

NOAA IN THE CARIBBEAN

CONNECTING NOAA & PARTNERS ACROSS THE CARIBBEAN



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Puerto Rico's Northeast Ecological Corridor Reserves

NOAA scientists support Puerto Rico in new Ridge-to-Reef planning

In 2011, Puerto Rico established the first of a new generation of managed areas that operate from summit to sea. The Northeast Ecological Corridor Reserves in northeast Puerto Rico were originally designated as a terrestrial ecological corridor until a marine component with existing reserves was added to create a new integrated land-sea ecological corridor. In February 2015 the NE Reserves, together with the entire island of Culebra, were chosen as the Habitat Blueprint Focus Area for the Caribbean. The vision of NOAA's [Habitat Blueprint](#) is to help coordinate efforts to maintain or create conditions that promote healthy habitats to sustain resilient and thriving marine and coastal resources, communities, and economies.

In addition to the marine reserves, recognized as one of Puerto Rico's coral reef priority areas, the network of land reserves encompass the United States' only tropical rain forest at El Yunque National Forest. Yet, as with so many Caribbean islands, there are noticeable human impacts and threats to ecosystem health. The Reserve's marine waters receive large volumes of sediment, nutrients and contaminants through runoff from land, particularly after rainfall events, and the region is home to 75% of Puerto Rico's recreational vessels.

In response to the need for a comprehensive land-sea management plan, the Department of Natural and Environmental Resources (DNER), the Puerto Rican agency in charge of managing this protected area, is working with NOAA's CRCP to create a management plan that balances resource protection and resource use. To support strategic zoning, the plan will use local scientific expertise and underwater data to identify priority areas and potential threats. The project team is composed of a mix of ecologists, social scientists and oceanographers. Through DNER's Cooperative Agreement with CRCP, and in collaboration with the U.S. Forest Service, watershed assessments are underway for the land portion bordering the marine waters of the NE Reserves.

"Recognizing the value of this area to local communities and the importance of managing connectivity between land and sea, the ridge to reef approach has been essential to ensuring that all stakeholders join forces" said Chris Jeffrey, project co-lead at NOAA's Biogeography Branch.

Through the NE Reserves Marine Management Plan development process, the scientists intend to make existing data and large amounts of new information available to managers and planners to help

locate special and vulnerable places and potential threats from human uses. Products will include an online spatial data planning tool and draft management plan, available at the end of 2015. More information can be found on the [project page](#). ■



The sand cays of Arrecifes La Cordillera are popular for recreation. Credit: Antares Ramos

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Diverse and productive seascapes of Puerto Rico's Northeast region. Credit: Gustav Kagesten, NOAA.



NOAA issues Best Management Guidance for Marine Aquaculture

Best Management Practices (BMPs) are now available to guide siting, permitting, and operation of marine cages for aquaculture in the U.S. Caribbean. The past four decades have seen a rapid global expansion of marine aquaculture in response to increasing seafood demand and in the wake of plateaued wild fisheries production. Production in the U.S, however, has remained at low levels in part due to concern about potential environmental impacts. Past and current marine aquaculture practices have demonstrated the need for proper management to avoid negative impacts to the marine environment, and much effort has been put into developing more sustainable marine aquaculture technologies and practices. Examples from the U.S. and elsewhere demonstrate that properly sited and

managed marine aquaculture operations can be environmentally sustainable while coexisting with other coastal uses and safeguarding the ocean. There is growing interest in the U.S. Caribbean in establishing a marine aquaculture industry to produce seafood for local and export markets, reduce pressure on reef species, and provide economic opportunities for coastal communities. Given the presence of sensitive coral reef habitats in the area, coastal managers and researchers, including members of the U.S. Coral Reef Task Force, have expressed concern about the environmental risks of marine finfish cage culture near coral reefs. In response to these concerns, NOAA's Aquaculture and Coral Reef Conservation Programs, Puerto Rico Sea Grant, and the Gulf and Caribbean

Fisheries Institute hosted a workshop in San Juan in 2010 to facilitate exchange of scientific and regulatory information regarding marine cage culture.

