

# NOAA in the Caribbean Initiative 1<sup>st</sup> Annual Meeting Report

## NOAA IN THE CARIBBEAN

Connecting NOAA and Partner's Across the Caribbean



University of the Virgin Islands, St. Thomas,  
May 15-16, 2012



*photos and credits (left to right): C. Menza gives a briefing on the deck of the Nancy Foster, NCCOS; M. Henderson of NOAA works with VI partners on navigation concerns and charting in St. Thomas, NOAA; NOAA divers conducting underwater surveying, NCCOS*

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Cover page photos and credits (Counterclockwise from top): USVI view, S. Aubery; NOAA divers doing underwater surveying, NCCOS

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Congresswoman Donna Christensen, U.S. Virgin Islands Delegate to Congress  
Dana Wusinich-Mendez, NOAA Coral Reef Conservation Program

Dr. Jeffrey Payne, NOAA Coastal Services Center and SECART Team Lead

Dr. Sean Griffin, NOAA Restoration Center

Anne Marie Hoffman, The Nature Conservancy

Dr. Ron Hill, NOAA Fisheries, Southeast Fisheries Science Center

Graciela Garcia-Moliner, Caribbean Fisheries Management Council

Dr. David Brown, NOAA National Climatic Data Center

Dr. Meredith Muth, NOAA Climate Program Office

Ernesto Diaz, Puerto Rico Department of Natural and Environmental Resources

Dr. Kenrick Leslie, Executive Director Caribbean Community Climate Change Centre

Dr. William Gould, USDA Forest Service

Dr. Alan Leonardi, NOAA Atlantic Oceanographic and Meteorological Laboratories

Bill Proenza, NOAA National Weather Service

Elton Lewis, Virgin Islands Territorial Emergency Management Agency

Michael Henderson, NOAA Office of Coast Survey

Dr. Aurelio Mercado, University of Puerto Rico

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### FOR MORE INFORMATION

For more information about this report or to request a copy, please visit the SECART webpage at [www.regions.noaa.gov/secar/](http://www.regions.noaa.gov/secar/).

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## List of Acronyms

AOML	Atlantic Oceanographic and Meteorological Laboratory
BMPs	Best Management Practices
BVI	British Virgin Islands
CaMPAM	Caribbean MPA Managers Network
CaricOF	Caribbean Regional Outlook Climate Forum
CaricOOS	Caribbean Coastal Ocean Observing System
CCCC	Caribbean Community Climate Change Centre
CFMC	Caribbean Fisheries Management Council
CLCC	Caribbean Landscape Conservation Cooperative
CMES	Center for Marine and Environmental Studies
CMSP	Coastal and Marine Spatial Planning
CRCP	Coral Reef Conservation Program
CROP	Caribbean Regional Ocean Partnership
CSC	Coastal Services Center
CZM	Coastal Zone Management
DFW	Division of Fish and Wildlife
DR	Dominican Republic
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GCFI	Gulf Caribbean Fisheries Institute
GIS	Geographic Information System
L BSP	Land-Based Sources of Pollution
MDP	Marine Debris Program
MPA	Marine Protected Area
NCCOS	National Centers for Coastal Ocean Science
NESDIS	National Environmental Satellite, Data, and Information Service
NGO	Non-Governmental Organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA Carib	NOAA in the Caribbean
NOS	National Ocean Service
NWS	National Weather Service
OAR	Office of Oceanic and Atmospheric Research
PRCCC	Puerto Rico Climate Change Council
PR DNER	Puerto Rico Department of Natural and Environmental Resources
ROP	Regional Ocean Partnership
SECART	NOAA Southeast and Caribbean Regional Team
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
STEER	St. Thomas East End Reserves
TNC	The Nature Conservancy
USACE	U.S. Army Corps of Engineers
USDA-NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
USGS	U.S. Geological Service
USVI	U.S. States Virgin Islands
UVI	University of the Virgin Islands
VI DPNR	Virgin Islands Department of Planning and Natural Resources
VITEMA	Virgin Islands Territorial Management Agency
WFO	Weather Forecast Office

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# Executive Summary

This document summarizes information provided at the first annual meeting of the NOAA in the Caribbean (NOAA Carib) Initiative, held at the University of the Virgin Islands, St. Thomas, on May 15 and 16, 2012. The meeting was organized by NOAA's Southeast and Caribbean Regional Team; 74 people attended. The goal was to discuss how to best identify and respond to local and regional challenges in the Caribbean.

The draft NOAA Caribbean Strategy was an important discussion topic. The strategy is a NOAA-led, comprehensive effort to improve coastal resource management in the region by marshaling NOAA and partner forces to meet common local, regional, and international goals. Forum participants spent a large part of their time reviewing the draft strategy and providing comments and suggestions, many of which are included in this report.

In terms of the priority challenges facing the region, speakers and breakout groups focused on the following:

1. improved conservation and management of ocean and coastal ecosystems and resources;
2. strengthened understanding of and adaptation to a changing climate; and
3. enhanced multi-hazard monitoring, forecasting, and risk management.

The goal was to bring everyone to a common understanding of the issues and the priorities, and pave the way for increased resource sharing and collaboration. Presentation and discussion summaries are included in this document.

A NOAA in the Caribbean steering committee is responsible for this forum. NOAA in the Caribbean was initiated by the NOAA Southeast and Caribbean Regional Team (SECART) as a way to bring improved services to the regional by fostering new relationships among parties interested in the wise management of this region's coastal resources and the resilience and security of island communities.

## Meeting Overview

The first annual meeting of the National Oceanic and Atmospheric Administration (NOAA) in the Caribbean (NOAA Carib) Initiative was held on May 15 and 16, 2012, in St. Thomas at the University of the Virgin Islands. Initiated by NOAA's Southeast and Caribbean Regional Team (SECART), NOAA Carib is a forum designed to improve communication and coordination among NOAA and its Caribbean partners. Seventy-four (74) people attended, including 13 NOAA employees representing five NOAA line offices and 61 NOAA partners.

The goal was to identify and respond to local and regional challenges, needs, and opportunities. Speakers focused on three main themes: 1) improved conservation and management of ocean and coastal ecosystems and resources; 2) strengthened understanding of and adaptation to a changing climate; and 3) enhanced multi-hazard monitoring, forecasting, and risk management.

Understanding and providing comments in regards to NOAA's proposed Caribbean Strategy was another important component of the meeting.

The meeting was opened by host Dr. Henry Smith, the University of the Virgin Islands' Vice Provost for Research and Public Service. Dr. Smith highlighted the importance of partnerships between the University, the Center for Marine and Environmental Studies (CMES), and NOAA. Many of NOAA's priorities closely align with those of UVI and CMES. The University recently opened a new state-of-the-art Environmental Analysis Laboratory in the Center for Marine and Environmental Studies, and in 2013 will open a new Institute for Geocomputation and Statistics, which will conduct geospatial research, provide a local portal to serve environmental data, and provide technical training. Partnerships with NOAA have brought esteemed scientists to the faculty such as Dr. Simon Pittman with NOAA's National Centers for Coastal and Ocean Science (NCCOS). The University looks forward to continuing these partnerships through further collaborations between the faculty and NOAA scientists, as well as improving data sharing capabilities.

Meeting participants also had the honor of receiving a plenary address from U.S. Virgin Islands Congresswoman Donna Christensen, who reinforced the need to connect NOAA and local partners through face-to-face forums in order to keep up with the opportunities and challenges that face the Caribbean. The U.S. Virgin Islands have taken some initial partnership steps on their own, exemplified by the Salt River Bay Marine Research and Education Center, St. Croix; National Science Foundation's Experimental Program to Stimulate Competitive Research, UVI; Virgin Islands Environmental Resource Station, St. John; Center for Disease Control and Prevention; and the Caribbean Regional Association for Coastal Ocean Observing.



*U.S. Virgin Islands Senator, Donna Christensen.*

*CREDIT: J.P. ORIOL*

Christensen said collaboration with NOAA agencies is essential in the implementation of workable solutions for unified action by island territories, the United States, and global neighbors. Future funding uncertainty is a worry for many initiatives across the U.S. Caribbean and she pledged her support in seeking funding.

The chair of the NOAA Carib Steering Committee, lead meeting organizer, and Caribbean Atlantic team lead for NOAA's Coral Reef Conservation Program, Dana Wusinich-Mendez, then provided an introduction to the NOAA Carib Initiative. This presentation highlighted the main goal and objectives of NOAA Carib, guiding principles, and priority activities (see [NOAA Carib Initiative Introduction](#)).

This presentation was followed by an overview of NOAA's draft Caribbean Strategy, provided by Dr. Jeffrey Payne, Acting Director of NOAA's Coastal Services Center (CSC) and NOAA's SECART Team Lead (see [NOAA Caribbean Strategy](#)). The Caribbean Strategy is the agency's proposed framework to coordinate and integrate the abilities of all NOAA line and staff offices to address regional issues and improve mission effectiveness and international cooperation in the Caribbean region. Dr. Payne shared contextual information including the purpose and vision of the strategy followed by the proposed strategic goals, objectives, and actions. The meeting also served as a platform to gather input from participants on the draft strategy, including perspectives on priority issues that need attention, partnership and leveraging opportunities, and thoughts on implementation mechanisms and approaches. The intent is to provide the strategy for public review and comment.

The majority and remainder of the meeting was spent in partner presentations and roundtable discussion sessions aligned with the goals of the draft Caribbean Strategy.

### **ABOUT THE NOAA CARIB INITIATIVE**

NOAA has a broad portfolio of activities in the Caribbean region, both nationally and internationally. Given the extent of locations, mission, and partners throughout the region, communication and coordination can be challenging. SECART initiated NOAA Carib as a forum to improve communication and coordination since improved communication will foster more effective engagement with stakeholders and more efficient delivery of services. NOAA Carib includes NOAA employees and partners currently active in research, management, training, or other efforts in the Caribbean.

