

# NOAA IN THE CARIBBEAN

CONNECTING NOAA & PARTNERS ACROSS THE CARIBBEAN



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## Protection Beyond Borders for the Humpback Whale

**Stellwagen Bank National Marine Sanctuary's Sister Sanctuary Program Expands Protection in the Caribbean**

With the creation of several new protected sites in the Caribbean, NOAA's [Stellwagen Bank National Marine Sanctuary's](#) (SBNMS) Sister Sanctuary Program (SSP) now provides greater protection for Atlantic humpback whale populations.

In December 2006, SBNMS established the world's first Sister Sanctuary linkage protecting an endangered migratory marine mammal species on both ends of its range, between SBNMS and the Dominican Republic's Marine Mammal Sanctuary. In 2011, the SSP expanded its reach to include a sister sanctuary with the Agoa Marine Mammal Sanctuary in the French Antilles. In 2012, the Government of Bermuda joined the SSP to help protect humpback whales along

the migratory corridor between SBNMS in the Gulf of Maine and the Caribbean.

The SSP emphasizes the critical need to take a broader management view toward trans-boundary conservation of marine mammal species. The program provides critical support for a shared population of almost 1,000 humpback whales, which spend the spring and summer in the rich feeding grounds of SBNMS before heading south to the Caribbean Sea in the late fall to mate and give birth to their young.

"The Sister Sanctuary Program promotes a strategy that helps define emerging problems beyond exclusive economic zones (EEZs), kindles commitment to critical habitats and manifests the true spirit of regional cooperation, which is a key element to ensure effective management for biodiversity protection and the conservation of migratory, marine mammal species," Alessandra Vanzella-Khouri, a programme officer with the United Nations Environment Programme-Specially Protected Areas and Wildlife (UNEP-SPAW) program, said.

Talks between SBNMS and the Dutch West Indies are currently underway to designate the waters of the EEZ around the islands of Saba and St. Eustatius as a legal sanctuary for marine mammals some time this year. The Dutch government also has plans for additional SBNMS Sister Sanctuary partnerships.

"The sister sanctuary program between the Dominican Republic and SBNMS was a shining example of effective cooperation by linking the efforts in

critical habitats for humpbacks, and the Dutch government has resolved to pursue similar relationships with both the U.S. and France as neighboring countries in the region," Paul Hoetjes, nature policy coordinator for the Caribbean Netherlands and Dutch, said.

For more information on the Sister Sanctuary Program, visit: <http://stellwagen.noaa.gov/sister/welcome.html>.

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*A 40-ton humpback whale breaching. Credit: Whale and Dolphin Conservation*

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## Second NOAA in the Caribbean Annual Conference Goes Virtual

### Meeting connects participants to guide NOAA's priorities in the region

This year, NOAA in the Caribbean experimented with online conferencing to bring over 80 participants together from across the U.S. mainland and U.S. Caribbean to help guide strategic priorities for future NOAA activities in the region. The discussions centered around NOAA's new Caribbean Strategy document which outlines a collaborative approach for addressing priority environmental issues and societal challenges in the region.

On January 15, 2014, meeting rooms at 10 physical locations, or hubs, were connected via the web and participants were asked to discuss and prioritize short, medium and long-term goals and objectives related to NOAA's activities in the Caribbean region. The overall aim was to enhance coordination and application of NOAA capabilities, facilitate increased partnering in the region, and, where possible, to attract new resources to address priority needs.

Discussions were centered around three primary goals: (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.

Four of the meeting hubs were located in the U.S. Caribbean and six hubs were located across the mainland U.S. at various NOAA offices. After discussion on each of the primary goals, objectives were prioritized and facilitators at each location shared the results with all participants. Questions and comments from individuals were addressed via a moderated chat facility.

"In terms of how it worked, I think we benefited from having a smaller group of individuals" Marlon Hibbert, facilitator for the St. Croix, U.S. Virgin Islands (USVI) hub and management liaison for NOAA's Coral Reef Conservation Program, said.

The MeetingSphere virtual conference venue remained open for continued discussion for several weeks after the conference. Post-meeting, goal-oriented sessions also took place for detailed discussions on strategies for implementation of the three primary goals.

"While there is no substitute for face to face meetings among partners, the virtual meeting and post-meeting facilitated activities were an effective way to maximize limited resources and conduct the meeting efficiently with minimal environmental impact," Alan Leonardi, chair of NOAA Caribbean, said.

