



# GUÁNICA BAY WATERSHED UPDATE

## Scientists Found Extensive and Biologically Diverse Mesophotic Reefs off La Parguera

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A NOAA funded team of scientists and students from the University of Puerto Rico and the Caribbean Coral Reef Institute (CCRI), in collaboration with the University of North Carolina Wilmington, have found thriving Mesophotic Coral Ecosystems (MCEs) within a 12 mile span off the southwestern coast of Puerto Rico.

MCEs are light-dependent coral communities (and associated communities of algal, sponge and fish species) that occur in depths of 30-100 meters. The scientists are primarily using remotely-operated vehicles (ROV), mixed gas, and rebreather technologies. The goals of the research are to characterize distribution, composition, productivity and susceptibility to stressors.

Mesophotic reefs may serve as potential sources to reseed or replenish degraded shallow-water reefs. They may also serve as essential fish habitat for important species. More information on the survey can be found at:

[http://ccri.uprm.edu/media/Mesophotic\\_Web\\_page/index\\_dcres.html](http://ccri.uprm.edu/media/Mesophotic_Web_page/index_dcres.html)

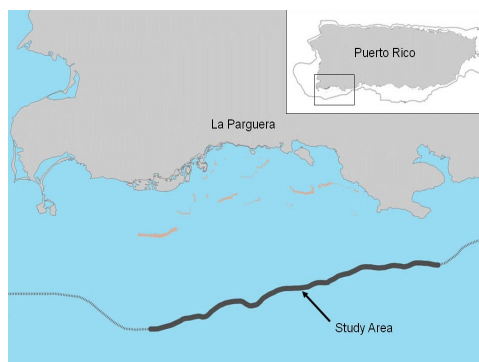


Dr. Richard Appeldoorn, lead principal investigator from CCRI deploying an ROV.

### Submission Guidance

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

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



Study area off coast of La Parguera



At 50 meters the survey found bright blue ascidians, amid sheet corals (*Agaricia*), light green algae (*Lobophora*), and red, orange, and brown sponges.

## 2011 Declared the International Year of Forests

The United Nations General Assembly declared 2011 as the International Year of Forests to raise awareness on sustainable management and conservation of all types of forests. Healthy forest ecosystems are ecological life-support systems. The natural benefits that a forest ecosystem provides are known collectively as “forest ecosystem services”.

Tropical forests provide many valuable products including fruits and nuts, meat, medicines and drugs, tropical plants (such as bromeliads and orchids), lumber, firewood, and charcoal.

Tropical forests also provide a number of services that are vital to human health and livelihood, such as air and water purification, flood and climate regulation, biodiversity, and scenic landscapes. For example, in the Guánica Bay Watershed, forests moderate stream flow. Trees slow the onslaught of tropical downpours, use and store vast quantities of water, and help hold the soil in place. When trees are cleared, rainfall runs off more quickly, contributing to floods and erosion.



Forests provide scenic landscapes such as La Coca Falls in El Yunque National Forest.



Forests provide recreational hiking opportunities. This photo shows people hiking in the Guánica Dry Forest.



The Puerto Rican Tody is a favorite of bird-watchers.

## 2011 ASLO Aquatic Sciences Meeting to be held in San Juan

On February 13-18, 2011, the American Society of Limnology and Oceanography (ASLO) will convene its biennial Aquatic Sciences Meeting in San Juan, Puerto Rico. Scientists from around the world will converge on the Puerto Rico Convention Center (PRCC) to discuss emerging science on limnology and oceanography in a changing world. (Limnology is the scientific study of bodies of freshwater). The goal of this conference is to bring together an international group of freshwater and marine scientists to meet the challenge of global change, exploring diversity and connections across the range of aquatic systems impacted by humans. The ASLO Aquatic Sciences Meeting is a widely recognized venue for scientific exchange across all aquatic disciplines. There will be several presentations that focus on issues in the Guánica Bay Watershed. The full schedule can be found at: [http://www.aslo.org/meetings/sanjuan2011/full\\_schedule.html#sat12](http://www.aslo.org/meetings/sanjuan2011/full_schedule.html#sat12).

## The Guánica Dry Forest—A United Nations Biosphere Reserve

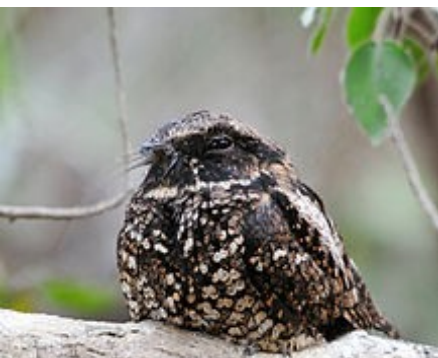
The Guánica State Forest is a subtropical dry forest located within the Guánica Bay watershed. Subtropical dry forests occur in regions where there are several months of severe drought, with most rain falling during a (usually) brief wet season. The absence of precipitation during a prolonged portion of the year is what produces the dry forest, an ecosystem type characterized by plants and animals possessing specific adaptations to survive the dry season.

