workers of Puerto Rico, by relying on their traditional knowledge, by asserting their social standing, their political status, and preserving their role in the natural environment. The actual governor of PR as well as Secretary of the DNER have agreed in writing to FEPDEMAR that they will attend main issues to support artisanal commercial fishers.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance-** This project provides special assistance and advisory services for the sustainable use of Puerto Rico's fishery resources, not only to the commercial and recreational fishermen, but also to resource managers and scientific researchers.

**Response-** Sea Grant MOP serves as a long-term facilitator and a non-advocate advisor for a diverse group of local fishers of Puerto Rico including commercial, recreational, skin-diver sport-fishers, and wild ornamental fishers.

**Results-** Advisory services have been oriented to help commercial fishers set priorities and develop long-range plans that include alternatives for product diversification. The specialized advisories from MOP have been extended to include recommendations to resource managers, particularly to the PR-Department of Natural and Environmental Resources, and the PR Department of Agriculture, on matters related to marine resources regulations, government incentive programs, and other critical fishers' needs. These include technical support to maintain commercial fishers informed about fishing regulations, biological aspects of regulated species, and issues dealing with environmental conservation.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

**MARINE ADVISORY SERVICE (2012 - 2013)**

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**the first coordinated mariculture extension effort involving multiple partners, including academia, state and federal agencies, and the collaboration of organized commercial fishers.**

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance-** This project developed a marine closed growout recirculation system at the Corozo CAUF Fishery Villa in Combate, Cabo Rojo, which includes a program of marine outreach extension to train commercial fishers and the general public interested in raising marine fish. This project should be visualized as the first step to successfully transfer science and technology to stakeholders, while promoting a sustainable aquaculture industry.

**Response-** The project primarily serves as a demonstration project for hands-on activities and workshops for Puerto Rico fishers. The facility is continually being fine-tuned to optimize the culture techniques, to train the fishers at the CAUF villa, and to offer "Open House" demonstrations oriented toward the general public, students, and especially to fishers from other fishery villas.



Results- The project has been successful in achieving the first two year's goals, which include fine-tuning seed collection; changing wild fish diets; and developing clear-cut, relatively simple, management procedures for fishers to utilize in the future.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

SEA GRANT AQUACULTURE EXTENSION 2010: OUTREACH MARICULTURE PROJECT AS A FISHERIES ALTERNATIVE FOR PUERTO RICO; GROWOUT OF YELLOWTAIL AND LANE SNAPPERS (OCYRUS CHRYSURUS, LUTJANUS SYNAGRIS) IN RECIRCULATION SYSTEMS MANAGED BY A FISHERY ASSOCIATION (2010 - 2012)

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## Professional Development for Educators

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

Relevance: PRSG capacitates and enhances Science teacher instructional skills, and provides high quality educational materials.

Response: Educators are capacitated in marine science concepts in order to develop their skills and address the Puerto Rico Science Education Standards (SES) to "guide our island toward a scientifically literate society." Our teacher workshops capacitate educators to make use of the marine environment to stimulate students to meet national standards.

Results: Five (5) professional development workshops were coordinated for eighty-five (85) K-12 educators representing 31 schools from 25 municipalities of Puerto Rico. Topics of the workshops included: (1) Sea Turtles, (2) Mangroves (3) Sea Grasses, (4) Coral Reefs and (5) Homemade Equipment to Assist in the Study of Marine Ecosystems. More than 5,000 students were impacted by these efforts.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

MARINE EDUCATION (2012 - 2013)

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## Marine Science Adventure Program (K-12)

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** No Recap in database

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

Relevance: K-12 students were introduced to marine topics and experienced unique hands on non-formal educational opportunities.

Response: Laboratories, exhibitions and fieldtrips are a major outreach activity of PR Sea Grant's non-formal educational efforts.