Following the workshop, a team of over 20 experts and partners including coral reefs and aquaculture scientists, industry representatives, and environmental NGOs have developed BMPs for sustainable marine finfish aquaculture in the Caribbean region. The BMPs are a resource for stakeholders including farm owners, coastal managers, community planners, and federal, state and local regulatory agencies. The [report](#) is now available for download. These BMPs are voluntary guidelines providing a roadmap to effectively site, permit, and operate sustainable aquaculture operations. The BMPs provide an overview and recommendations on ecological effects, water quality, fish health, feeds, human dimensions, permitting, siting, monitoring, and reporting. ■

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Cage used in marine aquaculture. Credit: Doug Perrine. Seapics.

News from Around the Caribbean

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

New topographic coastal surveys of the U.S. Caribbean

NOAA's Remote Sensing Division of the National Geodetic Survey recently began a multi-year airborne laser topographic and bathymetric survey of the coastal and nearshore areas of Puerto Rico and the U.S. Virgin Islands. The survey uses a LiDAR (Light Detection & Ranging) sensor to collect elevation data that can be used to build a 3D model of the terrain. This project collects data to update NOAA nautical depths, some of which can be 90 years old. Upon completion, the LiDAR project will provide the [Office of Coast](#)

[Survey](#) with an accurate shoreline that can be used to support a wide range of coastal management and marine habitat studies such as flood risk modeling. ■

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High tech mission for mapping fish habitat

In March 2015, NOAA's R/V Nancy Foster will be conducting a research mission in the USVI to map and survey seafloor

habitat important to the commercial red snapper fishery. The [NCCOS](#) research team will be collecting data on seafloor structure and fish simultaneously using multi-beam and split-beam acoustic sensors. The team will also deploy state-of-the-art autonomous vehicles and remotely operated vehicles to photograph and film the marine life in these remote areas. ■

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U.S. Caribbean News (continued from page 2)

How far do fish come to spawn?

Researchers at the University of the Virgin Islands, supported by NOAA's Coral Reef Conservation Program, are studying the timing and movement of dog snapper and Cubera snapper during spawning aggregation season along the south shelf of St. Thomas, USVI. The project aims to identify migration patterns and determine area requirements for individual fish to support sustainable fisheries. Currently, 29 dog snapper and 22 Cubera snapper have been implanted with acoustic tags, which are detectable by an array of underwater receivers. Preliminary data reveals that individuals of both species are repeatedly traveling >30 km to reach the aggregations, which occur 1-2 weeks after the full moon throughout the summer. ■



Researchers from UVI tagging a snapper. Credit: Jess Keller

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Socioeconomic monitoring for U. S. coral reef jurisdiction

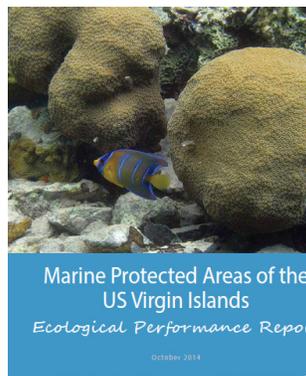
The socioeconomic component of the National Coral Reef Monitoring Program (NCRMP) is measuring and tracking trends in a number of socioeconomic indicators, including demographics in coral reef areas, human use of coral reef resources, as well as knowledge, attitudes, and perceptions of coral reefs and coral

reef management. The overall goal of the socioeconomic monitoring component is to track relevant information regarding each jurisdiction's population, social and economic structure, the impacts of society on coral reefs, and the impacts of coral management on communities. In 2015, the [socioeconomic](#) team has completed monitoring activities in Florida and American Samoa and will be working in Puerto Rico and Hawaii in 2016. ■

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Are marine protected areas working in the U.S. Virgin Islands?

NOAA's National Centers for Coastal Ocean Science (NCCOS) and the Department of the Interior's National Park Service (NPS) have released a report on the status and trends of biological communities within and around federally managed marine protected areas (MPAs) of the U.S. Virgin Islands (USVI). Results from a decade of underwater surveys revealed that regardless of differences in fishing regulations, none of the assessed MPAs in the USVI exhibited an increase in fish biomass, fish species richness, or the abundance of herbivorous fishes on coral reefs inside their boundaries. The NCCOS Technical Memorandum [187](#) highlights some of the many factors that could account for MPA performance.