For more information about NOAA's new Caribbean strategy, visit: [http://www.regions.noaa.gov/secar/?page\\_id=276](http://www.regions.noaa.gov/secar/?page_id=276) ■

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## TIDE Rising to Support Sustainable Development in Belize

### Fishers' knowledge exchange and sustainable ecotourism ventures

The Toledo Institute for Development and Environment (TIDE) in southern Belize is taking innovative steps to engage the fishing community and grow their network of research volunteers to promote the sustainable use and management of the area's marine resources from ridge to reef.



Participants in the Utila fisher visit to TIDE Belize Photo: A. Quiñonez

TIDE promotes community participation in developing ridge to reef solutions for sustainable resource use across the region known as the Maya Mountain Marine Corridor. The institute supports dedicated rangers, scientists, educators and community stewards to co-manage a large (100,000 acre) marine protected area (MPA) called the Port Honduras Marine Reserve.

In response to local concerns over fishing pressure, the Fisheries Department in partnership with TIDE and the Environmental Defense Fund introduced Managed Access, a fisheries management tool involving fishers who have a history of conducting commercial fishing in the marine reserve.

The program is already showing signs of success, leading to a fisher-knowledge exchange program in August 2013 where five Honduran fishers, as well as representatives from the Honduran Fisheries Division, visited Belize's Port Honduras Marine Reserve to learn more about the MPA and local Fishers Association.

To further support sustainable MPAs in Central America, NOAA's Coral Reef Conservation Fund and the National Fish and Wildlife Foundation awarded TIDE a grant to develop a paying volunteer scientific ecotourism program as a long-term financing mechanism for the Port Honduras Marine Reserve.





## TIDE Rising to Support Sustainable Coastal Development in Belize

(continued from page 2)

Sustainable financing was identified as a priority need in the [Caribbean Marine Protected Areas Network](#) management capacity assessment for this location.



The new logo for TIDE's pay-to-participate monitoring program.

Titled the "[Ridge to Reef Expeditions](#)" program, volunteers will stay in the local community and assist the Port Honduras Marine Reserve with biodiversity monitoring, applying best practices in line with NOAA science for monitoring status and trends in marine mammals, sea turtles, coral reefs and invasive lionfish. TIDE is now developing science and business plans and acquiring equipment for the program, which is set to begin this year.

This type of support for local capacity building for sustainable marine resource use addresses goals and objectives of NOAA's Coral Reef Conservation Program and NOAA's new Caribbean Strategy.

TIDE and the Bay Islands Conservation Association (Utila) in Honduras are among the 10 MPA partners that are participating in NOAA's FY12-13 Cooperative Agreement with the Gulf and Caribbean Fisheries Institute (GCFI).

For more information on TIDE, visit: <http://www.tidebelize.org/>. ■

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## News from Around the Caribbean

Connecting you with news and updates from NOAA and partners around the U.S. and international Caribbean

### U.S. Caribbean News

#### NOAA in the Caribbean now has a web presence!

The NOAA Carib web page is now available. The site provides Caribbean partners and stakeholders with background information on NOAA Carib, as well as access to products and related resources. There is also a news section with a calendar for timely information about NOAA's engagement in the Caribbean region, so please send news items to the NOAA Carib chair ([Alan.Leonardi@noaa.gov](mailto:Alan.Leonardi@noaa.gov)) or vice chair ([Lisamarie.Carrubba@noaa.gov](mailto:Lisamarie.Carrubba@noaa.gov)) for posting. The NOAA Carib web page can be found on the Southeast and Caribbean Regional Team website [http://www.regions.noaa.gov/secar/?page\\_id=276](http://www.regions.noaa.gov/secar/?page_id=276). ■

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#### Launch of reefconnect.org!