Results: Marine Science Adventure is an intense program that introduces students to the marine environment through lectures, laboratories and field activities. Marine education activities coordinated for K-12 students include: Marine Laboratory Experience (Plankton, Biology, Fish Classification, Invertebrates, Global Warming and Sands), Field trips (This is an Estuary, Marine Encounters, The Punta Tuna Wetland and Beaches) and Traveling Marine Exhibit (Sea Turtles and Beaches). These activities are a fun and dynamic way to associate students and ocean science. Close to 1,400 students and 85 teachers were introduced to these non-formal educational opportunities.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

MARINE EDUCATION (2012 - 2013)

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## Capacity building within coastal communities

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** Recap: VIMAS has been working to build local capacity for sustainable coastal development.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance:** The National Sea Grant Strategic Plan, the UPR Sea Grant College Program Strategic Plan 2010-14, UVI's Vision 2012, and recent CMES strategic planning efforts all focus on strengthening community and government agency capacity for improved decision-making. Collaborative, interagency restoration, conservation, and management of our Territorial marine resources should be facilitated to ensure synergistic results. Effective natural resource management strategies for marine protected areas and watershed management, are both priorities for community involvement and require skilled facilitation to move management forward and ensure compliance in the long term.

**Response:** VIMAS is working to build the potential for local governmental and non-governmental organizations to respond to the needs of the community. VIMAS is strengthening existing partnerships and developing new key partnerships to assist in developing and implementing strategies to better manage marine resources.

**Results:** VIMAS has been working with the Virgin Islands Network of Environmental Educators (VINE) to develop new educational programs and refine existing ones, i.e. the Adopt A School Program funded by the VI Experimental Program to Stimulate Competitive Research (VI-EPSCoR), and utilizes VINE events to disseminate relevant Sea Grant information. VIMAS was successful in completing the objectives of the 2011 Adopt A School Program and implemented a new 2012 Adopt A School Program with Eudora Kean High School; the program's focus was and continues to be building community capacity to live sustainably via a student-run aquapoints program. On St. Croix VIMAS participated in 6 VINE events which increased capacity of 17 school teachers and increased awareness of over 705 students and on STT VIMAS participated in 9 VINE events reaching a variety of constituents totaling near 1500 (2 Reef Fest events in this cycle). VIMAS also worked with VINE on radio shows to spotlight environmental events and programs. One radio interview on STX were done during this period, and 5 were done on STT, and in one show was a guest host instead of guest. VIMAS also contributed to 2 UPRSG online blogs and one Marejada article. Communication amongst stakeholders allowed for the development and completion of the St. Thomas East End Reserves (STEER, a marine protected area) management plan and initiated its implementation, with the overall goal of empowering the community to manage its natural resources. VIMAS has been working with the VI Fish and Wildlife Division, The Nature Conservancy and NOAA Fisheries to start a pilot sustainable seafood program. The program will work with restaurants to better buy and serve seafood that is sustainable.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

USVI MARINE ADVISORY SERVICE (2012 - 2013)

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## Sea Grant as a resource for sustainability

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** Recap: VIMAS has been working to promote its programs, services, and products within the USVI community.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance:** In order for the Virgin Islands Marine Advisory Service to be effective, people must be aware of the program and the services it offers. To increase public awareness of VIMAS and Sea Grant, and promote the program's goals, VIMAS agents participate in several community activities and boards. Objectives will be carried out through events such as community affairs and public presentations.

**Response:** VIMAS is working to increase awareness of marine issues, scientific research, career opportunities and Sea Grant activities through participation in community affairs, public presentations and media.