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RV Okeanos Explorer investigates depths of the U.S. Caribbean

Beginning in February 2015, NOAA's Office of the Ocean Exploration and Research will lead a three-cruise expedition aboard the NOAA ship Okeanos Explorer to survey unknown deep water regions around Puerto Rico and the U.S. Virgin Islands. Okeanos Explorer, a 224 foot, T-AGOS class vessel, is equipped with cutting-edge telepresence technology that allows researchers from around the globe to participate in real time via the internet. Leg 2 of the mission from 16th to 3rd April will map the seafloor followed by Leg 3 from with internet linked streaming video from a remotely operated vehicle. For more information about the expedition (including how to participate), please contact Lieutenant Brian Kennedy. ■

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ROV deployment from NOAA's RV Okeanos Explorer. Credit NOAA

Questions

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.

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

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

Novel genetic study of disease response in Caribbean corals

Stressors such as elevated sea temperature and pollution have intensified coral disease outbreaks, resulting in major die-offs of important reef building corals in the Caribbean. A NOAA funded study is the first to compare genetic responses by corals to multiple diseases. The research, led by scientists from Pennsylvania State University and University of the Virgin Islands, demonstrated that elkhorn coral and boulder star coral suffered similar impacts to their core defense systems, such as inflammation, but distinct differences occurred between diseases. Healthy and diseased samples showed distinct genetic expression profiles which can help to identify biomarkers for coral health in the Caribbean. ■

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workshop was convened in Barbados during the 67th Gulf and Caribbean Fisheries Institute (GCFI) conference. The workshop focused on identifying minimum fishery-dependent data collection needs to inform stock assessments in the wider Caribbean region, identifying options for enhancing sampling efficiencies, and improving stakeholder involvement. Case studies were presented describing historical and current fishery-dependent data systems in the region. Participant discussions focused on synthesizing best practices for biological collections sampling, engaging stakeholders, and using simulation studies to increase efficiencies in data collection. A final workshop report is planned for Spring 2015. ■

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NOAA staff contributed to Cartagena Convention

Representatives from three NOAA Line Offices participated in the U.S. delegation to a series of biennial meetings of the Caribbean Environment Program (CEP) and its Convention for the Protection and

Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) in Cartagena, Colombia during December 8-13, 2014. The NOAA staff worked to advance policy in ocean acidification, marine protected areas, oil spill prevention, and marine pollution. ■

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New lionfish web portal launched

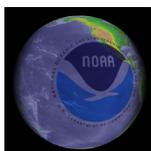
NOAA have partnered with the GCFI to launch a new web portal that provides managers, researchers, and the public with the latest information on the lionfish invasion in the Atlantic. The authors of the Invasive [Lionfish Web Portal](#) include NOAA scientists and policy experts, non-profit environmental groups, academic scientists, and coastal managers from the Southeast U.S., Caribbean, and Gulf of Mexico. The interactive site provides training videos, fact sheets, management plans, guidelines for monitoring, a discussion forum and a lionfish distribution map. ■

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International Caribbean News

NOAA sponsored workshop on fishery-dependent data

The first data-limited stock assessment



Data Zone

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

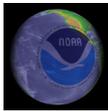
NOAA Online Chart Catalog

The Office of Coast Survey has created an online [map-based tool](#) to provide the public with information about, and access to, NOAA navigation products such as paper and digital charts. The tool allows you to view the outline of the area covered by each product. Selecting a product by clicking the mouse on an outline provides basic information about the product and a link to more detailed information. You can also find charts by drawing a box around an area of interest.