The Nature Conservancy (TNC), NOAA and other partners have launched [Reefconnect.org](http://Reefconnect.org)! This site provides an

interactive space for U.S. Virgin Islands, British Virgin Islands and Puerto Rico relevant news, resources and data. Register online to contribute regionally pertinent news and receive updates on topics that interest you. Check out the forum where this online community can discuss regional topics or view the calendar for regionally-relevant events and opportunities. Join us at Reefconnect.org and look for us on Facebook at Reefconnect! ■

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#### Virgin Islands Marine Protected Area Network

The Virgin Islands Marine Protected Area Network (VIMPAN) now has a web site that provides information on the mission of the network, details on the Coordination Framework and profiles for each of the member MPAs. VIMPAN was established in 2012 with support from a grant to TNC from the Marine Protected Areas Fund, a partnership between NOAA, the Department of the Interior and National

Fish and Wildlife Foundation. The VIMPAN vision is to cooperatively conserve and restore resources across a shared system of MPAs. The group of MPA managers and partners are working to develop a more coordinated collaboration, with greater communication flow among MPAs to address common challenges and build community support. If you are planning projects or research efforts in the territory, please use VIMPAN as a MPA resource in your scoping and planning. Check out the website at [vimpan.reefconnect.org](http://vimpan.reefconnect.org)! ■

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### Questions or Comments?

We want to hear from you! Please e-mail us to subscribe/unsubscribe to the newsletter or to submit any questions, comments and story ideas at: [CaribbeanNews@noaa.gov](mailto:CaribbeanNews@noaa.gov).

*Editorial Note: blue underlined text indicates a live hyperlink. When viewing pages in an Adobe PDF, click to open relevant web pages.*



# News from Around the Caribbean

Connecting you with news and updates from NOAA and partners around the U.S. and international Caribbean

## U.S. Caribbean News (continued from page 3)

### National Coral Reef Monitoring Plan (NCRMP) to survey Puerto Rican reefs

After successfully implementing monitoring protocols in the USVI in 2013, NCRMP will set sights on Puerto Rico in 2014. Fish communities and the seafloor composition of coral reefs will be surveyed by teams of NOAA scientific divers and staff from the Coral Reef Conservation Program and partner agencies at approximately 500 locations around Puerto Rico. The data collected will be analyzed to provide marine managers, and the wider community, with a broad assessment of coral reef status and trends. Survey missions will take place every two years and will be complemented by socioeconomic surveys to better understand how people use and value the resources. NCRMP's goal is to develop a nationally standardized assessment of coral reef communities, as well as support existing monitoring in the region. ■

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*A diver conducting surveys in Puerto Rico. Credit: National Centers for Coastal Ocean Science (NCCOS)*

### NOAA funded monitoring data helps identify resilient Caribbean coral species

A recent study using underwater monitoring data from the NOAA funded Virgin Islands' Territorial Coral Reef Monitoring Program has identified three groups of coral species that show different levels of resilience to seawater warming. The researchers analyzed seven

years of monitoring data. They found that some species (referred to as Type III corals), including common brain coral, lesser starlet and mustard hill corals, survived through the 2005 and 2010 high thermal stress events with little impact on their populations. In contrast, branching corals and foliose corals had high levels of mortality during bleaching in 2005. Star corals had low bleaching, but high levels of mortality from white disease after bleaching had subsided. The study suggests that Caribbean species composition on reefs will change as the result of climate change. The published research can be found at <http://dx.doi.org/10.1890/ES13-00107.1>. Work was supported by U.S. Virgin Islands Territorial Coral Reef Monitoring Program and the NOAA Coral Reef Conservation Program. ■

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### Seafloor mapping to support local coral reef conservation efforts

New marine benthic habitat maps have been developed by NCCOS spatial ecologists to provide essential information on priority sites on St. John and St. Thomas. The maps, which show the location of coral reefs, seagrasses and mangroves, are needed to help assess threats and support prioritization of management actions particularly for Local Action Strategies. The maps provide highly detailed and accurate information for the seafloor down to 40 m depth at Fish Bay and Coral Bay on St. John and for the St. Thomas East End Reserves (STEER) on St. Thomas. Habitats were mapped by analyzing aerial photographs collected by the U.S. Army Corp of Engineers and seafloor bathymetry collected by an airborne laser system flown by NOAA's Office of Coast Survey. To provide even more information NCCOS scientists have added hundreds of underwater photos and some videos of the marine habitats to an online mapping tool. This habitat mapping effort was funded by NOAA's

Coral Reef Conservation Program. Visit <http://maps.coastalscience.noaa.gov/biomapper/biomapper.html?id=STEER> to view the maps. ■

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### Ridge-to-reef study identifies problem watersheds on St. Croix