NOAA Carib recognizes the same geographic scope described in the NOAA Caribbean Strategy, the Caribbean Large Marine Ecosystem (refer to Figure 1). While the initial focus is on Puerto Rico and the U.S. Virgin Islands, NOAA Carib seeks to maintain resource exchanges with Florida and, as appropriate and practicable, with partners in the wider Caribbean.



Figure 1. Map of Caribbean

A steering committee of 15 volunteers, including both NOAA employees and regional partners, meet on a regular basis to guide this initiative and make progress on implementing the goals, objectives, and priority activities of NOAA Carib.

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Wusinich-Mendez*	Dana	NOS Ocean and Coastal Resource Management (OCRM) Coral Reef Conservation Program (CRCP)	Dana.Wusinich-Mendez@noaa.gov

*Table 1. List of NOAA Carib Steering Committee Members at the time of the First Annual Meeting*

\* DENOTES THAT PERSON IS ALSO MEMBER OF SECART

\*\* DENOTES THAT PERSON HAS RETIRED

## GOALS AND OBJECTIVES

The steering committee identified one main goal and three objectives for the initiative.

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*“The goal of NOAA Carib is to identify and respond to local and regional challenges, needs, and opportunities in the Caribbean region through collaboration across NOAA and with our partners.”*

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It is important to clarify that the intent of NOAA Carib is not to identify new projects and programs. The idea is to connect with the ongoing research, management, and stewardship activities and to create a place for improved communication, which will lead to improved collaboration and ultimately increased success for all.



*Steering Committee members and participants at the first annual NOAA Carib meeting.*

*CREDIT: J.P. ORIOL*

## NOAA CARIB OBJECTIVES

1. To improve coordination and application of NOAA capabilities by enhancing internal NOAA communications on Caribbean efforts; effectively communicating both NOAA information to partners and partners' information to NOAA; and sharing, mobilizing, and integrating knowledge and expertise with regional partners and constituents in the Caribbean.
2. To attract new resources to address regional issues and needs in the Caribbean and develop initiatives using a “One NOAA” approach.
3. To help NOAA achieve its mission and goals in the Caribbean in partnership with SECART, including support for the NOAA Caribbean Strategy.

## **GUIDING PRINCIPLES**

The steering committee also identified a series of seven guiding principles for NOAA Carib to govern how the initiative operates.

- Principle One: We share information within NOAA and with external partners regarding our engagement in the region and related products and services.
- Principle Two: We work to enhance stakeholder communication with NOAA personnel and access to NOAA resources.
- Principle Three: We serve as an ambassador for NOAA engagement in the Caribbean region.
- Principle Four: We stress the application of a “One NOAA” approach, where NOAA employees understand and are knowledgeable about NOAA activities in the region.
- Principle Five: We serve as a connecting link between NOAA headquarters and NOAA activities in the Caribbean region.
- Principle Six: We improve collaboration between NOAA and regional partners.
- Principle Seven: We seek to align our activities and protocols with NOAA’s priorities and to support implementation of the NOAA Caribbean Strategy.

## **PRIORITY ACTIVITIES AND INITIAL STEPS**

The steering committee defined several priority activities for the initiative, the first of which was the implementation of the first annual meeting. Additional priority activities include the following:

- Creating a web presence for NOAA Carib nested within the SECART web presence.
- Working to increase and improve communication between NOAA employees working in the Caribbean region.
- Understanding priority needs of NOAA’s constituents in the Caribbean region and communicating those needs within NOAA.
- Identifying region-wide opportunities that can attract resources for priority efforts.
- Establishing stronger partnerships with regional organizations that can assist NOAA.
- Developing a communications and public relations strategy to build awareness of NOAA’s link to the Caribbean regional economy.
- Although the steering committee has taken the initial steps to focus this initiative, the hope is that the regional NOAA employees and partners will actively engage in this effort to make it a success. There are several mechanisms available for engaging in NOAA Carib and receiving information including:
  - An e-mail list at [noaainthecaribbean@noaa.gov](mailto:noaainthecaribbean@noaa.gov). Contact Geno Olmi, SECART coordinator, at [geno.olmi@noaa.gov](mailto:geno.olmi@noaa.gov) to be added.
  - The NOAA Carib newsletter. To subscribe or submit content, use this e-mail: [CaribbeanNews@noaa.gov](mailto:CaribbeanNews@noaa.gov). To view back issues, visit [http://docs.lib.noaa.gov/noaa\\_documents/NOS/NCCOS/noaa-caribbean\\_newsletter/2012\\_Feb\\_v1-1.pdf](http://docs.lib.noaa.gov/noaa_documents/NOS/NCCOS/noaa-caribbean_newsletter/2012_Feb_v1-1.pdf). and [http://noaaoceanscience.files.wordpress.com/2012/08/noaa-in-the-caribbean\\_1august2012-tagged1.pdf](http://noaaoceanscience.files.wordpress.com/2012/08/noaa-in-the-caribbean_1august2012-tagged1.pdf).
- Participation in the next annual meeting. Information will be posted on the e-mail list and in the newsletter.
- Responding to NOAA’s call for public comment on the draft Caribbean Strategy.

# NOAA Caribbean Strategy

## OVERVIEW

NOAA's breadth of expertise and mission closely align with the stated needs for the region, such as:

- maintaining ocean and fishery resources;
- forecasting coastal, weather, and water hazards;
- predicting and preparing for the impacts of climate change; and
- understanding and observing the ocean and atmosphere.

The draft NOAA Caribbean Strategy outlines a collaborative approach for addressing these needs. Strong NOAA support is essential if the domestic and international goals are to be achieved, including the goals set forth in NOAA's Next Generation Strategic Plan and the National Ocean Policy. The draft strategy focuses on a NOAA-wide approach for this region, to include improved communication within NOAA and with the regional partners, stronger participation with additional Caribbean countries and organizations, and increased awareness and support for efforts in this region.

The draft strategy encompasses three strategic goals, each with multiple objectives and initial and long-term actions.

- improved conservation and management of ocean and coastal ecosystems and resources;
- strengthened understanding of, and adaptation to, a changing climate; and
- enhanced multi-hazard monitoring, forecasting, and risk management.

The strategy stresses the need for coordination and participation by all NOAA line offices and programs. The goals were selected based on the environmental issues and societal challenges of importance to the region, needs assessment information, consistency with administration priorities, and the experience of individuals working in the region. The goals are complementary and interdependent, an important consideration with respect to addressing certain cross-cutting issues such as sea level change. The initial actions generally target activities that may already be underway, are more easily achieved, build on existing efforts, or represent more urgent needs. The long-term actions target activities that may require significant additional resources and strengthened or new partnering. The actions in the strategy will be pursued subject to the availability of resources. Break out groups were given information about the goals as well as the proposed action items.

## SUMMARY OF BREAKOUT DISCUSSION GROUPS

Facilitators focused the discussions on the following topics:

1. General comments on the strategy.
2. Comments on goals, objectives, and actions. What priority issues have not been identified? What actions are missing and need attention? Where might the priority (timing) of actions need modification?
3. Partnerships and leveraging opportunities. How do regional partners envision NOAA working most effectively with Caribbean constituents and partners? Identify partnerships, collaborations, and on-going or planned activities that can advance the goals, objectives, and planned actions.
4. Thoughts on implementation mechanisms and approaches.

Breakout group results were compiled, and a high-level summary is provided here.



*One of the Caribbean Strategy discussion groups.*

*CREDIT: NOAA*

## **Attitudes and Scope**

A theme expressed by all the groups was the emphasis on bringing together corporate, private, and government partners when implementing the strategies. Partners include other Caribbean governments as well as entities such as the Department of Education. Throughout this process, NOAA employees must keep in mind that NOAA is not the only entity bringing resources to the table and that collaboration will help build on existing foundations and provide opportunities to combine resources.

There was a general agreement that the U.S. territories are being left out of Caribbean-wide initiatives, as well as federal initiatives in the U.S., and work should be done to integrate Puerto Rico and the U.S. Virgin Islands into both national and Caribbean-wide efforts. Developing more of a relationship with the Environmental Protection Agency and other agencies may help identify gaps in or lack of enforcement of regulatory measures, as well as improve communication between the NOAA and EPA.

## **Content**

The strategies are very comprehensive, but the creation of this document must also include implementation plans. Clarification is needed regarding timing and priorities. Long-term goals need to span a longer time frame, while some short-term goals do not allow sufficient time for completion.

Suggestions were made to place more emphasis on invasive species prevention and management.

- Participants identified a need for a well-developed plan to disseminate scientific knowledge to the nautical community, especially regarding protected areas, species migration patterns, and other relevant information.
- There is a need to aim some of the action items towards the local community and not just the scientists and managers, because ultimate success will require larger scale efforts involving multiple partners and communities.

- Because of the extensiveness of the document, priorities should be set to focus on biologically diverse areas and develop recovery plans for endangered species.
- NOAA should also be thinking about offshore renewable energy, underwater electrical lines, and infrastructure development from a marine planning perspective.

### **Formatting Improvements**

- Placing items into a table may improve readability.
- Show linkages between action items to avoid duplication of effort within and among agencies.
- Goals are very ambitious and do not include identification of funding sources.
- May need to refocus efforts and develop budgets for these items.

### **Moving Forward**

As a next step it is suggested that there be a Caribbean region representative, either an individual or an entity, which can connect the islands but also be present in Washington. SECART has been suggested as a possibility, given the connections of team leadership.

### **Suggested Action Items**

Include the NOAA Coastal Services Center more, especially when it comes to social and economic science and applications needs.