**Results:** VIMAS has participated in the St. Croix Agriculture Fair every year and promotes Sea Grant and VIMAS activities. It also organizes Coastweeks and coordinates about 35 cleanups around the Territory during the event, with reach to an average of 1,000 people annually. VIMAS has also participated in annual Eco Fair and Earth Day activities to promote Sea Grant and the wise use of natural resources. During this period VIMAS led 17 field activities, 10 classroom presentations, and organized 5 community activities. VIMAS agents serve on government and local environmental nonprofit boards and committees. Reef Fest is a major annual outreach event held in each jurisdiction with leadership from VIMAS agents, and media personnel have covered several VIMAS activities including but not limited to Reef Fest.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

## Environmental Education and Marine Careers

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** Recap: VIMAS efforts of presentations and seminars provided important information to students in order to understand their marine environment.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

**Relevance:** There is a need to expand marine educational programs for students at all academic levels in the Virgin Islands. More effective marine science, ecology and technical/vocational training are needed to increase youth and young adults' awareness of the many recreational, economic and career opportunities associated with the sea. Increasing awareness and understanding of the marine environment is a vital step toward increased pursuit of marine related careers and conservation efforts. Marine related career opportunities must be promoted and made available and "attractive" to Virgin Islanders.

Numerous opportunities are available in the marine sector in the USVI. However, the majority of marine related positions in academia, the private sector, marine military/law enforcement and the local government are held by individuals from the U.S. mainland. In order to increase the pool of local candidates for these positions, VIMAS will disseminate information on marine related career opportunities.

**Response:** During this period VIMAS did 5 marine education presentations to schools in the Territory and presentations to summer camps. VIMAS also presented marine career presentations and distributed Coastnotes to students on marine careers at 4 career days. With funding from the Community Foundation of the VI, a summer day camp, Coral Reef Discovery Week, was developed and offered to 12 local middle and high school students which provided marine career information and guidance.

**Results:** About 200 students received information on marine issues and careers.

**PARTNERS:** None listed in Database

**ASSOCIATED PROJECT(S):**

USVI MARINE ADVISORY SERVICE (2012 - 2013)

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## Fishing culture outreach and education

**NATIONAL FOCUS AREAS:** Sustainable Coastal Development

- Accomplishment
- PO Review Complete

**RECAP:** Recap: VIMAS is increasing awareness of fishery issues in the Territory and offering citizen science opportunities.

**PROGRAM FOCUS AREAS:** SUSTAINABLE COASTAL DEVELOPMENT

Fishermen in the Virgin Islands have had a historically adversarial relationship with scientific and regulatory institutions. VIMAS has been conducting research to determine the health of local fisheries and associated habitats but has lacked effective venues to disseminate research results. In addition, local fishermen have lacked unity and organization and subsequently, have had little voice in regulatory decisions about VI fisheries.

**Response:** Though offered, a quarterly STFA newspaper was not desired and the Aquatic heritage project videos were not released for public use (due to change in project personnel and goals), thus these were not a focus during this time period. VIMAS continued to serve as the marine biologist on the St. Croix Fisheries Advisory Committee and promoted lionfish awareness with local presentations to school students and at local Eco Fairs, and partners with STFA in collecting dead lionfish from trap hauls to use for educating students at UVI and summer camps. VIMAS continues to promote awareness of the Nassau grouper status and its local and federal regulations within the territorial community engagement campaign "Bring Back The Nassau Grouper".

**Results:** The fishing community in particular received opportunities to contribute scientific data pertaining to the distribution and abundance of Nassau grouper by participating in the Bring Back the Nassau Grouper campaign. "Fisher Scientist Kits" were provided to fishers at various venues and events and by request; these kits contained tools and information regarding how to safely release Nassau grouper when caught as by-catch and how to obtain genetic and spatial information for contribution to local research. Students, primarily at the University level, were given the opportunity to learn about lionfish through dissection labs and lectures.