Wreck & Obstructions Database

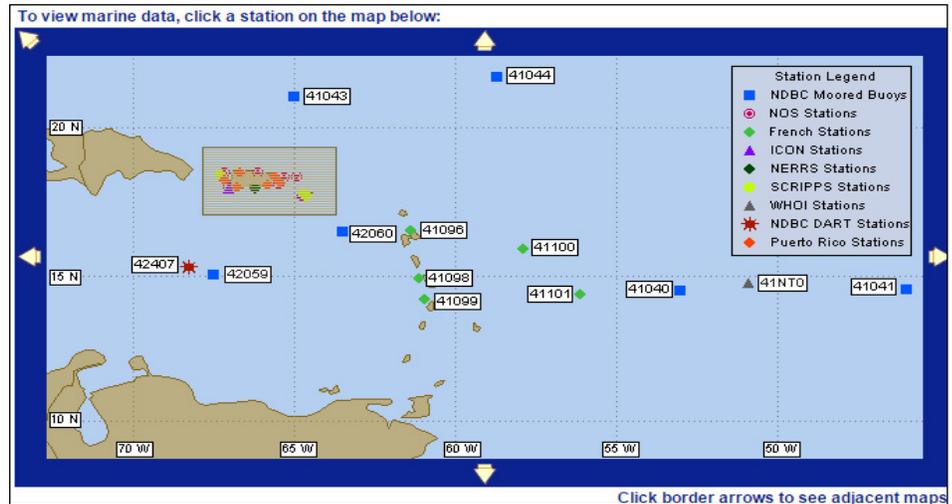
The Office of Coast Survey's Wrecks and Obstructions [database](#) contains information on the identified submerged wrecks and obstructions within U.S. maritime boundaries. The data includes the position of each feature (latitude and longitude) along with a brief description. Information for the database is sourced from the NOAA Electronic Navigational Charts (ENC) and Automated Wrecks and Obstructions Information System (AWOIS).



Data Zone (continued from page 4)

Online viewer for National Data Buoy Center (NDBC)

NOAA's NDBC provides a [map tool](#) to locate data buoys, read the latest measurements or download historical records. NDBC also have locations for ships, gliders and meteorological stations. ■



Profiles in Partnership

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

NOAA scholars study transport of African dust

NOAA's Office of Education and the University of Puerto Rico, Mayagüez are working together to support and educate the next generation of marine and atmospheric scientists in the Caribbean. This article is the second of a three-part Profiles in Partnership series to highlight the special ties between NOAA's Office of Education and a leading university in the Caribbean.

Since 2004, the Saharan Dust AERosols and Ocean Science Expeditions (AEROSE) have been investigating the impacts of aerosols (including Saharan dust and sub-Saharan smoke), transported from the African continent, on the ocean, atmosphere and environmental health

of the tropical Atlantic region. AEROSE missions are supported by NOAA in collaboration with the NOAA Center for Atmospheric Science (NCAS).

These multidisciplinary, trans-Atlantic research cruises aboard the NOAA Ship Ronald H. Brown have produced the most comprehensive available dataset of atmospheric and oceanographic observations on the impact of Saharan dust aerosol transport. During each expedition, AEROSE acquires in situ data which are used to ground truth observations derived from NOAA satellites sensors. Data collected during AEROSE expeditions have also been

participated in the expeditions, including Ramón López-Rosado, Ph.D., as well as students from NCAS and other NOAA Cooperative Science Centers.

Each student on the expedition is assigned a research project that directly supports the mission, and then presents their findings at the end of the cruise. To advance collaborative research in the NOAA-mission sciences and increase the diversity of the science, technology, engineering and mathematics workforce, NOAA works with universities through the Educational Partnership Program to build research capacity. For the past 13 years, NOAA has been collaborating with the University of Puerto Rico at Mayagüez to build capacity in physics and atmospheric science. The University of Puerto Rico at Mayagüez is a partner of both the NCAS and the NOAA Cooperative Remote Sensing Science and Technology Center.

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AEROSE VII - NCAS co-hosted an open house aboard NOAA Vessel Ronald H. Brown in San Juan, Puerto Rico, in February 2013

critical to improving global modeling in the tropical Atlantic. During these trans-Atlantic AEROSE expeditions, undergraduate and graduate students work alongside NOAA scientists and NCAS faculty, gaining hands on field experience. Several students from the University of Puerto Rico at Mayagüez have



Keeping track of fishy behavior in Coral Bay, St. John

NOAA scientists use miniature implanted transmitters to track fish movements

For the past year, 75 reef fish have been sharing their daily schedules with NOAA researchers as part of a collaborative study jointly funded by NOAA and the National Park Service (NPS). By way of an underwater array of acoustic receivers, the fish implanted with transmitters are unwittingly clocking in as they swim past receivers moored to the seafloor. The

data is then downloaded and analyzed to provide the time of their movements among the coral reefs, seagrass beds, and mangrove lined coves of Coral Bay. The array is also cleverly designed to reveal the excursions back and forth across the boundary of the Virgin Islands Coral Reef National Monument (VICRNM).

was “Do fish reside mostly within the protective boundaries of the NPS Monument or do they migrate into adjacent waters that are more intensively fished?” said Matt Kendall, the NOAA biologist leading the three year study.