- Compile a list of upcoming initiatives (a living document) and the responsible parties, especially Caribbean and NOAA agencies that should be working together to achieve these initiatives.
- Incorporate outreach and communication tools to help engage and inform the public concerning why and how measures are being taken. A monthly webinar, in addition to the quarterly NOAA in the Caribbean Newsletter, may be an option.
- Consider timing the next NOAA Carib meeting with the U.S. Caribbean Climate Change Conference.

The input from NOAA Carib participants is being considered along with public comments on the draft NOAA Caribbean Strategy via an upcoming announcement of opportunity for review in the Federal Register. Once the full range of comments are compiled and considered, a final draft of the strategy will be prepared for review and approval by NOAA leadership. This is expected to take place in 2013 (calendar year).

# Improved Conservation and Management of Ocean and Coastal Ecosystems and Resources

Presentations are summarized below, followed by group discussions that cover watershed planning and restoration, marine protected area capacity building, fisheries management, protected species, territorial coral reef management efforts, the Caribbean Regional Ocean Partnership, and marine debris. Discussions were led by NOAA and non-NOAA partners, who were asked to describe their work on the theme they were moderating. Moderators were asked to summarize the discussions and present information regarding relevant efforts in the region, potential areas for improved collaboration, and additional support and effort needed from NOAA Carib. Differences in content in the discussion summaries are due to the different authors for each discussion topic.

## PRESENTATIONS

- Ridge to Reef Watershed Approaches to Coral Reef Management (Dr. Sean Griffin, NOAA Restoration Center)
- Watershed Management in the St. Thomas East End Reserves (Anne Marie Hoffman, The Nature Conservancy)
- Conservation of Coral Reef Ecosystems in the Caribbean (Dr. Ron Hill, NOAA Southeast Fishery Science Center)
- The Caribbean Fishery Management Council (Graciela García-Moliner, Caribbean Fishery Management Council)

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## Ridge to Reef Watershed Approaches to Coral Reef Management

*Dr. Sean Griffin, NOAA Restoration Center*

Dr. Griffin talked about using a ridge to reef approach to watershed management to benefit the coral reef ecosystem (see [Ridge to Reef Watershed Approaches to Coral Management](#)), describing how NOAA has identified the ridge to reef approach as a critical step towards watershed management whereby the organization: 1) identifies areas with sensitive resources, and 2) identifies associated watersheds that influence these resources. The approach is meant to guide coastal management on islands characterized by steep slopes, highly erodible soils, high runoff volumes, a large percentage of dirt roads, active construction, and no existing storm water management, resulting in delivery of high sediment loads to nearshore environments. Key elements of the watershed management approach include attracting and including the right project partners, engaging stakeholders in public meetings, reviewing existing data, conducting on-the-ground field assessments, and developing a watershed plan that includes elements such as pollutant models, an implementation strategy, an education plan, engineering designs, and applying best management practices (BMPs).

Dr. Griffin went on to describe the local action strategy process that led to the identification of priority coral reef areas and associated watersheds: Fish Bay and Coral Bay (St. John); St. Thomas East End Reserve (STEER); St. Croix East End Marine Park; and Culebra, Northeast Reserves, Guánica, and Cabo Rojo (Puerto Rico). Jobos Bay, which is part of the National Estuarine Research Reserve, has also been a focus of watershed management as part of the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA-NRCS) Conservation Effectiveness Assessment Project which is primarily examining effectiveness of agricultural BMPs. The Guánica Watershed Restoration project has been a priority for several years with work guided by the Guánica Bay Watershed Management Plan. Dr. Griffin closed the presentation with examples of BMPs for reducing land-based sources of pollution (LBSP) and information regarding cooperative research to look for sources of LBSP, test the effectiveness of BMPs, and lessons learned that contribute to successful watershed scale conservation.

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## Watershed Management in the St. Thomas East End Reserves

*Anne Marie Hoffman, The Nature Conservancy*

Ms. Anne Marie Hoffman discussed watershed management in STEER (see [Watershed Management in STEER](#)), focused on conservation action planning for STEER and including an assessment of natural resource targets, identification of threats, development of strategies and actions, and consideration of monitoring and evaluation. Approximately 50 meetings over two years were used to foster community involvement and solidify partnerships, as well as identify targeted resources and threats to these. Ms. Hoffman also discussed the strategies proposed to abate threats to targeted resources developed through stakeholder participation. The strategies include: improving watershed and stormwater management; improving enforcement of existing coastal rules and regulations; developing a zone and mooring plan for recreational and commercial activities; and restoration activities. The list of current projects and on-going and proposed research includes: Contaminants in Sediments and Bioeffects (NOAA); Watershed Assessment (NOAA); Coastal Mapping/Activity Use Survey (NOAA); Biological Surveys (NOAA); Hurricane Mooring System (VI DPNR); Willingness to Pay and Preferred Management Approach Study (VI DPNR); Contaminants in Queen Conch (UVI); Seascape Influence on Fish Abundance, Richness and Distribution (UVI); Seagrass and Mangrove Monitoring (UVI); and Biological Monitoring Protocol (UVI). Ms. Hoffman closed by outlining how NOAA and STEER's goals align to work to restore and maintain a functional coastal ecosystem that promotes sustainable recreational opportunities and compatible commercial uses with community engagement through effective management.

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## Conservation of Coral Reef Ecosystems in the Caribbean

*Dr. Ron Hill, NOAA Southeast Fishery Science Center*

Dr. Hill presented on NOAA's work toward the conservation of coral reef ecosystems in the Caribbean (see [Conservation of Coral Reef Ecosystems in the Caribbean](#)). He described how NOAA's activities support the precepts that to effectively manage and conserve coral reef ecosystems, managers must know: 1) where are the resources (mapping); 2) what are the resources (assessment); 3) how resources change over time (monitoring); 4) why resources change over time (research); and 5) how to access information (data dissemination). To effectively manage and conserve coral reef ecosystems, managers must be empowered to take appropriate conservation action (managing), ensure actions are effective (monitoring and research), and ensure compliance with actions (enforcement and buy-in). Dr. Hill outlined the work of NOAA line offices toward coral reef ecosystem conservation. NOS OCRM administers the NOAA CRCP, a matrix program comprised of five NOAA line offices. NOS NCCOS's Biogeography Branch works on assessments of water and sediment quality and marine resource distribution and condition in St. John, St. Croix, and parts of Puerto Rico. NMFS has a number of offices and divisions active in the Caribbean, largely in management of reef fisheries, protected species, habitat conservation, and highly migratory species. OAR includes the National Sea Grant College Program, NOAA's Office of Ocean Exploration and Research and the NOAA Climate Program Office.

Dr. Hill described how, for coral reef ecosystem management, mapping has been an area of common need in the region. And gave an example of research partnerships between NOS/NCCOS, CFMC, the University of Puerto Rico-Mayagüez, and VI DPNR for seafloor mapping of the Marine Conservation District and Grammanik Bank south of St. Thomas and the documentation of coral cover and fish abundance. Detailed maps frame robust coral reef ecosystem monitoring designs for benthic, water quality, and fish parameters. Dr. Hill also discussed how other NOAA offices bring technological solutions to regional problems. AOML has set up Integrated Coral Observing Network (formerly, Coral Reef Early Warning System or CREWS) stations to continuously record a broad range of environmental data. The National Environmental Satellite, Data, and Information Service (NESDIS) oversees the use of satellite data that have produced the predictions used for coral bleaching alerts and environmental characterizations involving satellite measurements of sea surface temperature, global data on thermal stress on coral reefs, time series data for virtual stations worldwide, and satellite product research, development, and implementation. Dr. Hill closed with a discussion of how the combination of in-situ monitoring through grants and by NOAA researchers, automated observations, and satellite observations provide a framework that can be expanded to address a wide range of needs for local stakeholders and managers. This is the impetus behind the current partnership to institute the National Coral Reef Ecosystem Monitoring Program (through the NOAA Coral Program) that will establish or expand base level monitoring, consistent across jurisdictions.

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## The Caribbean Fishery Management Council

*Graciela García-Moliner, Caribbean Fishery Management Council*

Ms. García-Moliner discussed the relationship between the CFMC and NOAA (see [Caribbean Fishery Management Council](#)), profiling how the CFMC serves as an example of collaboration among NOAA (especially SERO and SEFSC), local jurisdictional governments, fishers, and academia focused on fisheries management. The CFMC is composed of full-time professional staff, fisheries managers and fishers from Puerto Rico and the U.S. Virgin Islands (USVI), other concerned individuals, law enforcement representatives, and NOAA Fisheries representatives. Expanded collaborations with NOAA began with the need to describe and identify essential fish habitat (Magnuson-Stevens Fishery Conservation and Management Act of 1996, Magnuson-Stevens Act) when the CFMC initiated the mapping of coral reef resources within the U.S. Caribbean, working with NOS. Initial benthic habitat maps and a habitat association table were generated and included in fishery management plans. From 2002, work has continued in mapping habitats and assessing biological communities in coordination with University of Puerto Rico-Mayaguez researchers, including biological surveys and high-technology approaches such as video surveys with autonomous underwater vehicles to support CFMC needs. Using NOAA CRCP grant funds, CFMC has been able to contract surveys of mid-depth reefs seeking to understand linkages with managed reef resources. Those most recent efforts produced highly detailed bathymetric maps of the U.S. Caribbean seafloor, including detailed contour information supporting identification of (among other things) deep-water coral reefs. Deep-water reefs are an essential component of effective resource management in the U.S. Caribbean, as they provide a refuge for numerous species from the impacts of fishing and other anthropogenic impacts. Ms. García closed by reiterating how the CFMC brings together diverse groups with a common interest in improving the conservation of coral reef ecosystem resources in the U.S. Caribbean.