NCCOS researchers, in collaboration with managers from the St. Croix East End Marine Park, The Nature Conservancy and the NOAA Coral Reef Conservation Program, have completed a report that characterized the MPAs marine environment and watershed condition. The project identified areas where land-based threats, like pollution and runoff, may impact coral reef ecosystems in the park. Maps identifying high, medium and low impact watersheds were provided to managers to support prioritizing of management actions to tackle immediate threats to vulnerable marine habitats and species. The results are now available in a newly released document called *Land-Sea Characterization of the St. Croix East End Marine Park*. Visit <http://coastalscience.noaa.gov/> to download the report. ■

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### 30th U.S. Coral Reef Task Force, St. Croix

Another successful [Coral Reef Task Force](#) meeting, co-chaired by NOAA and Department of the Interior staff, was hosted by the University of the Virgin Islands in November 2013. Representatives from eight federal agencies, two states, five territories and one freely associated state met for strategic discussions on coral reef conservation, ocean planning, public outreach activities, and to share experiences with local reef and watershed restoration projects.



## U.S. Caribbean News

*(continued from page 4)*

A business meeting also took place to highlight the local economic and cultural importance of coral reefs through panel discussions on tourism, watershed protection and climate change impacts on coral reefs. ■

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### New commercial swordfish permit available

A new open-access Swordfish General Commercial permit is available. It allows two swordfish per trip to be sold in the U.S. Caribbean. Authorized gear includes: rod and reel, handline, harpoon, green-stick and bandit gear. The Highly Migratory Species (HMS) Charter/Headboat permit has also been modified to allow commercial swordfishing when not on a for-hire trip. The new permit cannot be held with an HMS Commercial Caribbean Small Boat permit, but can be held with an Atlantic tunas general category permit. These permits are available at <https://hmspermits.noaa.gov>, or at 888-872-8862. The HMS Commercial Caribbean Small Boat permit is available at <http://sero.nmfs.noaa.gov>, or at 877-376-4877. ■

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## International Caribbean News

### Whale Ahoy! Yachters to assist with humpback whale research

In January 2014, CARIB Tails, a Caribbean citizen science project for yachters and cruisers, was launched by the NOAA Stellwagen Bank National Marine Sanctuary to enlist boaters to help track the movement of humpback whales between their North Atlantic feeding grounds and their breeding and calving grounds in the wider Caribbean. Volunteers will take photos of the

tail flukes, the fingerprints for whale identification, to help scientists monitor the movements, behavior and recovery of this endangered species. Sailors will help build the database for this shared population of approximately 1,000 animals by uploading photos of whale tails and locations. This international research project is a collaboration between NOAA and the UNEP-SPA. It aims to share data and collaborate with other humpback whale initiatives in the region. Visit <http://www.caribtails.org> for more information. ■

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*CARIB Tails logo.*

### Sister Sanctuary meeting at 2013 GCFI conference

Representatives from NOAA, the National Park Service and the Mexican government discussed ecological connectivity in the Gulf of Mexico and shared interests in MPA management during a special meeting at the 2013 GCFI conference in Corpus Christi, Texas. This meeting built on efforts for the development of a network of Sister Sanctuaries between MPAs in the U.S. and Mexico. It proved an excellent opportunity for marine managers to meet face-to-face, some of them for the first time. Beyond discussing high priority topics, such as enforcement and coral reef monitoring, an unexpected outcome was sharing of knowledge about marine archaeology. ■

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### SocMon in Turks & Caicos Islands

The Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon) held a training in the Turks and Caicos Islands in August 2013.

The training was attended by 14 participants, including staff and interns of the Department of Environment and Maritime Affairs, representatives of collaborating NGOs and local volunteers, plus a representative from the British Virgin Islands National Parks Trust. An extended SocMon model was successfully tested over the course of the nine-day meeting. The local MPA Princess Alexandra Land Sea Park provided a case study during training and baseline SocMon data is now being collected for three MPAs. The training was provided by Centre for Resource Management and Environmental Studies, with support from NOAA Coral Reef Conservation Program through GCFI. Visit <http://youtu.be/2msbem52RJI> to learn more about SocMon. ■

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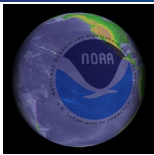
*SocMon training in progress in the Turks & Caicos Islands. Credit: GCFI*

