



GUÁNICA BAY WATERSHED UPDATE

Tropical Storm Rains Damaged Rio Loco River Basin

Tropical Storm (TS) Otto hit Puerto Rico in early October with torrential rains that caused flooding, mudslides, and landslides. Twenty-one (21) municipalities were declared disaster areas.

On October 14, 2010, Roberto Viqueira, Louis Meyer and Mario Rodriguez conducted a field assessment of the damages caused by TS Otto to the Rio Loco river basin. During the assessment they found the Rio Loco's riverbanks had eroded, and in some places the entire riverbank was destroyed and water was flowing through into papaya fields. They also observed that debris collected around former railroad structures, creating a dam that diverted the river into fields, and destroying those fields.

The Puerto Rico Department of Natural Resources and Environment (DNRA) helped the farmers to remove the debris. DNRA was unable to remove the old railroad structures, because the collapsed structures were too heavy to be lifted with their machinery. DNRA was able to push the railroad structure to the bottom of the river, so the water now flows over it. Material was not available to reconstruct the riverbank at this time.

NRCS and Partners are looking for alternatives to help restore this site of the Rio Loco river basin as part of the Guánica Bay Project. (contact: Mario Rodriguez, mario.rodriguez@pr.usda.gov).

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Submission Guidance

The Guánica Bay Watershed Update is issued monthly. Please send any notices that you would like to share with the group to Patricia Bradley (bradley.patricia@epa.gov).

Please send photos that support your story and include a caption for each photo.



Rio Loco Erosion and Debris

Debris around former railroad structures

NOAA Coral Reef Survey

Scientists from NOAA's National Centers for Coastal Ocean Science (NCCOS), Center for Coastal Monitoring and Assessment (CCMA), recently returned from a successful field mission to Guánica, Puerto Rico. This mission was a core component of a larger collaborative effort to restore the Guánica Bay watershed and improve the condition of the neighboring coral reef ecosystem. The co-led CCMA/University of Puerto Rico component of this effort includes a baseline assessment of biological resources (fish, corals and seagrass), chemical contaminants, nutrients and sedimentation rates, prior to proposed watershed restoration activities.

UPR is conducting monthly surface water quality sampling for nutrients, as well as sediment trap sampling. Nutrients are being monitored monthly at 23 sites to assess the flux of nutrients from the watershed and from the wastewater treatment facility. Additional samples are being collected after extreme rainfall events. Eleven sediment traps are being used to determine sedimentation rates at fore reef sites as well as inside the Bay. CCMA has also conducted a one-time contaminant sampling mission at 33 sites in and around Guánica Bay where sediments were collected, and 16 sites where coral tissue was sampled. Samples are being analyzed for a suite of approximately 150 organic and inorganic contaminants. A stratified random approach was taken to determine sampling locations. Strata consisted of areas upstream and downstream, as well as inside and directly outside the Bay. This spatial stratification will be used to quantify the extent and distribution of contaminants within the Bay and the nearby coral reef ecosystems. Sampling locations for coral and sediment contaminants were further constrained by the availability of hard and soft bottom, respectively. These habitats were selected using the NOAA Benthic Habitat Map product available at: http://ccma.nos.noaa.gov/ecosystems/coralreef/usvi_pr_mapping.html

There are two components to the NOAA-conducted biological assessment. The first is an *in situ* biological surveys for fish, corals and macro-invertebrates. Using ArcView GIS software, sampling sites were randomly selected within three habitat strata (hardbottom, unconsolidated sediments, mangrove) and the spatial strata described above to ensure coverage of the entire study region. At each site, information for fishes, macro-invertebrates, and habitat were quantified following standardized protocols (see http://ccma.nos.noaa.gov/ecosystems/coralreef/fish_protocol.html). These protocols are standardized throughout the U.S. Caribbean to enable quantification and comparison of reef fish abundance and distribution trends between locations. By relating the data collected in the field back to the habitat maps and bathymetric models, CCMA scientists will be able to model and map species level and community level information. Knowledge of the current status of fish, coral and macro-invertebrate communities coupled with longer-term monitoring will support the evaluation of management efficacy.