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## BREAKOUT DISCUSSIONS

### Watershed Planning and Restoration

*Moderators: Edwin Almodovar, Anne Marie Hoffman, Sean Griffin*

Moderators gave an overview of the connections between different groups and on-going collaborations. For instance, in 2009, NOAA and Puerto Rico's Department of Natural and Environmental Resources (PR DNER) developed a local watershed management plan for a watershed in Guánica, Puerto Rico. USDA-NRCS brings funding to projects, as well as expertise, in order to assist in addressing issues in watershed management plans. Partnerships are essential in order to address the needs in watershed management plans. In the Guánica watershed, USDA-NRCS is working with the local land authority to address the erosion of creeks. Other partners on the project are the local Department of Agriculture, U.S. Fish and Wildlife Service, and the Environmental Quality Board. The watershed approach is more efficient and it is easier to obtain buy-in from the community, which is a key to collaboration. Federal agencies bring resources and people with relevant expertise.

#### *Information on Relevant Efforts in the Region*

- Guánica watershed project with partnerships between federal and local agencies and organizations. USDA-NRCS often involves private sector as well through bidding to do surveys and other work.
- Completed stakeholder workshop in Guánica Bay (to learn about nutrient management).
- Researchers are studying roads and runoff into Coral Bay on St. John to look at the influence of sedimentation. Coral Bay is an important site for shark breeding and in the summer of 2012 researchers will also be looking at juvenile sharks in the bay. Data from these types of studies can be linked to determine impacts of land-based sources of pollution on these important resources.
- Caroline Rogers (U.S. Geologic Survey (USGS)) leads coral reef research efforts in Coral Bay's Hurricane Hole area.
- Systematic monitoring occurs at STEER, with the data going into a baseline report for the area.



*NRCS and farmers mapping a contour line in the Guánica watershed for installation of BMPs.*

*CREDIT: NOAA*

#### *Potential Areas for Improved Collaboration*

- Need to improve partnership efforts to meet funding requirements. Managers must be creative in a time of hiring freezes to be sure work can still be accomplished. USDA-NRCS has funding to help with watershed management, but needs matching funds and partners willing to commit to the project for several years if necessary.
- Involve small businesses in watershed management efforts as is being done in Coral Bay. Local companies within the community will often provide funding or other donations for work if they are involved in the process. Work with local groups like the Coral Bay Community Council to accomplish this. For instance, landscaping businesses might be willing to donate funds or materials for the creation of rain gardens to assist in controlling runoff.
- Look for corporate sponsorships and get assistance from non-governmental organizations (NGOs) who may have public relations people to assist. Home Depot and West Marine could be sponsors of some of the watershed activities that involve landscaping and boaters, respectively.
- Refer to groups like The Nature Conservancy (TNC) as a model for communication within organizations and projects that have people spread out over large areas, and take advantage of organizations that have a presence on several islands to facilitate communication about projects and efforts.
- Collaboration between the U.S. Environmental Protection Agency (EPA) and NOAA, as well as local agencies and universities, can assist in gathering needed weather data (e.g. rainfall), and water quality data (e.g. sedimentation). By linking funding sources and on-going monitoring, such as with the VI DPNR Division of Environmental Protection's quarterly monitoring, a better picture of what goes on in watersheds can be created.

#### *Additional Support and Effort Needed from NOAA in the Caribbean*

- Capacity building related to engineering standards for roads, including enforcement, as roads are being built. This includes education of inspectors, builders, and others regarding standards and appropriate practices based on characteristics of a site.

- Additional investment in implementation. NOAA continues to invest in the creation of management plans, but they just sit on the shelf due to lack of funding. NOAA should work with federal and local partners in the jurisdictions to establish priorities that would assist in the decision-making process for the creation and implementation of plans that include BMPs for roads and septic systems in a systematic way. Implementation also needs to include monitoring and sampling events to test the effectiveness of BMPs and other aspects of management plans that have been implemented.
- Work with USGS or others to establish stream gauges or reactivate those that have been in place in the past, such as in Turpentine Ghut. Work with the public housing authority to get the community involved by placing rain gauges on homes, or at local schools. There are private companies that have rain gauges, although the cost may be an issue (Weather Bug, Weather Underground). Rainfall data is critical to put sediment data into perspective, including the sources of sediment based on rainfall patterns.
- St. Thomas and other islands have “critical information gaps” that make watershed planning and implementation difficult so plans first need baseline data and a monitoring network. Need to establish monitoring standards for water quality to look at baseline conditions and pulse events, as well as extreme weather. Monitoring should include near and offshore sampling areas to identify the zone of influence of terrestrial plumes.
- Circulation models showing the relationship between wind, rain events, currents, flushing, and retention times that influence water quality in bays associated with watersheds.

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## Marine Protected Area Capacity Building

*Moderators: Dana Wusinich-Mendez and Bob Glazer*

Moderators provided a summary of a partnership between NOAA and the Gulf and Caribbean Fisheries Institute (GCFI) to support the Caribbean Marine Protected Area Managers Network and Forum (CaMPAM) by addressing key capacity needs for the effective management of marine protected areas (MPAs) in the region. More information on this effort is available at <http://campam.gcfi.org/campam.php>. Information was also provided on efforts by NOAA's Coral Program to understand and address MPA management capacity needs in Puerto Rico and the U.S. Virgin Islands. Resources can be found at <http://coralreef.noaa.gov/resources/publicationsdata/>

### *Information on Relevant Efforts in the Region*

Participants from Puerto Rico identified that MPA management in Puerto Rico is a top down approach and that there needs to be more involvement with MPA users and partners to manage these areas. Puerto Rico needs to transition from paper parks to the active manage of protected areas. Other needs identified by participants from Puerto Rico and the USVI were: biological assessments to establish MPA baselines; improved signage and designation of reserve areas; more marine science programs that educate the community to foster long term preservation; identifying MPA users and how the capabilities and resources of those users can help with MPA management initiatives. This approach would help with sustainable financing which does not exist in Puerto Rico.

### *Potential Areas for Improved Collaboration*

- Create a “mini CaMPAM” for the American Caribbean. It could be an in-house network between the MPAs in the USVI and Puerto Rico. This network could help with capacity building, implementing the NOAA Caribbean Strategy, and aiding in leveraging money.
- Peers in the U.S. Caribbean should be talking amongst themselves and with other neighboring countries more often.
- Partners coming in to help with capacity building in Puerto Rico need to understand the history and local culture. NOAA should help identify small locally-based organizations to help support local MPA efforts.
- Success often comes when people of similar environments interact with each other on

management strategies. As such, Puerto Rico and the Dominican Republic could be good partners. Connecting MPAs in Puerto Rico and the Dominican Republic would be a good long-term goal.

- Engage the tourism industry in MPA management. Though tourism industries are dependent on the marine resources, they are not involved with conservation issues in Puerto Rico.

#### *Additional Support and Effort Needed from NOAA in the Caribbean Region*

- Provide specialized training and build local capacity to allow local and regional managers to create their own management plans for MPAs.
- Provide an MPA webinar series.
- Help with citizen science programs.
- Partners would like NOAA to help facilitate peer-to-peer meetings and learning exchanges at the leadership level between Caribbean countries. Caribbean countries operate in the same way and have similar problems. They can easily relate to, and teach, each other. For example, Barbados could share their successful conservation strategies with the U.S. Caribbean.
- NOAA could help contribute to specialized training in MPAs and coastal management. There is also a need for more internship funding.
- NOAA needs to play a role in helping to facilitate site-to-site learning.

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## **Fisheries Management**

*Moderators: Bill Arnold and Graciela García-Moliner*

The group maintained a lively and wide-ranging discussion on issues including:

- Grazing and corals – Acroporid corals have decreased in abundance throughout Caribbean waters to the extent that they are now listed as threatened species. A possible contributor to the continued death of Acroporid corals is decreased grazing intensity following the collapse of *Diadema* sea urchin populations. That grazing function has been supplemented to some degree by herbivorous fish such as parrotfish and surgeonfish. Discussion focused on the need to distinguish among parrotfish species with regard to their role as grazers, not only with respect to Acroporids but also to other coral species and particularly those likely to be listed in the near future. Suggestions included better prioritization of funding opportunities to ensure that U.S. Caribbean needs are addressed, specifically including habitat-specific grazing, ecosystem level studies of species-habitat associations, contemporaneous multi-species studies, and funding dedicated to monitoring population abundance relative to recently established annual catch limits, relying more on fishery-independent data.
- Spawning aggregations – The need to protect producers was recognized, and to protect the settlement habitats of the resultant offspring. Thus, this issue also addressed the concept of connectivity among sites and the potential impact of climate change on those connections.
- Management integration – The group recognized the importance of continuity between state and federal management regulations, especially with annual catch limits. It was suggested that liaisons should serve to bridge the gap between state and federal entities, providing an essential function in translating science and management for the lay community. Additionally, it was recognized that impending marine spatial planning initiatives will impact fisheries, so fishery management and marine spatial planning efforts need to be integrated and those involved need to maintain clear lines of communication (see below).
- Collection and application of life history information – Life history information on many species inhabiting Caribbean waters is deficient or entirely lacking. Data on parameters such as age, growth, size at maturity, size at sex change and maximum length are needed for all managed species. These data can then be fed into modern assessment models that consider not only fishing mortality but various other sources of mortality (e.g., mortality due to sedimentation, anoxia, water quality) that contribute to population and ecosystem health. Total mortality needs

to be properly partitioned among sources so that contributors to population health can be properly recognized and addressed.

- Communications – Essential to all of the above is clear, effective, and timely communication. The suggestion was made that NOAA in particular, but all management agencies in general, need to listen more carefully to their constituents (i.e., “the locals”). Fishers and managers need more connection, and the recently implemented USVI fishery liaisons were cited as a valuable change supporting this need. It is important to address local requests for assistance, for example by providing access to tools such as Geographic Information Systems and working to improve data collection systems. Suggestions include better staffing of local field offices and a long-term commitment to those staffing levels (local capacity building). Several participants expressed the concern that resources are devoted and programs initiated, but when funding diminishes these programs are cut despite their contributions. It is paramount to leverage all available resources, including those from federal, local, and non-governmental sources to maintain success.