**PARTNERS:** None listed in Database

## 2012 Leveraged Funding

### Project Level

Source	Project	Title	Amount	Type
National Marine Fisheries Service (US DOC, NOAA, NMFS)	8368 - Marine Advisory Service (M-151-1-12)	SEAMAP-C	\$87,927.00	Managed
		TOTAL:	\$87,927	

### Program Level

Source	Title	Amount	Type
Puerto Rico Department of Natural and Environmental Resources	A Social and Economic Study of Migratory Bird and Waterfowl Hunting in Puerto Rico	\$326,992.00	Managed
UNESCO	Sandwatch Training Videos	\$50,000.00	Managed
University of South Florida (USF)	Lionfish in the Southatlantic and Caribbean: integrated regional research and extension to support effective management of an invasive marine species	\$9,450.00	Managed
	TOTAL:	\$386,442	

## Performance Measures

### 2012 Communities implementing hazard resiliency practices

County of the Coastal Community	Name of Coastal Community	Number of Resiliency Training/Tech Assistance provided	Community hazard resiliency improved
Aguada	Espinal	2	Yes
Aguada	Tablonal	2	Yes
Aguadilla	Barrio Pueblo	2	Yes
Anasco	Parcelas Tres Hermanos	2	Yes
Cabo Rojo	Corozo	2	Yes
Cabo Rojo	Joyudas	2	Yes
Cabo Rojo	Puerto Real	2	Yes
Mayaguez	El Mani	2	Yes
Mayaguez	El Seco	2	Yes
Mayaguez	Public Housing Project Candelaria	2	Yes
Mayaguez	Public Housing Project Carmen	2	Yes
Mayaguez	Public Housing Project Columbus Landing	2	Yes
Mayaguez	Public Housing Project Kennedy	2	Yes
Mayaguez	San Jose	2	Yes
Rincon	Barrero	2	Yes
Rincon	Parcelas Estela	2	Yes

### 2012 Sea Grant Products - (tools, technologies, info services)

(No Data)

### 2012 Economic (market and nonmarket) impacts

(No Data)

### 2012 National Performance Measures - General

Performance Measure	Annual Target	Reported	Program Comment
Number of fishers who adopt and implement responsible harvesting	2,356	5,000	

techniques and practices.			
Number of stakeholders who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood.	34,268	78,000	
Number of coastal communities who have adopted/implement sustainable - economic and environmental - development practices and policies (e.g., land-use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure) as a result of Sea Grant activities.	71	36	
Number of coastal communities who have restored degraded ecosystems as a result of Sea Grant activities.	27	12	

## 2012 Program Performance Measures

Program Performance Measure	Annual Target	Reported	Program Comment
Number of stakeholders who use ecosystem-based approaches in the management of land, water, and living resources in coastal areas as a result of Sea Grant activities.	100	500.000	Our program collaborates with Natural Resources Conservation Services, the UPR Agricultural Extension Services, the Department of Natural and Environmental Resources, the Puerto Rico Planning Board, the Puerto Rico Environmental Quality Board, the United States Fish and Wildlife Service, the US Forest Service, the Puerto Rico National Parks Company and the US EPA in the coordination of workshops, publications, conferences, videos, capacity building activities and seminars to promote ecosystem based approaches in the management of land, water and living resources. With the EPA we collaborated in a workshop for marinas about Compliance Assistance and Pollution Prevention Workshop to Green Marinas and with the NRCS we developed workshops to stop sedimentation from farm lands on the West coast that affected coral reefs. We have developed educational efforts with all these collaborators and partners.
Number of coastal communities engaged in activities (e.g. visioning, resource inventories, analysis of development policies) or making informed development decisions that address the sustainability of economic and environmental resources as a result of Sea Grant's capacity building, tools, data, technologies, and/or education of community leaders.	10	26.000	Our Program has engaged in activities to address the sustainable development of coastal and marine resources in more than 26 communities around the archipelago of Puerto Rico. We have developed projects to capacitate leaders and residents of coastal communities in the municipalities of Rincón, Culebra, Carolina, San Juan, Isabela, Lajas, Aguadilla, Aguada, Cabo Rojo, Fajardo, Ceiba, Vieques, Guánica, Mayagüez, Cataño among others to learn about the importance of ecosystem based management, marine reserves, river basins importance and protection, wetlands, endangered species, coastal erosion, public access, water quality, drownings, gentrification, recreational and economic opportunities and public policy development and implementation. Activities include: field visits to marine reserves and coastal natural attractions, development of resource inventories, workshops, dissemination of information and meetings with managers of the resources and members of the academia.
Number of coastal communities who have adopted/implement sustainable - economic and environmental - development practices and policies (e.g., land-	30	26.000	