NOAA Coral Reef Survey, continued

The second component of the biological assessment involves a refinement of the existing NOAA benthic habitat maps for the study area. Two major improvements include a reduced minimum mapping unit from one acre to one quarter acre and increased coverage into areas formerly classified as unknown. The digital map product is being produced using a technique known as heads-up digitizing where digital satellite imagery will be visually interpreted and habitats delineated in a hierarchical classification scheme. In addition to forming the framework for subsequent biological surveys, the maps will permit a level of change detection that is a result of the restoration activities, for example, in the extent of seagrass.

This information will then be utilized to evaluate the subsequent effectiveness of restoration efforts. Complementary efforts to identify, design and implement appropriate watershed restoration activities are being led by the Center for Watershed Protection, NOAA's Restoration Center and the U.S Department of Agriculture's Natural Resource Conservation Service. Funding for these projects was provided by NOAA's Coral Reef Conservation Program. (Contact: Laurie Bauer, Laurie.Bauer@noaa.gov or Dave Whitall, David.Whitall@noaa.gov).



NOAA diver taking a coral tissue sample



Gray snapper (*Lutjanus griseus*) in seagrass habitat

EPA Funding Opportunities

Fall 2011 EPA Science To Achieve Results (STAR) Fellowships For Undergraduate Environmental Study

EPA, as part of its Science to Achieve Results program, is offering Greater Research Opportunities (GRO) undergraduate fellowships for bachelor level students in environmental fields of study. The fellowship provides up to \$19,700 per academic year of support and up to \$9,500 of support for a three-month summer internship. Deadline: December 9, 2010.

http://epa.gov/ncер/rfa/2011/2011_gro_undergrad.html

8th Annual P3 Awards: A National Student Design Competition for Sustainability Focusing on People, Prosperity and the Planet (P3)

The U.S. EPA, as part of the P3 Award Program, is seeking applications proposing to research, develop, and design solutions to real world challenges involving the overall sustainability of human society. The P3 competition highlights the use of scientific principles in creating innovative projects focused on sustainability. The P3 Awards program was developed to foster progress toward sustainability by achieving the mutual goals of economic prosperity, protection of the planet, and improved quality of life for its people-- people, prosperity, and the planet - the three pillars of sustainability. The EPA offers the P3 competition in order to respond to the technical needs of the world while moving towards the goal of sustainability. Deadline: December 22, 2010.

http://www.epa.gov/ncер/rfa/2011/2011_p3.html#SUMMARY

Environmental Education Grants

EPA's Office of Environmental Education (OEE), Office of External Affairs and Environmental Education, supports environmental education projects that enhance the public's awareness, knowledge, and skills to help people make informed decisions that affect environmental quality. EPA awards grants each year based on funding appropriated by Congress. Annual funding for the program ranges between \$2 and \$3 million. Most grants will be in the \$15,000 to \$25,000 range. EPA is currently working on the Requests for Proposals for the 2011 Environmental Education Grant Program. To be electronically notified when the RFPs are available, use the URL below and sign up by clicking the blue button on the right.

<http://www.epa.gov/education/grants.html>

Personnel Updates

Rob Ferguson is the new NOAA Coral Coordinator for the Guánica Watershed Initiative.

Coral Reef Factoids

Coral Reefs are valued at between \$100,000 and \$600,000 per square kilometer each year (UNEP, 2006)

Just three to four decades ago, coral coverage in the Caribbean was commonly 40 to 60 percent. Now in many areas of Puerto Rico it is less than 10%

The Caribbean has lost half its reef areas since the 1970s

Matthew Kendall, NOAA (in 2001) estimated 756 km² of coral reef in PR so a loss of 50% or more of reef area $756/2 \times \$250,000$ (conservatively) = **Total loss of >\$93 Million dollars a year**



As the World Turns: Real-time Statistics

Worldometers is updated in real time - world statistics on population, government and economics, society and media, environment, food, water, energy and health. You can watch as the number of people born today rises steadily, as the number of hectares of arable land lost due to soil erosion this year grows, and as the carbon dioxide (CO₂) emissions this year speeds upward.