### MPA monitoring at Soufrière Marine Managed Area in St. Lucia

The Soufrière Marine Management Association, Inc. is collaborating with the Australian Great Barrier Reef Marine Park Authority to look at the status of the reefs along Saint Lucia's west coast. The group will also develop the requisite frameworks and protocols for comprehensive decision making regarding the condition and resilience of coral reefs in the Caribbean. NOAA participated in a recent workshop in 2013 that brought together experts from the Caribbean and Australia to develop a protocol that would allow for greater understanding of conditions and trends to inform effective decision-making, especially in the context of adaptive management and climate change adaptation. ■

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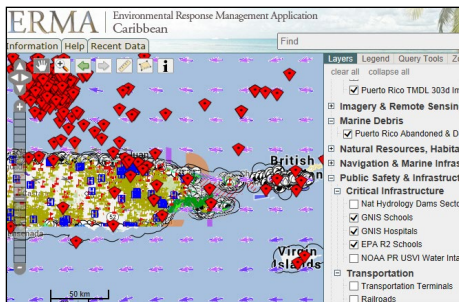


# Data Zone

Here we connect you with NOAA data portals and datasets for the Caribbean that are easily accessible via the internet

## The Environmental Response Management Application

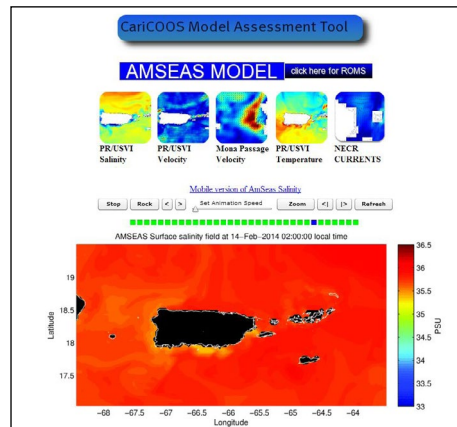
The [Environmental Response Management Application](#)<sup>®</sup>, or ERMA, is a web-based map tool designed by NOAA's Office of Response and Restoration and the U.S. Environmental Protection Agency to assist emergency responders in the event of a chemical spill. The Caribbean ERMA integrates various real-time and static datasets into a single interactive map to make essential data rapidly available to responders and environmental managers coordinated by the multi-agency [Caribbean Regional Response Team](#). Data includes sensitive areas, oceanographic conditions (six to 72 hour forecasts), earthquakes, tsunami travel times, staging areas and command posts, equipment storage locations, critical infrastructure (schools, hospitals, roads, airports) and much more... ■



The ERMA map tool integrates a wealth of environmental response management data.

## CariCOOS Model Assessment Tool

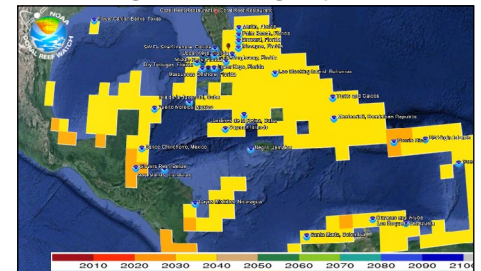
CariCOOS—the United States Caribbean Coastal Ocean Observing System—together with CaRA (Caribbean Regional Association), funded by NOAA, have produced an [animated tool](#) to help visually compare model predictions from models of ocean circulation, sea surface temperature and current velocity. The tool has a point-and-click interface to allow users to select model animations and view them side-by-side so that you can compare, for example, the U.S. Navy AMSEAS model for surface velocity field to the observed geostrophic field. For more information contact [Jorge Capella](#) at the University of Puerto Rico. ■



Explore predictions from models of ocean circulation, sea surface temperature and current velocity using this CariCOOS tool.

## Climate change risk prediction tool on Google Earth

NOAA's Coral Reef Watch has developed a [series of maps, available to view on Google Earth](#), that forecast areas of the Caribbean (and globally) that will be at risk from increased ocean acidification, decreased calcification rates and coral bleaching over the next 100 years. The projections which show that by 2055, 90% of all reef locations will experience severe annual bleaching events, come from a study led by the [Cooperative Institute for Marine and Atmospheric Science](#) in Miami, Florida in collaboration with NOAA scientists. The new Google Earth tool shares updated projections based on an ensemble of climate models from the The Intergovernmental Panel on Climate Change's Fifth Assessment Report. The user can select from a range of climate model scenarios based on different levels of future greenhouse gas production. ■



How might reefs in your area fare? Find out more with this climate change risk prediction tool.