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## Protected Species

*Moderators: Lisamarie Carrubba, Jocelyn Karazsia, Renata Platenberg, Stephen Hale*

Moderators from DPNR’s Division of Fish and Wildlife (DFW) began the discussion with an overview of the cooperative agreement they have with the U.S. Fish and Wildlife Service, which delegates federal authority to USVI to implement and enforce aspects of the Endangered Species Act (ESA) for species such as sea turtles, the VI tree boa, roseate terns, and the St. Croix ground lizard. DFW also provided information regarding their role in the review of coastal construction projects and potential impacts to protected species and their habitat. DFW also assists in responding to vessel groundings and sea turtle entanglements, collection of data for Southeast Area Monitoring and Assessment Program, a commercial catch reporting program, and an *Acropora* monitoring program at Christmas Cove required as part of a DFW mooring buoy project.

Moderators from NMFS discussed the listing of Acroporid corals and designated critical habitat for corals and sea turtles, as well as the status review for 82 species of coral, 7 of which are in the Atlantic/Caribbean. Information on the overall listing process was presented, including the factors NMFS considers when listing a species, the Biological Review Team roles, Regulatory Mechanisms analysis, the difference between 4(d) rules and critical habitat, recovery planning, take prohibitions, and public comment opportunities. Many ESA-listed species are also either essential fish habitat (EFH), such as corals, or utilize EFH, such as sea turtles (that utilize colonized hardbottom, coral reef, seagrass beds). NMFS provided a review of EFH and EFH Habitat Areas of Particular Concern in the U.S. Caribbean designated by the Caribbean Fishery Management Council. Consultation responsibilities under ESA and the Magnuson-Stevens Act, in particular the EFH provisions, were also described by NMFS. In response to questions regarding the status document for the 7 species of corals, there was a discussion about climate change as a major factor affecting corals.

### *Information on Relevant Efforts in the Region*

- Two projects in Colombia through the University of Magdalena: 1) examining the connectivity of Acroporids in Colombia with the broader Caribbean; and 2) reproduction and genetics of lionfish, which are affecting local fisheries.

### *Potential Areas for Improved Collaboration Related to Protected Species and Climate Change*

- Support from NOAA is needed regarding how to address effects of climate change locally (such as in the Wildlife Action Plan for USVI that will come out in 2015). Additional resources (funding for staff, research, and predictive tools), as well as opportunities to learn from other on-going activities such as sea turtle nesting studies in Louisiana are needed. It is also important to determine whether a change in species’ distribution is due to climate change impacts versus development pressures, impacts to migration corridors, or other factors.
- USVI needs a better understanding of seasonal coastal and marine changes including beach seasonal erosion rates, the disproportionate level of hawksbill hatchlings getting entrained in *Sargassum*, whether fish kills are related to *Sargassum*, and whether last year’s unusual amount of

- Sargassum* is due to climate change or just upwellings.
- Acroporid and *Montastraea* researchers need to move toward a big picture examination of coral reef ecosystem despite the differences between particular coral species in terms of physical characteristics and spawning.
  - Create a network of colleagues throughout the region willing to collaborate rather than simply using researchers in PR and VI as sample collectors, so that everyone participates in the analysis of data, publishing of results, and the sharing techniques to make data comparable for regional analyses.

#### *Additional Support and Effort Needed from NOAA in the Caribbean Region*

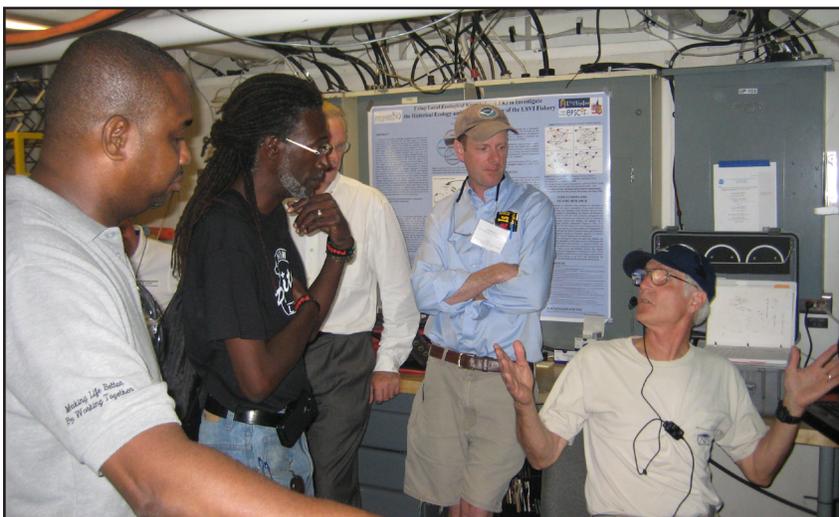
- Better international collaboration needed in terms of training, for example genetic markers to determine differences in Acropora and webinar courses in English and Spanish.
- International data sharing (e.g., use of cloud-based data storage capabilities) and general opportunities to collaborate with entities outside the U.S. Caribbean.
- Now that NMFS has completed a status review for additional coral species that could lead to new listings, the agency needs to review management issues related to permitting of research activities meant to assist with the propagation and recovery of listed species. NMFS assigned permit authority to local agencies in PR and VI, but the permit process is extremely slow, which affects research programs, project budgets, and sampling schedules.
- Volunteer training programs should be a tool employed by NOAA to assist in data collection for protected species and EFH.
- Data collection and other techniques need to be standardized so data are comparable across regions to assist NMFS when performing required status reviews and recovery of listed species.

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## **Territorial Coral Reef Management Efforts**

*Moderators: Marlon Hibbert, Paige Rothenberger, Damaris Delgado*

This session focused on the efforts of NOAA's Coral Reef Conservation Program in the U.S. Caribbean and the relationship between NOAA and its partners and contacts leading coral reef conservation initiatives in Puerto Rico and the USVI. Priorities for coral reef management were developed in 2010 for both jurisdictions which identified priority goals and objectives for coral reef management as well as priority geographic areas. Subsequent efforts at the community level resulted in the development of Local Action Strategies, MPA management plans and watershed management plans to address these priorities.



*Senator Terrence Positive Nelson attending Nancy Foster open day.*

*CREDITS: NOAA*

## Information on Relevant Efforts in the Region

### *Summary of Ongoing Efforts in Puerto Rico:*

- Focus on water quality and land use planning.
- Development of integrated management plan for land/marine reserve.
- Coral fellowship building capacity in fisheries.
- Enforcement challenges – stark difference between arrests and prosecutions.
- Guánica watershed activities are making a difference.
- Additional areas placed in National MPA system.
- Reef resources stabilized according to data (fish biomass).
- Other partnerships are improving (EPA, U.S. Coast Guard, Department of Interior).
- Improved integration of science into management.

### *Summary of Ongoing Efforts in the USVI:*

- Coral reef conservation cooperative agreements are positive and will improve the relationship with NOAA and increase effectiveness –
  - Coral reef management priority setting process; identified 8 thematic focus areas and 4 geographic focus areas.
  - An important criterion is ability to achieve on the ground success with partners and constituents/communities.
  - The metric is ability to make progress (even if the relative importance/value of the areas is not necessarily the highest).
- Long-term territorial monitoring program – expanded despite challenges.
- NOAA ship time has helped in creating useful baseline conditions.
- *Acropora* monitoring – standardized methodology -
  - NOAA liaisons funded by CRCP have been critical in helping bridge gaps and creating an environment for a cooperative agreement to succeed.
  - The USVI had success with American Recovery and Reinvestment Act (2009) funding; being ready allowed the territory to take advantage of the opportunity including leveraging of funds and strengthening of partnerships.
- Support for sustainable financing mechanisms.
- MPA management effectiveness project –
  - Enforcement training; reef resilience program; economic evaluation project; and jurisdictional capacity assessment for coral reef management.

### *Actions Underway:*

- The NOAA Coastal Services Center is developing coastal change data sets for both Puerto Rico and the USVI, as well as information for application of the sea level rise and coastal flooding impacts viewer.

### *Potential Areas for Improved Collaboration Related to Protected Species and Climate Change*

- Regional ocean governance – hoping to position the U.S. Caribbean to lead the newly formed Caribbean Regional Ocean Partnership (CROP). The region is ready for this effort, but it is important to keep people at the table in part through policy support and links to the wider Caribbean.
- Focus of Caribbean Strategy needs to improve constituent engagement in management process.
- Proposed Endangered Species listing could mean critical changes in the way management happens.
- Coastal communities' tool for coastal managers – (CSC tool) very useful.

### *Additional Support and Effort Needed from NOAA in the Caribbean Region*

- Recent work on economics and management capacity will need support to socialize and institutionalize changes that are identified to withstand administrative shifts.
- A coral reef program will require strong partnerships with diverse stakeholders.
- Additional assistance with technical support for addressing reef issues; liaisons can help with identifying needs and linking resources.

### *Facilitated Discussion*

- CRCP Liaison positions led by NMFS (Fishery Liaisons) and NOS (Management Liaisons) that have been placed in jurisdiction have gone a long way in enhancing the relationship between jurisdictions and NOAA headquarters.
- Dedicated Coral Reef Point of Contacts by Territorial governments, ability to tap into coral/coastal fellowship programs gives programs capacity to get work accomplished. The crosswalk of local and national objectives has helped to focus efforts.
- The use of cooperative agreements may help more than grants, offers more interaction between jurisdictions and NOAA.
- There is a greater need for management of people who interact with resources, and science and socioeconomic conditions need equal attention going forward.
- The attention on science and the management of people needs a specific “location based focus” – engaging local populations and harnessing their abilities. Also need to learn more from our neighbors elsewhere in the Caribbean.
- Action is needed on making a Memorandum of Understanding with Caribbean Community Climate Change Centre more functional and operational; the U.S. Caribbean is not alone and could benefit from work already in progress in the region.
- More interaction is needed between resource managers and NOAA scientists, as issues are constantly changing and these changes have to be communicated.
- Need for change in thinking and actions; control over resources is limited and climate change is further eroding that ability. Territories need to tap into other regional bodies such as the Caribbean Natural Resources Institute or CANARI.