The counters display real-time numbers based on Worldometers' algorithm that processes the latest and most accurate statistical data available together with its estimated progression to compute the current millisecond number to be displayed on each counter based on the specific time set on each visitor's computer clock.

Worldometers is part of the *Real Time Statistics Project*, which is managed by an international team of developers, researchers, and volunteers with the goal of making world statistics available in a thought-provoking and time relevant format to a wide audience around the world. The website is available in both English and Spanish. To display correctly, Worldometers requires that you have JavaScript installed on your browser. In addition, there are known compatibility issues with some browsers, like Konqueror or Safari. Please use IE, Opera, Mozilla or Firefox. Check out the site: <http://www.worldometers.info/>

Submit updates to:

Patricia Bradley
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 305-809-4690



Guánica Bay

Recently Added to the ESC

Advancing the Guánica Bay Watershed Management Plan. (Presentation) This is a pdf of the November 3rd by Bill Fisher and John Carriger (EPA's Office of Research and Development). The presentation briefly reviews the Guánica Bay Watershed Management Plan and the Decision Workshop held in La Parguera this past April, then presents a characterization of the information in terms of overall objective and decision context, fundamental objectives, and means to achieve the objectives. ESC Folder: Presentations (contact: William Fisher fisher.william@epa.gov)

Tropical Storm Otto Damage. (Photos). 15 photos taken by Roberto Viqueira, Louis Meyer and Mario Rodriguez during an October 14, 2010 field assessment of the damages caused by TS Otto to the Rio Loco river basin. ESC Folder: Photos (Contact: Mario Rodriguez, mario.rodriguez@pr.usda.gov).

NRCS and Farmers Work Together to Protect the Guánica Watershed

The Natural Resources Conservation Service (NRCS) is the primary Federal Agency of the USDA that works with private landowners to help them conserve, maintain and improve their natural resources. The Agency emphasizes voluntary, science-based conservation; technical assistance; partnerships; incentive-based programs; and cooperative problem solving at the community level.

In the past year NRCS helped producers in the Guánica-Rio Loco Watershed to voluntarily implement conservation practices that avoid, control, and trap sediment and nutrient runoff; improve wildlife habitat; and maintain agricultural productivity in order to address water quality resource concerns and to enhance the health of the coral reef in Guánica Bay. Within those three categories there are practices listed that are meant to "avoid" the excess application of nutrients onto the field, "control" the amount of sediment and nutrients that are able to runoff the fields into the watershed, and "trap" sediment and nutrients before they make it into the watershed from the edge of the field.

These improvements will be accomplished through a conservation systems approach that will minimize runoff and reduce downstream sediment and nutrient loading. Sediment and nutrient loading contributes to both local water quality problems and the decline in health of the coral reef in the Guánica Bay watershed.

In addition, NRCS, through the Environmental Quality Incentive Program (EQIP) awarded 35 contracts to farmers in the Guánica bay watershed for a total of \$1,491,405.00. Contracts were awarded to eleven farmers in Guánica County, five farmers in Lajas County and nineteen farmers in Yauco County.

NRCS also holds meetings with the local communities and agencies. These meetings provide information to the community about the Guánica restoration program, including projects and funding opportunities. They also provide an opportunity for stakeholders to share their experiences and build a watershed alliance. For all meetings and activities NRCS provides participants with handouts, flyers and other informational material about the Coral Reef Initiative and Farm Bill Programs. (Contact: Mario Rodriguez, Mario.rodriguez@pr.usda.gov)