# Profiles in Partnership

Research highlights from the Caribbean with a focus on collaborations between NOAA and partners

## NOAA and the National Park Service Team to Better Understand the Marine Habitats of St. John, U.S. Virgin Islands and How Marine Life Utilize Them

The waters surrounding St. John are home to a mix of marine habitats, many of which are formally protected by the National Park Service (NPS). The NPS oversees the management of the Virgin Islands National Park that spans over 7,000 acres of marine and terrestrial habitat, as well as the more recently established Virgin

Islands Coral Reef National Monument, which encompasses nearly 13,000 acres of marine habitat.

Strong, long-term research partnerships between NCCOS, NPS, the NOAA Coral Reef Conservation Program, U.S. Geological Survey and the territorial government in the USVI,

are supplying NPS staff with the scientific information they need to manage and safeguard these special places.

The most recent results of this collaboration are published in two studies by NCCOS. The first, *Coral Reef Ecosystems of St. John, USVI: Spatial and Temporal*



## Profiles in Partnership (continued from page 6)

Research highlights from the Caribbean with a focus on collaborations between NOAA and partners

*Patterns in Fish and Benthic Communities (2001-2009)*, provides analysis of long-term data on fish, coral and invertebrates to highlight trends in resource condition.

"The information we present in the report establishes a baseline for the entire marine ecosystem surrounding the island of St. John," Alan Friedlander, a biologist with the University of Hawaii and report author, said. "It can be used to support management decisions, such as the ongoing discussions to modify the existing boundary of the Virgin Islands Coral Reef National Monument to include nearby high quality reef habitat."

In a second report, scientists build upon the information in *Coral Reef Ecosystems of St. John, USVI (2001-2009)* by collecting



*The St. Croix East End Marine Park. Credit: Friends of the St. Croix East End Marine Park*

data on fish movement patterns in both managed and unmanaged areas. To do this, researchers tagged and tracked fish in the area over a three-year period. The fish tracking data enabled them to confirm that St John's MPAs are connected by fish movements and that some fish move across the shelf

to spawning aggregations south of St. Thomas. This information identifies important corridors and connected habitats along the southern coast of St. John. These findings are reported in, *Fish Movement Patterns in Virgin Islands National Park, Virgin Islands Coral Reef National Monument and Adjacent Waters*.

"These results show how management units are connected and highlights the need to manage across the seascape among agencies," Friedlander said.

For more information about these projects and to download the reports, visit: <http://coastalscience.noaa.gov/>. ■

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## Resilient Partnerships Remain a Priority in the St. Thomas East End Reserves

From successful coral nurseries and watershed management efforts to regional-scale conservation initiatives, the St. Thomas East End Reserves (STEER) are at the heart of collaborative research efforts in the USVI between NGOs, academic institutions and federal and territorial agencies.

The STEER extends along the southeast coast of St. Thomas, protecting almost 10 km<sup>2</sup> of significant resources, including lush mangroves, sea grass beds, coral reefs, fish and other marine life. The reserves are also adjacent to a large and active landfill, numerous marinas, businesses and residential areas.



*More collaborative science in action: Staghorn coral raised in TNC's coral nursery and outplanted in STEER has created a resilient thicket near Stragglers, a popular dive site. Credit: K. Lewis, TNC*

Examples of current collaborative science include:

- Ongoing efforts to delineate contaminant concentrations (e.g., tributyltin, or TBT, and copper) and reduce flooding into Benner Bay, a high density boating area in STEER. Scientists from NOAA and the Virgin Islands Department of Planning and Natural Resources have conducted sediment core sampling to define the extent of TBT and copper contamination.
- Work by The Nature Conservancy (TNC), NOAA and the Environmental Protection Agency to develop outreach materials to inform boaters of the ills of TBT and copper.
- TNC, NOAA, Horsley Witten Group, Independent Boatyard and others are designing and constructing a drainage project to limit flooding through Independent Boatyard, thereby decreasing contaminant transport into Benner Bay.

TNC and several partners also recently installed groundwater wells in the mangrove wetland interface between

the Bovoni Dump and Mangrove Lagoon, a primary fish nursery area. Results will improve groundwater modeling and determine heavy metal concentrations, further informing us of impacts from the dump on STEER resources.

