UNIVERSITY OF PUERTO RICO
SEA GRANT PROGRAM

Research and Information Needs for Innovative Marine and Coastal Studies in the Caribbean

University of the Virgin Islands
Center for Marine and Environmental Studies, St. Thomas
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Introduction

The US Virgin Islands is known for its richness in marine biodiversity, which is one of the main attractions for visiting tourists. However, conservation of the mangrove coastlines, seagrasses, coral reefs, and fishes are essential to sustaining these ecosystems. To date, we continue to search for more information on the best strategies needed for the management and conservation of our marine resources. With this in mind, the University of Puerto Rico Sea Grant College Program (UPRSG) is performing a regional assessment to determine critical research and information needs for innovative marine and coastal studies in the Caribbean. Surveying the community of users of marine and coastal resources is essential to an effective assessment of research needs. Therefore, we carried out a discussion session (focus group) with several faculty members of the College of Science and Mathematics at the University of the Virgin Islands, who additionally serve as faculty within the Master of Marine and Environmental Science Program (http://mmes.uvi.edu/), and representatives from The Nature Conservancy (St. Thomas) and USVI Department of Planning and Natural Resources' Division of Fish & Wildlife (DFW).

The discussion focused on addressing issues that are presently considered a concern among researchers and resource managers. UPRSG requested comments on questions regarding short- and long-term research needed to develop better models and make better decisions, and obstacles that are presently hindering research and/or assessments that may help improve management and conservation of our local resources.

Funding and Support

The NOAA award no. NA08OAR4170748 provided funding for this activity. Dr. Manuel Valdes-Pizzini (Associate Director-UPRSG), Dr. Kurt Grove (Research Coordinator), Jasmine Seda (Project Assistant), and Christine Settar (UVI-VIMAS, Marine Extension Specialist) coordinated this activity.

Dates and Venue

The focus group was held at the Center for Marine and Environmental Studies at the University of the Virgin Islands, St. Thomas Campus on Thursday, October 14, 2010 from 10:00 am to 3:00 pm. Thirteen participants attended the activity. A short workshop on how to use the Sea Grant publications database was also offered from 3:30 – 4:00 p.m.

Goals

The main objectives of the focus group were the following:

1. Assess research needs of managers and scientists for the improvement of marine and coastal management on a short- and long-term scale.
2. Identify obstacles that may be hindering or delaying the development of research and strategies for marine and coastal management in the Virgin Islands.

Discussion Questions and Feedback

The following questions were presented for discussion:

1. What type of research or information is needed on a short-term (less than 5 years) and long-term (5-10 years) period to effectively manage our marine and coastal resources?
2. What obstacles are presently hindering research/ assessments that can help better management and conservation of our marine and coastal resources?
3. Elaborate three research projects that you consider urgent and would help make management and conservation more effective (preferably in your area of expertise).

Responses to the first question regarding the short- and long-term research needed for resource management included:

- Short-term studies that demonstrate the social importance of rebuilding relationships with the community in order to change their perception on environmental conservation (e.g., coastal cleanups).
- Projects that deal with socioeconomic aspects of coral reefs, including its role as a essential habitat for fisheries and an attractive habitat for ecotourism.
- Long-term efforts that focus on effectively communicating with user groups - understanding the language of local users and how resources are used will facilitate the transfer of science-based information and increase trust between users and managers.
- Evaluations that assess the risks of climate change - Detailed elevation models need to be improved (particularly, accuracy) and combined with recent demographic information for improved public safety and evaluation of community resilience.
- Focus on studies focused on socioeconomic parameters and their importance on local fisheries – impacts of regulations, stock assessments (obtain independent fisheries data).
- Evaluate effectiveness of watershed management for improvements in storm water control and water budget modeling (considering the impacts of climate change); studies on pollution brought about by poor watershed management and land-use practices; encourage multidisciplinary research on synergistic conditions (watersheds and climate change).
- Studies on invasive species such as lionfish; studies that identify predators (sharks?); assess the effectiveness of control measures, explain impacts of ciguatera on invasive species? Conduct a market analysis of the potential of invasive species to be commercialized (how to market it and whether it's an interest to the public).
- Short-term studies on understanding shelf/basin interactions in tropical systems such as the Caribbean Large Marine Ecosystem (CLME), benthic-pelagic coupling processes and impacts of climate change in benthic or pelagic areas.
- Long-term projects that incorporate multi-disciplinary research and addresses major issues of resource management.
- Detailed knowledge of shelf circulation needed to implement management measures – understanding the source of lionfish/larvae and their biology (breeding, migration); Fishery independent stock info.
- An accurate inventory of the biological resources and understanding physical processes; will mariculture be an effective way of controlling these invasive species?