The forest encompasses almost 9,500 acres (38 km<sup>2</sup>) and is maintained by the *Departamento de Recursos Naturales y Ambientales* (DRNA). Due to its ecological importance, it has been designated as a United Nations International Biosphere Reserve.

The forest offers 36 miles (58km) of trails through four forest types (deciduous trees, a coastal region with tree-size milkweed and nine-foot-tall prickly pear cactus, a mahogany forest, and twisted gumbo limbo trees). It is home to about 50% of Puerto Rico's terrestrial bird species, including the rare *guabairo* (Puerto Rican Nightjar), making it a bird-watcher's paradise.



Cactus at Guánica State Forest.



Puerto Rican Nightjar (guabairo)



Guánica Dry Forest Reserve is one of the most significant dry forests in the world.

## EPA Research Grant Announcement

The U.S. Environmental Protection Agency (EPA), as part of its Science to Achieve Results (STAR) program, is seeking applications proposing the development of assessments, tools and techniques, and demonstration of innovative technologies for providing information and capacity to adequately prepare for climate-induced changes in extreme events in the context of air and water quality management. A goal of this RFA is to seek a better understanding of the hazards (the extreme events) and to establish ways for climate scientists, impact assessment modelers, air and water quality managers, and other stakeholders to co-produce information necessary to form sound policy in relation to extreme events and their impact on air and water quality under a changing climate. Open Date: 01/20/2011. Close Date: 04/18/2011. More information is available at:

[http://www.epa.gov/ncer/rfa/2011/2011\\_star\\_extremeevent.html](http://www.epa.gov/ncer/rfa/2011/2011_star_extremeevent.html).

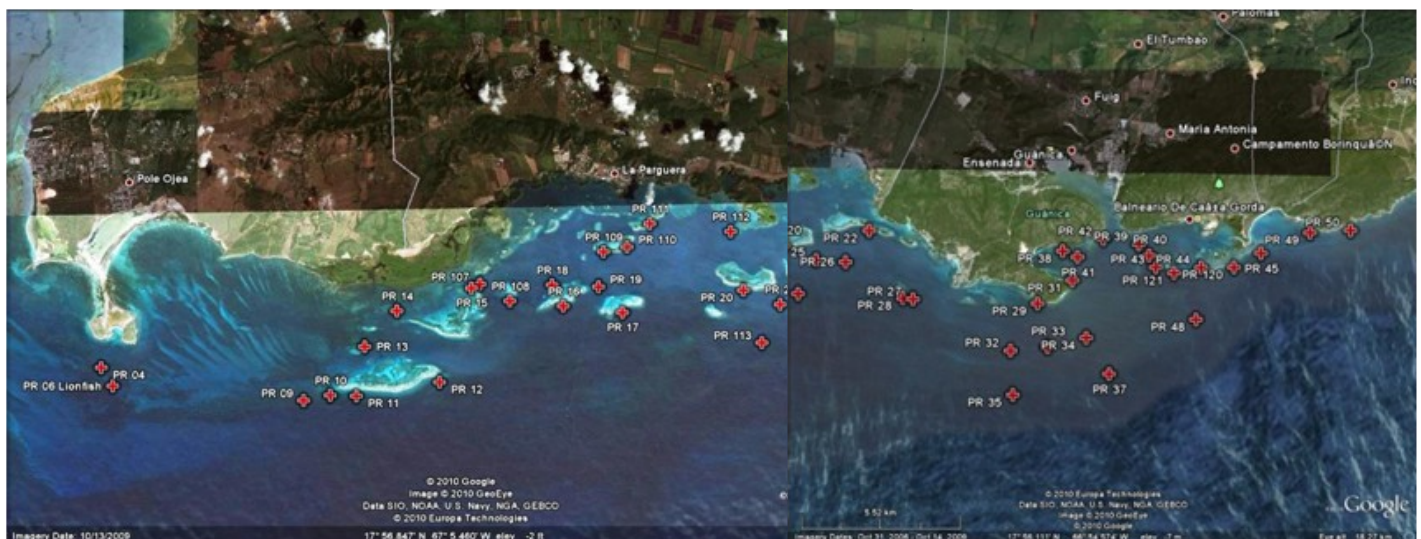


## EPA Coral Reef Survey

In partial fulfillment of commitments to the Guánica Bay Watershed Initiative, USEPA performed a coral reef survey along the southwestern coast of Puerto Rico from November 27-December 15, 2010. The EPA dive team, which included divers from EPA Regions 2, 4 and 6, Office of Research and Development, Environmental Response Team and the U.S. Fish and Wildlife Service, performed 432 dives at 73 stations on shallow hardbottom areas along some 50 miles of coast from Cabo Roja to east of Jobos Bay. Survey teams were housed aboard EPA's Ocean Survey Vessel (OSV) BOLD, which supports up to 20 scientists and is equipped for Nitrox diving (extending the possible diving time). Small dive boats were deployed daily to reach survey locations.