On a regional scale, STEER will become part of two initiatives announced by USVI Governor John P. DeJongh at the November 2013 Coral Reef Task Force meeting in St. Croix. First, STEER will become a part of the new USVI Territorial Parks System. Second, the acreage protected by the reserves will count towards the territory's goals associated with the Caribbean Challenge Initiative, an effort to effectively conserve 20% of the coastal and marine environment by 2020.

Many of the projects underway in the STEER are directly supported by NOAA. As our projects and partnerships grow, you can keep up with the latest news, at [steer.reefconnect.org](http://steer.reefconnect.org), or look for exciting updates on Facebook at ReefConnect! ■

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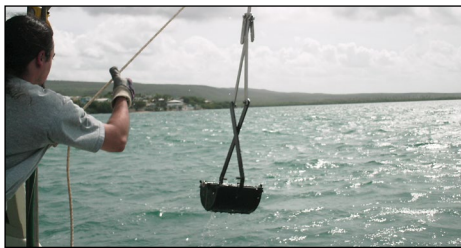




## Study Finds High Levels of Pollutants in Guánica Bay that Represent a Serious Toxic Threat to Corals and Fish

### Effort creates ecological baseline to improve watershed management

A recent study by NOAA and partner scientists found areas in Guanica Bay, Puerto Rico had some of the highest concentrations of PCBs, chlordane, chromium and nickel ever measured in the history of the NOAA National Status & Trends (NS&T) nationwide contaminant assessment program, which began in 1986. These findings are outlined in a new report released by NCCOS: *Baseline Assessment of Guanica Bay, Puerto Rico in Support of Watershed Restoration*.



A scientist deploys a sediment grab. Credit: NCCOS

Researchers also studied the reef's ecology to help establish baseline conditions that coastal managers can use to measure changes resulting from new efforts to manage pollution. Among the items studied were habitat types, coral cover, fish and pollution stressors, such as nutrients, sedimentation and toxic contaminants.

"These concentrations of pollutants represent serious toxic threats to corals, fish and benthic fauna -- bottom dwelling animal life and plants," David Whittall, the report's principal investigator and NOAA ecologist, said. "We also observed lower indicators of biological health, such as how much of the coral covers the sea floor offshore from Guánica Bay when compared to an adjacent study area, La Parguera. Further research is needed to determine if this is the result of the toxins

or some other cause. At this point, we cannot definitively link it to pollution."

The new measurements demonstrate the importance of long-term contaminant monitoring programs like NS&T, which allow new data to be placed in national and historical perspective. Funding was provided by NCCOS and NOAA's Coral Reef Conservation Program. NOAA is the co-chair of the U.S. Coral Reef Task Force, which had designated Guánica Bay as a priority watershed. Project partners included: NOAA's Restoration Center, and the University of Puerto Rico at Mayagüez.

For more information and to download the report, visit: <http://coastalscience.noaa.gov/>. ■

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## Tropical Storms Stir Up Bad Chemistry for Corals

### Unexpected results from long-term monitoring of ocean chemistry

New research led by NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) and the Cooperative Institute for Marine and Atmospheric Studies (CIMAS) at the University of Miami have revealed some unexpected impacts to corals from severe tropical storms.

NOAA scientists and research partners measured ocean chemistry on coral reefs in Florida before, during and after the passage of Tropical Storm Isaac (TS Isaac). This storm, which passed across the eastern Caribbean in late August 2012, caused a prolonged decline in seawater acidity (pH), with depressed aragonite saturation states for a week after the storm had passed.

Aragonite, the carbonate mineral that corals depend on to build reefs, is normally very abundant in the waters around tropical coral reefs. Increasing acidity and decreasing aragonite

saturation in our oceans are known to negatively impact reef building by corals, but this is the first study to document the interaction between ocean acidification and tropical cyclones.

Scientists think the decline in pH was linked to a stressed coral reef community, where reduced respiration led to a build-up of carbon dioxide, making the surrounding water more acidic. Storm-water runoff and the stirring up of corrosive sediment pore waters were thought to be the cause.

"We show, for the first time, that in a high CO<sub>2</sub> world, even modest tropical cyclones have the potential to cause aragonite under-saturation on coral reefs before the end of this century," Derek Manzello, AOML's lead author of the study, said.

Although the measurements were taken in Florida, the results of the study

have broader implications across the Caribbean, where hurricanes and tropical storms occur every year and are predicted to become more frequent as the oceans continue to warm. Their findings have been published online in the *Journal of Geophysical Research: Oceans*.