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## **Caribbean Regional Ocean Partnership (CROP)**

*Moderators: Ernesto Diaz, J.P. Oriol, Aaron Hutchins*

The session began with a presentation by Ernesto Diaz with Puerto Rico DNER detailing how the territories of Puerto Rico and the U.S. Virgin Islands formed the CROP, beginning with President Obama’s Executive Order (more commonly known as the administration’s National Ocean Policy) and how it creates the framework for regionally-based planning processes, then showing the nine geographic regions that can be recognized to receive funding to undertake regional coastal and marine spatial planning (CMSP). The presentation detailed specifics of the CROP, and how the territories will work together to create the legal and institutional framework for CMSP within the region, including working with existing regional partners during the process and. When a foundation has been established, the intent is to expand the partnership to the immediate international neighbors: the British Virgin Islands (BVI) and the Dominican Republic (DR). Following the presentation, the panel fielded questions from the audience focused on the following areas of concern:

- The advantage of having a formalized regional ocean partnership (ROP) when CMSP is not receiving the funding desired.
- The interest of both parties to continue with this initiative, and the consequences if things change.
- The ability of the territories to implement this initiative including infrastructure and data management concerns.

The panel assured the group that Puerto Rico and the USVI are committed to the initiative because the islands are interconnected through our oceans and only with a better understanding of these connections will there truly be sustainable planning for each of the territories. Regardless of funding opportunities, PR and VI see the CROP to be extremely valuable for the planning of Caribbean shared ocean resources. The panel acknowledged that not every geographic region will formally create an ROP; those that do not have some other regional alliance that has been working for them on a state level.

When addressing the interest, or the will, of the territories to continue with the ROP initiative, the panelists pointed out that both government and NGOs, and not individuals, are responsible for the implementation of the CROP. The CROP states the CZM programs for PR and VI are responsible to provide technical guidance to the cabinet-level signatories of the ROP. The Coastal Zone Management programs are involved in a number of other regional initiatives which could supplement the ROP initiative (Caribbean Landscape Conservation Cooperative, Caribbean Fisheries Management Council, Caribbean Coastal Ocean Observing System, electrical power interconnectivity) and therefore, the programs will be furthering the goals of the ROP through their involvement in these initiatives. TNC's role in the CROP was also identified in that they were awarded funding to support the facilitation of the CROP process. TNC's role was also highlighted due to their involvement in other international regional planning initiatives (e.g., the Caribbean Challenge) which will be of importance when the CROP wishes to extend its agreements with nearby international partners such as the BVI and DR. The role of academia was discussed, and it was acknowledged that the process will be dependent upon the expertise provided by academic institutions. Although the CROP administratively is housed within the two governments, there are multiple entities that will support responsibilities.

Several questions related to the capacity of the territories to implement this initiative were raised, specifically on the data management needs. The panelists agreed and stated that it is one of the early tasks identified in the Memorandum of Understanding, and some of the initial funding awarded to TNC is for a data manager to store the necessary information until other infrastructure is identified to fulfill that purpose. It was also shared that the President's National Ocean Council is in the process of creating web portals to further the data management needs of the states and territories pursuing marine spatial planning. In closing, a comment on the value of the CROP warranted extra consideration, basically that the CROP will have utility for as long as the territories speak with a unified voice on the international stage. With the pledged support of the NOAA in the Caribbean effort, both PR and the USVI see this as a worthwhile endeavor in the planning of shared ocean resources.

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## Marine Debris

*Moderator: Neal Parry*

The NOAA Marine Debris Program (MDP) handles emergency response, assessment and restoration, and deals with marine debris issues. Mr. Parry serves as the NOAA MDP Regional Coordinator for both the Caribbean and Gulf of Mexico regions.

In 2006, the Marine Debris Reduction and Prevention Act was signed into law and established the NOAA MDP. The MDP provides grants and is interested in promoting projects in the Caribbean. Other regions covered under the MDP include: Pacific, West Coast, East Coast, Alaska, and Great Lakes. Examples of funding given through this program include Friends of Virgin Islands National Park for work on Hassel Island and the Derelict Fishing Trap Study in St. Thomas and St. John with NCCOS. Receiving funding is more likely if removal accompanies prevention practices and outreach with the community.

### *Information on Relevant Efforts in the Region*

- Gulf of Mexico Foundation grant for Virgin Islands Marine Advisory Service activity and trash cleanup in Mangrove Lagoon and outreach and education. Supports an event called, "Afternoon on the Green," with brochures distributed at community activities.
- In 2005 created a 501 c3 with cleanthebay.org. SEATOW does commercial oil response, has booms, skimmers and boats, and removed 27 vessel following Hurricane Earle (funded by the Federal Emergency Management Agency (FEMA)).

### *Potential areas for Improved Collaboration*

- Ocean modeling to response, offshore wind turbine planning, and developing a forecast system.
- Development and associated runoff is an area of concern, however, communities often are uninformed in terms of science and the impacts of development and other human activities. Need to better inform the public to be sure environmental policies are science-based and understood.
- Recommend setting priorities for U.S. Caribbean to guide funding decisions related to marine debris and impacts. For instance, littering and dumping of toxins is a concern in the Territory due to the major health hazards they present.
- Need clarifications on agency structure and how funds are disseminated within USVI agencies.
- Better coordination with the cruise ships industry is needed. In terms of derelict vessels, challenges exist concerning where to dispose of boats. Most derelict boats in Puerto Rico are concentrated in marinas. Hurricane mooring buoys are needed in many areas, but there are often permit problems that prohibit their establishment.
- Boats should have to demonstrate adequate sewage pump out before being allowed to moor. Marinas do not want to lose money by having a pump out space, but this should be a requirement. Need to collaborate with the Coast Guard and EPA to pool limited funds and strengthen regulations.
- Recommend a fund for removal of abandoned vessels to be included in a boat registration fee for the Territory because fees are very outdated. However, there is an issue with raising fees because there needs to be a complementary increase in services.
- Need to improve grounding response because it often takes too long to remove grounded vessels, such as the ferry that grounded recently on Great St. James. Need agencies to work together to accelerate the process.
- The impacts of trash are important in the Territory, but funds for local programs have been cut. Outreach efforts need to more effectively target critical stakeholder groups, for example developers (impacts of runoff and transport of materials from construction) and fishermen (issues with ghost traps). Need to work with solid waste authorities because legislation for recycling and solid waste management either does not exist or is not enforced. Need to educate people about the impacts of dumping cooking oil down the drain and motor oil into storm sewers. Also recommend working with the Department of Corrections and providing funding for logistics to get manpower for cleanup activities.
- In STEER the Territory is interested in funding to remove garbage and create an outreach campaign about the impacts of debris on marine life, but need information on funding sources. FEMA has assisted in the past in removing vessels after major storms, so need NOAA to look further into funding and partnership opportunities. Need to consider a policy requiring that vessel insurance includes funds for vessel removal after a grounding or storm event.
- Participants were very interested in the notices for potential derelict vessels used in Florida and would like assistance in adapting this type of program to the U.S. Caribbean.

### *Additional Support and Effort Needed from NOAA in the Caribbean Region*

- The Territory has data on marine debris, including GPS locations and photos of abandoned boats, but is frustrated because proposals don't receive funding. Need more pro-active programs to remove derelict vessels before storms hit and cause more damage. The MDP abandoned boats budget is only \$25K, which is too small to enable the removal of vessels. Therefore, support for prevention is necessary.
- Huge need for coastal cleanups divided into three parts: outreach, cleanup, and presenting findings. Funds are needed for transportation to get kids to the cleanup events. Cleanup needs to include the removal of large appliances near the sea.
- Need a good way to get information on funding opportunities from NOAA and other partners and proposal deadlines.

# Strengthened Understanding of, and Adaptation to, a Changing Climate

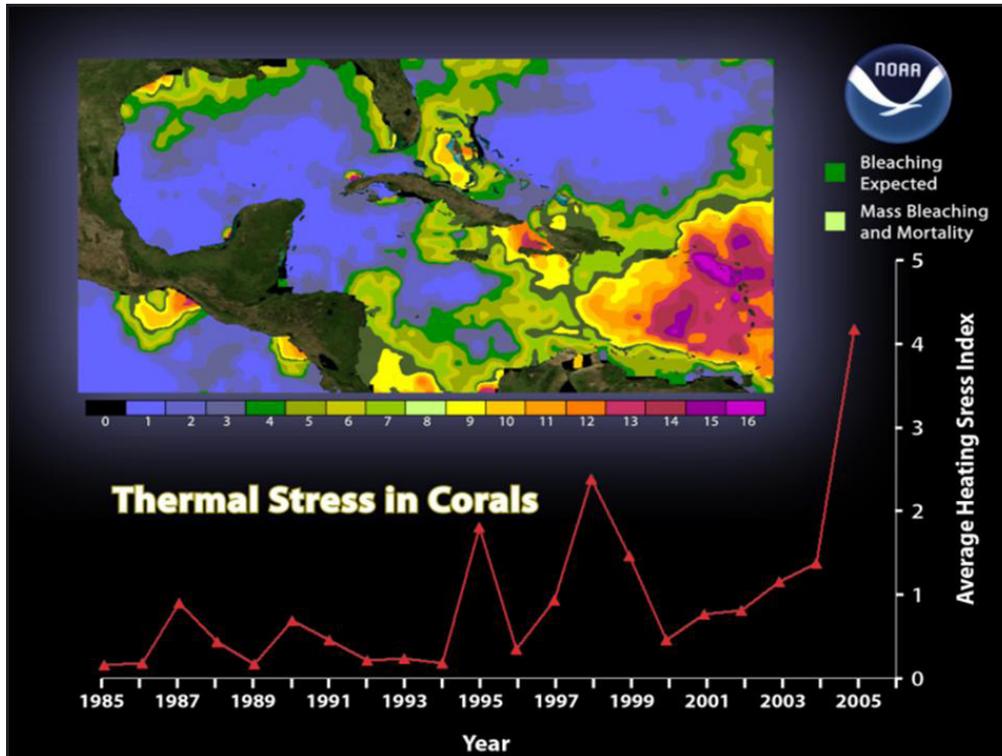
## PRESENTATIONS

- NOAA Climate Services in the Caribbean (Dr. David Brown, NOAA National Climatic Data Center)
- Caribbean Regional Climate Outlook (Dr. Meredith Muth, NOAA Climate Program Office)
- Puerto Rico Climate Change Council (Ernesto Díaz, PRDNER, CZM)
- Caribbean Community Climate Change Centre (Dr. Kenrick Leslie, CCCCC)
- Caribbean Landscape Conservation Cooperative (Dr. William Gould, Department of Interior)