use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure) as a result of Sea Grant activities.			In the same communities where we develop our educational efforts we promote smart growth, climate change expected impacts and adaptation strategies, energy saving tools and practices and the value of wetlands, beaches, coral reefs and mangrove forests as green infrastructure. Our communications component is very active generating publications, videos and coordinating talks and workshops on these topics. We also have numerous collaborations with insular and federal agencies to educate coastal communities about these topics.
Number of fishermen, resource managers (harvesters, and fishermen) who adopt and implement responsible harvesting and processing techniques and practices.	500	800.000	Sea Grant is a leader in the education about invasive species including lionfish removal and consumption in Puerto Rico. We have also developed collaborations with the Caribbean Fisheries Management Council, the Fisheries Division of the DNER and of the Department of Agriculture to educate fishermen about responsible harvesting and processing techniques through publication, posters, talks and workshops specially designed for artisanal fishermen of Puerto Rico.
Number of coastal communities provided with information/trained in local hazard resiliency, and hazard mitigation tools, techniques, and best practices.	48	26.000	Sea Grant has given special attention to the development of trainings and capacity building activities for 26 coastal communities of the West coast of Puerto Rico regarding coastal hazards resiliency and hazards mitigation tools and techniques. These communities were established on the coastal wetlands, beaches and river basins and are susceptible to floods from hurricanes, sea level rise, tsunamis and rain and rivers. Our program has worked in the communities with leaders and residents providing them information about evacuation routes, how to prepare the community about the coastal hazards and how to make their communities resilient.
Number of coastal municipalities who adopt/implement hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events.	15	6.000	Sea Grant has worked with 6 municipalities of the West Coast in a pilot project to educate emergency management officials regarding resilient communities and how to respond to the coastal hazards before the events hit, in order to minimize losses to the residents and communities.
Number of citizens provided with information/trained in local hazard resiliency, and hazard mitigation tools, techniques, and best practices.		12000.000	Sea Grant has disseminated information to different citizens and residents of coastal communities as well as to managers of emergencies. Our program has developed various publications and tools to make communities more resilient to coastal hazards. Our publications are distributed at fairs, meetings, conferences, visits to communities and visits to government agencies.

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## 2012 Metrics

Staffing Numbers	Individuals	SG FTEs	non-SG FTEs
Administrative	6.00	2.67	2.83

Communications	14.00	2.00	5.94
Education	5.00	1.75	0.68
Extension	9.00	4.60	3.94
Research	53.00	5.30	3.20

Core Funding	Proposals	Institutions Involved	From Home Institution
Pre-Proposals			
Full Proposals			
Proposals Funded			

Student Support	Number of New Students	Number of Continuing Students	Number of Degrees Awarded
Sea Grant Supported Undergraduate Students	10	11	5
Sea Grant Supported MS/MA Graduate Students	6	5	2
Sea Grant Supported PhD Graduate Students	3	4	
Other Sea Grant Supported Professional Degree Graduate Students			

Other Metrics	Amount
VolunteerHours	6000
Number of P-12 Students Reached Through Sea Grant-Trained Educators or Directly through Sea Grant Education Programs	10000
Number of P-12 Educators who participated in Sea Grant education programs	
SG-Sponsored/Organized Meetings/Workshops	32
Attendees in SG Meetings/Workshops	11500
Public or Professional Presentations	82
Attendees at Public or Professional Presentations	16400
Clean Marina Program -- Certifications	
HACCP -- Number of people with new certifications	