- Identify coral reefs that are more resilient and may act as refugia; studies that help to understand why some are more resilient than others (particularly with coral diseases and identifying causes of outbreaks).
- Trends in CLME-habitat degradation (considering factors such as development and climate change), which needs identification, continued monitoring, and explanations on the effect of climate change and land-use practices.
- Long-term ecological research (LTER) models are needed to assess ecosystem with different parameters (abiotic and biotic) and explain effects of climate change and land use practices
- Studies that develop tools for ecosystem-based management in fisheries.
- Studies of human and environment interaction in coastal habitats; studies on the community's engagement and establishment a sense of ownership; explore incorporation of user groups in resource management ("bottom-up" co-management); cross-organizational efforts and communication between managers, scientists and users.
- Development of resilient and sustainable marine resource-based livelihoods – studies that assess linkages between poverty and resource conservation; legal policy, resource use and conservation needs to consider user communities, resilience, habitat migration and re-adaptations.
- Short and long-term impacts of fishery expressed in temporal ecosystem changes – assess the role of fish in coral reef ecosystems.
- Natural changes in coral reef framework and coral recruitment rates need to be determined (current strategies do not include recruitment rates); obtain historic accounts on target species, level and type of change over time and contribution to coral reef states.
- Studies on changing coral demographics and predicting the future reef composition and resilience should be conducted; scenarios of reef composition and spatial migration should be considered in light of climate change; research on the synergy of multiple stressors on corals and its association with different users.
- Assessment on the success of ecotourism and the resilience of communities depending on this trade (e.g., social aspects and livelihood).
- Studies on the effect of climate change on ciguatera; development of field assays for early detection and assessments or identification of linkages with changes in ecosystems over time
- Resource management, institutional policies, and legal frameworks need to be included in studies on regional and local spatial habitat changes that are affected by climate change and development. International and regional policy analysis and legal issues need to be clearly linked to resource and watershed management practices.
- Short-term projects on fish spawning aggregations (SPAGs) that include collecting baseline data (size frequencies, fecundities, sex ratio), spatial and temporal habitat use and spawning, ecological and hydrologic processes that occur in SPAGs, and the effect of tourism and fishing on SPAGs.
- Long-term projects on the trajectories for repopulation of fisheries and identify the management options for a particular area (e.g., seasonal closure, size limit); understanding connectivity of SPAGs and larvae recruitment; developing MPA-based management and evaluating its effectiveness; studies of life history bottlenecks and how climate change can affect these species.
- Education and outreach efforts to promote better understanding of anthropogenic effects on fish populations.
- Assessments on the status of fisheries, particularly recreational data (currently only data from tournaments are available).
- Studies on tropic cascade of predators – assess spatial and temporal movements of sharks and groupers.

- Studies on salt ponds and their restoration, including fish species.
- Assessments on the maritime infrastructure such as mooring buoys and boat ramps (localities and benefits).
- Inventory of the CLME's biodiversity (e.g., marine invertebrates, corals) – short-term projects that focus on species level identification and whether these are endemic, which is necessary for ecosystem-based management and understanding connectivity within the ecosystem.
- Studies that focus on understanding evolution and extinction rates of endemic marine species.
- Studies on the connectivity between coral biodiversity and ecological processes.
- Identification of biological indicators that detect changes in the environment and their main role in the ecosystem.
- More information on recreational fish; studies on the linkage between marine birds and baitfish, affects of the Orinoco plume on baitfish (the focus for DFW has mostly been on offshore, but should integrate both onshore and offshore areas).
- Assess the threshold of data/species collection – encourage more collaboration among organizations and institutions on using species that have already been collected for studies
- Evaluate the effects of reef balls used for coral reef restoration.
- Stock assessments of endangered or threatened species – fishes, birds, sea turtles; evaluate effectiveness of conservation management; how these species are affected by climate change (sea level rise, beach erosion, etc.).
- Research into mitigating the effects of invasive species (e.g., lionfish).
- Studies on management linkages.
- Assessments on specific fishery issues that need to be addressed.

Obstacles that are currently delaying the advancement of research and assessments that could improve resource management:

- Lack of standard formats for data gathering and collections (quality assurance, credibility and public access to the data are also major concerns).
- Lack of basin-wide scale studies, which are important for understanding regional processes.
- Lack of taxonomic experts and very few local expertise on species identification.
- Unregulated harvest of fisheries and unregistered fishermen.
- Lack of collaboration and coordination between agencies on neighboring islands (e.g., USVI and BVI), which is needed for effective management and to identify gaps in research.
- Loss and lack of qualified personnel (chronic problem), which results in increased workload for existing personnel (e.g., DFW).
- Lack of base (local government) funding (e.g., DFW) – most federal operational funds are distributed for personnel, not to monitoring and interpretation of important data.
- Lack of studies that are applicable to management; need research that develops management tools rather than solely data
- Lack of reports from off-island visiting researchers that conduct studies on USVI
- Providing matching funds (especially 1:1 matches) for UPR Sea Grant research – UVI should be qualified for exemption because it doesn't have the capacity nor funds to match funds.
- Limited capacity and infrastructure for research and outreach/education efforts.
- Limited expertise in marine conservation and management.
- High cost for obtaining supplies and transportation for materials/equipment; should rely more collaboration between institutions/agencies.

- General disconnect between applied management and basic research.
- Lack of financial assistance for graduate students conducting research that is relevant to management or conservation.

Final Overview

Overall, most participants emphasized the need for research that is focused on the connectivity among biological/ecological processes and ecosystem-based management, including assessment and optimization of human interactions with the environment. The group also highly stressed the need to evaluate socioeconomic aspects of communities that depend on marine resources for their livelihood. Also, studies focused on the effects of climate change on local communities and identifying the basis or aspects of their resilience. More efforts on education and outreach were also expressed.