## Summary

Plenary presentations, including two from NOAA and three from partners, were used to set the stage for discussions about the climate components of the NOAA Caribbean Strategy, as well as to highlight existing Caribbean partnerships in the area of climate services. Dr. Brown, NOAA's Southern Regional Climate Services Director, began the session with an overview of NOAA's role in providing climate services in the Caribbean (see [NOAA Climate Services in Caribbean](#)). Dr. Brown stressed the importance of a regional-scale, integrated approach to service delivery that is closely aligned with identified constituent needs for climate data, products, and information. The NOAA Caribbean Strategy can be used to guide NOAA's regional climate services activities. Dr. Muth, International Programs Manager at NOAA's Climate Program Office, spoke about the Caribbean Regional Climate Outlook Forum (CariCOF) that NOAA has helped to facilitate (see [Caribbean Regional Climate Outlook](#)). CariCOF is a mechanism to provide authoritative, regional-scale climate forecasts through a consensus prediction process, drawing on expertise and participation from meteorological services among many Caribbean nations. Establishing a sustained process for the Forums and expanding the scope of the operational products remain priorities among CariCOF participants.

Following the NOAA speakers, Ernesto Diaz, Director of Puerto Rico's Department of Natural and Environmental Resources, led off a series of three partner presentations by highlighting climate assessment and adaptation work in Puerto Rico, particularly the efforts of the Puerto Rico Climate Change Council (PRCCC) (see [Puerto Rico Climate Change Council](#)). Of note was the PRCCC's work in supporting an island vulnerability assessment, released in 2012, whose focus spanned three key sectors: coastal communities; critical infrastructure; and coastal biodiversity. Recommendations from the assessment are being used to guide adaptation strategies including revisions to building codes and new land use regulations. Dr. Leslie, Director of the Caribbean Community Climate Change Centre (CCCCC), followed next with an overview of the role and mandate of the CCCCC and its new memorandum of understanding with NOAA (see [Caribbean Community Climate Change Centre](#)). The CCCCC, having been charged directly by the Caribbean Community heads of government, developed a regional framework for climate resilient development actions that was approved in 2012. Working with NOAA, the CCCCC will continue to develop and implement a risk management approach to decision-making and sector-specific adaptation policies that are well-coordinated among Caribbean partners. Concluding the climate plenary session, Dr. Gould, coordinator of the Caribbean Landscape Conservation Cooperative (CLCC), presented an overview of the newly-formed CLCC including its landscape-scale mission to promote conservation, including in response to a changing climate (see [Caribbean Landscape Conservation Cooperative](#)). NOAA is a contributing member of the LCC network, which was initiated by the Department of Interior, and is working with other partner agencies to identify, prioritize, and implement shared strategies for conservation science and service. An early collaborative effort among NOAA, the U.S. Forest Service, the U.S. Fish and Wildlife Service, and the Puerto Rico Department of Natural and Environmental Resources has been the establishment of a CLCC Partnership and Outreach Coordinator who will help lead interagency coordination for the CLCC vision within the U.S. and international Caribbean.



Screen shot of thermal stress index for corals from NESDIS.

CREDIT: M. EAKIN

## MODERATED DISCUSSION

*Moderator for Plenary Session Discussion: Dr. Alan Leonardi*

During the moderated discussion in between and following the plenary speakers, and during subsequent small group breakouts later in the day, a number of additional recommendations, observations, and strategies were identified to help NOAA move forward with implementation of its climate priorities in the Caribbean as articulated in the NOAA Caribbean Strategy

- There are examples of regional progress on climate issues. In the British Virgin Islands, a new national climate change policy has been implemented, as has a climate change “trust fund” to protect natural and built infrastructure as well as protected areas.
- Opportunities exist to engage the private sector in supporting NOAA’s Caribbean activities including for climate. The Caribbean Challenge Initiative is one such example.
- An ongoing focus should be on engagement, with NOAA doing as much “listening” as “leading” with Caribbean partners. NOAA should also find opportunities to engage with international efforts, such as those funded by USAID and the State Department, and with international organizations like World Health Organization and United Nations Educational, Scientific, and Cultural Organization.
- There is a need to find opportunities to build stronger connections with NOAA’s Coastal Services Center, especially the Human Dimensions program. In this area, the climate priorities in the NOAA Caribbean Strategy could be informed to some degree by the hazards priorities.
- Challenges remain in connecting U.S. territorial activities both with the U.S. mainland and the broader international Caribbean region. Political and legal limitations on U.S. territories’ ability to engage in regional decision-making are often frustrating; territories have often lacked a presence in regional dialogues while sitting in the shadow of U.S. mainland activities. An example of this is the Caribbean Coastal Ocean Observing System (CariCOOS); funding comes from NOAA, and while it is necessary to work through and with the mainland, it is important to expand

interactions with regional partners on ocean observations. It may be possible to work with the CCCCC to help promote territorial engagement in regional climate activities and minimize some of these within-region barriers.

- A number of meeting participants reinforced the need to continue improving communication networks and pathways, support increased education on climate issues, and identify resource streams for climate change response activities.

In addition to comments made during the plenary and breakout sessions, a small group of NOAA individuals representing four line offices (National Weather Service (NWS), NOS, NESDIS, and OAR) met with Dr. Leslie in a special side meeting to discuss challenges and opportunities under the existing NOAA-CCCCC Memorandum of Understanding. Dr. Leslie expressed interest in having NOAA experts assist in technical training, and would be able to support the travel of CCCCC staff to NOAA courses (e.g., CSC trainings; Cooperative Program for Meteorology, Education and Training). The group also identified coastal and marine issues as a key area for collaborative work. Finally, Dr. Leslie agreed that the CCCCC could serve as a mechanism for U.S. territories to become more involved in activities across the Caribbean region.

## Enhanced Multi-hazard Monitoring, Forecasting, and Risk Management

### PRESENTATIONS

- An assessment of tropical severe weather and the growing tsunami coastal threat in the Caribbean (Bill Proenza, NOAA National Weather Service)
- USVI emergency management (Elton Lewis, Virgin Islands Territorial Management Agency)
- NOAA support to safe navigation (Michael Henderson, National Ocean Service)
- Ongoing risk and coastal hazards mitigation efforts in the U.S. Caribbean (Dr. Aurelio Mercado, University of Puerto Rico)

### Summary

Mr. Bill Proenza kicked off the session by providing a presentation on Caribbean-related threats to life from hazards, particularly those associated with weather and tsunami (see [Tropical Severe Weather and Tsunami Threat](#)). Mr. Proenza began with an overview of NOAA's NWS, its origination, and its mandates. He highlighted the fact that the NWS provides a broad range of services, around the clock, to the Nation and the Caribbean region, including bulletins, outlooks, forecasts and warnings from its Weather Forecast Offices (WFO), River Forecast Centers, Radar Operations Centers, Tsunami Centers, and Central Weather Service Units. Mr. Proenza highlighted the major weather hazards impacting the U.S. and Caribbean islands including tornadoes, floods, and hurricanes. Included in this discussion were the impact of changes in the El Niño and Southern Oscillation signal and its possible impacts to the 2012 hurricane season.

Mr. Proenza continued his presentation by discussing the prevalence and impacts of severe weather and other extreme events disasters across the U.S. in the past few decades, but focusing primarily on tsunamis and flash floods. The discussion continued with a comparison between the Indian Ocean and Caribbean basins and the number of catastrophic tsunami events that have occurred in the two basins in the last century. The conversation included reference to the increasing vulnerability to tsunamis in the Caribbean brought about by both coastal population and tourism growth. He also discussed the NWS Emergency Management Weather Information Network and its potential role in the Caribbean. Mr. Proenza closed the presentation with a discussion of NOAA's efforts to make the Caribbean more tsunami-ready, including the recent launching of the USVI Tsunami Plan in February 2012.

Mr. Lewis, Director of the Virgin Islands Territorial Management Agency (VITEMA), described the efforts of VITEMA and the many challenges facing hazard awareness, preparation, and response in the Virgin Islands and broader Caribbean region (note that a slide presentation was not provided). Mr. Lewis described the responsibility VITEMA has for ensuring the Territory's resilience to disasters. These efforts include building and sustaining effective partnerships with federal, state, and local government agencies, and with the private sector focused on ensuring the ability to rapidly recover from natural disasters, both large and small.