These data represent the start of a larger-scale effort to conduct long-term monitoring of ocean acidification. This ocean acidification monitoring is funded cooperatively by NOAA's Coral Reef Conservation Program and Ocean Acidification Program.

For more information e-mail: [Derek.Manzello@noaa.gov](mailto:Derek.Manzello@noaa.gov) or visit: <http://www.aoml.noaa.gov/>. ■

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# Upcoming Events & Announcements

A preview of upcoming important events and happenings around the Caribbean and beyond

## Events

### March

**March 15-April 3:** Sea floor mapping mission in St. Croix, U.S. Virgin Islands led by NCCOS

**18-19:** Continuation of the USVI Green Construction Program Training, St. Croix. Contact [Lisamarie.Carrubba@noaa.gov](mailto:Lisamarie.Carrubba@noaa.gov)

**25-27:** Scientific and Statistical Committee meeting, Caribbean Fishery Management Council headquarters in San Juan, Puerto Rico

### April

**22-23:** 149th Meeting of the Caribbean Fishery Management Council, St. Croix, USVI at the Divi Carina Bay Beach Resort & Casino. Open to the general public

**7-14:** Island-Based Scoping Meeting, Caribbean Fishery Management Council. Open to the general public.

April 7 - Arecibo, PR and St Thomas, USVI  
April 8 - Mayagüez, PR and St Croix, USVI  
April 9 - Naguabo, PR  
April 10 - San Juan, PR  
April 14 - Ponce, PR

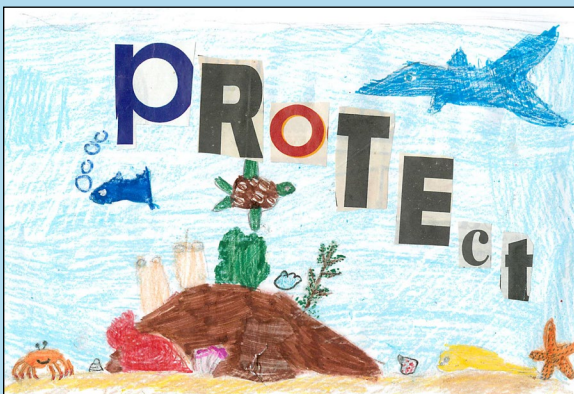
### May

**13-15:** [Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions](#) meeting held in St. Thomas, USVI. Contact [christa.vonh@noaa.gov](mailto:christa.vonh@noaa.gov)

## Announcements

**Grant opportunity:** The NOAA Office of Ocean and Coastal Resource Management issued a request for proposals through its National Estuarine Research Reserve System Collaborative Science Program. Proposals are due March 31, 2014. Contact [Dwight.Trueblood@noaa.gov](mailto:Dwight.Trueblood@noaa.gov) or visit [Grants.gov](http://Grants.gov) for more information.

## SHARE YOUR Underwater Photos & Artwork



Artwork by Molly Pittman, age 8, from Plymouth, UK.

### Announcing the NOAA in the Caribbean K-12 Student Artwork Contest

A picture is worth a thousand words, so we want to hear from you! It's never too early to show an interest in science, oceans and marine life. NOAA in the Caribbean Newsletter is hosting an artwork contest to spotlight marine-related artwork created by students, the future of marine science and conservation.

**Contest Rules:** only original artwork created by K-12 students (or persons under 18) will be accepted. Please mail your entry to:

Alicia Clarke, 1305 East West Hwy., SSMC4 Rm 9245, Silver Spring, MD 20910, USA, or scan an image of your work and e-mail it to [CaribbeanNews@noaa.gov](mailto:CaribbeanNews@noaa.gov).

Be sure to include the following information with each entry: name, age, city/state/country. **The contest deadline is April 15, 2014.** The newsletter team and steering committee will select a winner and a runner up. The winners will receive a small prize and their work will be featured in the spring/summer '14 issue.



## **NOAA in the Caribbean Newsletter Editorial Team**

Please e-mail us at [CaribbeanNews@noaa.gov](mailto:CaribbeanNews@noaa.gov) to subscribe or unsubscribe to the newsletter or to submit any questions, comments, story ideas, artwork and photographs. *NOAA in the Caribbean Newsletter* is produced by NOAA's National Centers for Coastal Ocean Science for the Southeast and Caribbean Regional Team. Contract labor was provided by CSS-Dynamac.

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