Tagged fish being released in Coral Bay, St. John.
Credit: Matt Kendall NOAA

Using fish traps, 16 common fish species were captured, tagged and released including grunts, snappers, parrotfish, porgies, groupers, and squirrelfish. Fifteen receiver stations were moored inside Monument waters positioned to provide near complete detection of fish movements inside the protected area boundary. Twelve receiver stations were moored outside the Monument to provide seamless detection of fish departures from the protected area and an additional 11 receiver stations were moored directly on the boundary. An important question for NPS managers

NOAA plans a return to Coral Bay in 2015 to retrieve the receivers from the seafloor, download the records of fish movements, and analyze the information to determine the home range habitats, movement scales, and frequency of VICRNM boundary crossing for each fish. [The research](#) not only provides insight into the movements and general ecology of the fish species being tracked, but also measures how effective the VICRNM boundary may be in protecting them. ■

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SHARE YOUR Underwater Photos & Artwork

A picture is worth a thousand words, so we want to hear from you! Share your best Caribbean underwater and science-in-action stories captured through a camera’s lens or an artist’s pen. Two images will be featured in each issue. Please e-mail your photo or artwork to CaribbeanNews@noaa.gov. Be sure to include your full name, affiliation, a one or two sentence description and the date the image was made.



Photographer: Jan Paul Zegarra, USFWS, Caribbean Office

Description: Male Hogfish Culebra, Puerto Rico.



Photographer: Jan Paul Zegarra, USFWS, Caribbean Office

Description: Guamá, an orphaned manatee from Guantánamo Bay Cuba that was rehabilitated at the [Manatee Conservation Center](#) in Bayamon Puerto Rico.



USVI Marine Outreach Activities Review

Over the past two years, collaborative efforts between local partners and a team of dedicated contractors funded by the NOAA Coral Reef Conservation Program have supported a comprehensive review of past and current marine communications, outreach and education projects for the U.S. Virgin Islands. The project led by Lia Ortiz, NOAA's Fisheries Liaison on St. Croix, examined reports and interviewed people closely associated with marine outreach and education in the USVI to gather experiences and opinions. The results are available in an [online report](#)

describing existing marine outreach and education programs, and implementation gaps, in the U.S. Virgin Islands (USVI), including a series of recommendations to improve future communication efforts. ■

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Strategizing for Improved Outreach, Education and Communication Pertaining to USVI Marine and Fisheries Management and Conservation



Upcoming Events & Announcements

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

Events

February

22: The NOAA Research Vessel Nancy Foster will cruise from the U.S. Virgin Islands to Jamaica arriving in Montego Bay on 22nd April to conduct surveys for the NMFS Coral Reef Ecosystems Research project.

March

25: CARIBE WAVE/LANTEX Regional Tsunami Exercise, more info [here](#).

April

26: The RV Nancy Foster departs for Cozumel on 26th April and arrives on 5th

Announcements

May to conduct surveys for the Coral Reef Ecosystem Research project and the NMFS Healthy Oceans and Bluefin Tuna Ecology projects. Contact John Lamkin for more information.
john.lamkin@noaa.gov

BAA Grants Opportunities BAA

Broad Agency Announcement (BAA) providing funding for special projects and programs associated with NOAA's strategic plan and mission goals Ref: NOAA-NFA-NFAPO-2014-2003949 – Closing Date: Sept 30th 2015

National Sea Grant College Program 2014 Special Projects Grants Opportunities

National Sea Grant College Program 2014 Special Projects request proposals for special projects associated with the National Sea Grant College Program's (Sea Grant) strategic focus areas - NOAA-OAR-SG-2014-2004033 – Closing Date June 30th 2015

Keep up-to-date with events using the new NOAA in the Caribbean online calendar at: <http://www.regions.noaa.gov/secar/index>.

NOAA in the Caribbean Newsletter Editorial Team

Please e-mail us at 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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