Mr. Lewis also discussed recent efforts in VITEMA to bolster support for hazard preparedness in response, including efforts to launch a Tsunami Incident Plan and a Territorial Hazard Mitigation Plan.

Mr. Henderson, from the NOAA Office of Coast Survey, highlighted that more than 95% of all products delivered to and within the Caribbean are carried via marine transportation and that NOAA's efforts in the Caribbean and elsewhere are committed to ensuring safe navigation, marine safety, and coastal protection (see [NOAA Safe Navigation Support](#)). Mr. Henderson discussed the new charts and updates available for Puerto Rico and the USVI, which can be found at [nauticalcharts.noaa.gov](http://nauticalcharts.noaa.gov). He also discussed involvement with the Mesoamerican-Caribbean Sea Hydrographic Commission and NOAA's efforts to expand state-of-the-art charting and mapping capabilities to member states throughout the broader Caribbean Basin. These efforts involve working with both the International Maritime Organization and International Hydrographic Organization to combine coastal protection initiatives with marine transportation efforts.



*Michael Henderson in San Juan Harbor with Tanker Albane in background.*

*CREDIT: USCG*

Mr. Henderson discussed the expansion of the existing Panama Canal (Post-Panamax), noting that beginning in 2015 the amount of cargo using the Canal is projected to triple, thereby putting additional pressure upon all ports in the region to expand. This expansion will likely create additional dredging and environmental impacts on ecosystems. It was also noted that trade may resume with Cuba, resulting in increased business opportunities in American ports such as Tampa, Miami, Ft. Lauderdale, along with San Juan and the USVI. Mr. Henderson closed by discussing the impacts of developing and emerging technologies, such as how combining an Automatic Identification System (vessel tracking systems) with standard geographic information system (GIS) products will provide additional layers of safety as well as coastal hazard awareness.

Dr. Mercado, representing the University of Puerto Rico/CariCOOS and Sea Grant (see [Ongoing Risk and Coastal Hazards Mitigation](#)), provided a detailed description of the CariCOOS web page ([www.caricoos.org/drupal](http://www.caricoos.org/drupal)), plus an overview of the on-going CariCOOS-sponsored storm surge mapping project for Puerto Rico and the U.S. Virgin Islands, and laid out future plans to include river discharge in the modeling (similar to NOAA's CI-FLOW efforts) for the project. Dr. Mercado described the NOAA-sponsored National Tsunami Hazard Mitigation Program, including the tsunami-ready tide gauges, the TsunamiReady program, the (local) tsunami flood mapping that has already been completed, and the on-going landslide tsunami modeling efforts that are underway.

Dr. Mercado also discussed a white paper being prepared concerning the peculiarities of storm surges and wave action around islands like Puerto Rico and the USVI, including river effects. The effort involves multiple institutions including University of Puerto Rico, CariCOOS, NOAA/NWS WFO San Juan, Integrated Ocean Observing System, U.S. Army Corps of Engineers (USACE) Research and Development Center, Sea Grant, FEMA, NOS Coast Survey Development Laboratory, Puerto Rico Coastal Zone Management Program, USGS San Juan, University of Notre Dame, USACE Mobile District, University of North Carolina, NOAA/NWS/National Hurricane Center, University Corporation for Atmospheric Research, and the NOAA/NWS National Centers for Environmental Prediction. The primary conclusion of the white paper is that models that are suited for the continental shelf do not work as well in the islands setting. Further, it was noted that steep, nearshore topography makes for quick inland rainfall discharge through rivers out to the sea and that additional problems arise when dealing with fringing reefs and mangrove forests. Dr. Mercado closed the presentation by highlighting that the model complications are not limited to storm surge modeling, but also include tsunami models, including the impacts of steep and complicated bathymetry surrounding the island of Puerto Rico.

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## **MODERATED DISCUSSION**

*Moderator: Ruperto Chaparro*

The discussion focused on two primary issues/needs:

- (1) The need to encourage NOAA to investigate additional ways to provide support to Caribbean islands for damages done by natural disasters.
- (2) The need to signify MPAs in nautical charts.

For the former, it was noted that the Pacific region has been working steadily to improve the leveraging of support from the federal government for natural disasters, and that lessons learning might be applied within the Caribbean basin. It was also noted that while NOAA concentrates largely on ecological aspects of recovery from events, it would be good to engage with FEMA on hazard risk management and mitigation. On the issue of MPAs, it was noted that many navigators don't know about the demarcation of MPAs around Puerto Rico and that while navigational charts are set for navigation only, a GIS portal is currently being created to add layers that may signify important areas.

## Next Steps for NOAA in the Caribbean

The 1st Annual NOAA Carib meeting was one of seven priority activities and projects identified by the steering committee for action in FY 2012. Other priority activities that have been accomplished to date include:

- Development and distribution of a quarterly NOAA Carib newsletter ([http://docs.lib.noaa.gov/noaa\\_documents/NOS/NCCOS/noaa-caribbean\\_newsletter/2012\\_Feb\\_v1-1.pdf](http://docs.lib.noaa.gov/noaa_documents/NOS/NCCOS/noaa-caribbean_newsletter/2012_Feb_v1-1.pdf) and [http://noaaoceanscience.files.wordpress.com/2012/08/noaa-in-the-caribbean\\_1august2012-tagged1.pdf](http://noaaoceanscience.files.wordpress.com/2012/08/noaa-in-the-caribbean_1august2012-tagged1.pdf)).
- An electronic mailing list to share information relevant to NOAA Carib within NOAA and with external partners.
- Introducing NOAA Carib to additional partners at other meetings, such as the American Society of Limnology and Oceanography meeting in San Juan, Puerto Rico (2011) and the Gulf and the Caribbean Fisheries Institute meeting in Puerto Morales, Mexico (2011).

As for the next steps, the 15 member NOAA Carib steering committee will continue to meet on a monthly basis. Dr. Lisamarie Carrubba will replace Ms. Dana-Wusinich-Mendez as chairperson and Dana will serve as vice-chair of the committee. Annual rotation of the chairperson is expected. For FY13, priority activities will focus on additional opportunities for coordination with partners, and on communications such as through continuation of the newsletter. Priorities also include updating the mailing list with NOAA and non-NOAA partners and promoting more active use of the list, developing a communications strategy for NOAA Carib, enhancing NOAA internal and NOAA external communications, planning and executing a NOAA Carib 2nd Annual Meeting, and continuing to introduce NOAA Carib to new partners at relevant meetings in the Caribbean.

The steering committee has also identified other priority activities to be accomplished in out-years. Although these activities are not ranked as high as those mentioned above, they are still considered to be important next steps for NOAA Carib, and include:

- Creating a web presence and web calendar for NOAA Carib.
- Identifying priority needs of constituents in the region and communicating partner needs at annual NOAA Carib meetings.
- Identifying region-wide opportunities that can attract resources and completing an inventory of resourcing opportunities.
- Establishing stronger partnerships with regional organizations that can assist NOAA and partners.
- Developing an inventory of information related to NOAA Carib including people, expertise, projects, NOAA line offices and programs, and a one-NOAA portfolio of activities in region.
- Conducting an analysis of inventories to identify overlaps and gaps (assisted by the NOAA Caribbean Strategy).



*VI school group at Nancy Foster open day.*

*PHOTO: NCCOS*

To view any of these documents, follow the instructions to access the Adobe Acrobat file.

## Appendix I. Meeting Agenda

See: [Meeting Agenda](#)

## Appendix II. Attendees

See: [List of Meeting Participants](#)

## Appendix III. Presentations

Introduction to NOAA in the Caribbean (Dana Wusinich-Mendez)

See: [NOAA Carib](#)

NOAA Caribbean Strategy (Jeff Payne)

See: [Caribbean Strategy](#)

Improved Conservation and Management of Ocean and Coastal Ecosystems and Resources

- Ridge to Reef Watershed Approaches to Coral
- Reef Management (Sean Griffin)
- See: [Ridge to Reef Watershed Management](#)
- Watershed Management in the St. Thomas East
- End Reserves (Anne Marie Hoffman)
- See: [STEER](#)
- Conservation of Coral Reef Ecosystems in the
- Caribbean (Ron Hill)
- See: [Coral Reef Ecosystem Conservation](#)
- The Caribbean Fisheries Management Council (Graciela Garcia-Moliner)
- See: [CFMC](#)

Strengthened Understanding of, and Adaptation to, a Changing Climate

- NOAA Climate Services in the Caribbean (David Brown)
- See: [NOAA Climate Services](#)
- Caribbean Regional Climate Outlook (Meredith Muth)
- See: [Climate Outlook](#)
- Puerto Rico Climate Change Council (Ernesto Diaz)
- See: [PRCCC](#)
- Caribbean Community Climate Change Centre (Kenrick Leslie)
- See: [CCCCC](#)
- Caribbean Landscape Conservation Cooperative (Bill Gould)
- See: [CLCC](#)

## Enhanced Multi-hazard Monitoring, Forecasting, and Risk Management

- An assessment of tropical severe weather and the growing tsunami coastal threat in the Caribbean (Bill Proenza)
- See: [Tropical Severe Weather and Tsunami Threat](#)
- NOAA support to safe navigation (Michael Henderson)
- See: [Safe Navigation](#)
- Ongoing risk and coastal hazards mitigation efforts in the U.S. Caribbean (Aurelio Mercado)
- See: [Coastal Hazards Risk and Mitigation](#)
- Note that Elton Lewis of VITEMA gave a talk with no visual aids so there is no PowerPoint presentation available for viewing.

## Appendix IV. List of Posters

See: [List of Poster Presentations](#)



# **NOAA in the Caribbean Initiative 1<sup>st</sup> Annual Meeting Report**

## **NOAA IN THE CARIBBEAN**

Connecting NOAA and Partner's Across the Caribbean

University of the Virgin Islands, St. Thomas,  
May 15-16, 2012