Scientists are housed aboard EPA's OSV BOLD, which deploys dive boats to reach station locations.



Station locations for EPA coral reef surveys near La Parguera and Guánica Bay

The primary objective of this survey was to assess the potential impact of sediments and other watershed stressors on coral reef communities. Pollutants, nutrients and litter enter near shore waters through rivers, streams, waste water and storm water runoff. Areas far from the coast can affect the clarity and quality of water flowing to the reef. The Guánica Bay Watershed Initiative is focused on mitigating pollution from agriculture and urban development in the Guánica Bay Watershed.

Perhaps one of the biggest challenges confronting coral reef managers is distinguishing effects of human activity. One way to evaluate responsiveness is to measure the responses of potential indicators across a gradient of human disturbance. Measurements are made at sampling locations within and progressively removed from an area affected by humans. If human influence is significant, it can alter the responses of indicators that are sensitive to the activity.

## Coral Survey, continued

EPA used this sampling approach to select site locations that may reflect a gradient of human influence. Efforts were targeted to potential stress from watersheds adjacent to La Parguera, Guánica Bay, Guayanilla and Jobos Bay. Sampling locations extend across and beyond the presumed zone of influence.

Assessments included measurements of stony corals, octocorals, sponges, fish and megafauna at each location. Because aquatic plants and animals are constantly exposed to the effects of various stressors, these communities reflect not only current conditions, but also stresses and changes in conditions over time and their cumulative impacts.

Divers followed EPA and NOAA protocols. For stony corals, divers took three simple underwater observations (colony identification, size and percent live tissue). Octocorals and sponges were classified by morphology (shape and structure) and measured. Divers counted fish and identified them by species and size class. Photos and videos were used to document the reef communities observed at each station.

Similar surveys have been performed at St. Thomas (USVI) and along inner reefs of La Parguera (2009). Results of this type of survey, called a 'human disturbance gradient', are used for evaluating which indicators successfully detect human disturbance signals over natural variation, and lead to a better understanding of the type and intensity of stressors that impact shallow coral reefs. Once the links between stressor and condition are established, then reasonable controls in the watershed, such as those proposed in the Guánica Bay Watershed Management Plan, can be implemented and monitored for performance.



Bill Fisher measuring a large Barrel Sponge.



Sherry Vickery measuring octocorals.



Debbie Santavy recording measurements on data sheet.



## Caribbean Regional Alliance

The governments of Puerto Rico and the U.S. Virgin Islands have signed an agreement to coordinate planning for marine and coastal areas around the two U.S. Caribbean territories. Under the alliance, the directors of the coastal zone management programs from Puerto Rico and the U.S. Virgin Islands will be responsible for coordinating scientific research, planning and technical issues at the local and regional levels to promote the sustainable use of marine and coastal resources. Puerto Rico Natural & Environmental Resources Secretary Daniel Galán Kercadó stated “these marine ecosystems include important coral reefs and sea plants that warrant special protection.”



Butter hamlet in coral reef off southern Puerto Rico.

The agreement stems from an executive order issued in June 2010 by President Barack Obama setting a new national policy for strengthening the way the U.S. manages its oceans and coasts, and the Great Lakes. A key tenet of the policy is a zoning process, known as marine spatial planning, that confines some recreational and commercial activities to designated areas. Proponents of the process say it will help balance and manage competing uses of the oceans.

## Guánica Networking Workshop

The National Fish and Wildlife Foundation (NFWF) is a congressionally established nonprofit organization. Its goal is to sustain, restore and enhance the Nation's fish, wildlife, plants and habitats. For nearly a decade, NFWF has worked with the National Oceanic and Atmospheric Administration (NOAA) to build partnerships and leverage resources for effective stewardship of marine and coastal resources, and the communities that depend on them. NFWF has established the Coral Reef Conservation Fund to support NOAA and the US Coral Reef Task Force. The purpose of the Coral Reef Conservation Fund is to build public-private partnerships to reduce and prevent degradation of coral reefs and associated reef habitats (e.g. seagrass beds, mangroves etc.). Since the establishment of the Coral Fund in 2000, the partnership has grown to include several federal and private sector funders.

In December, NFWF hosted a Networking Workshop to bring together recent grant recipients and federal, territorial and non-profit agencies conducting work in the Guánica/Rio Loco watershed. The workshop provided grantees with an opportunity to network amongst themselves and with local agency representatives to learn about the ongoing projects and how everything fits together into the broader effort.

A folder for the workshop has been set up on the EPA Environmental Science Connector's Coral Reefs Puerto Rico project. The folder contains a workshop overview, handouts, and presentations. More information about NFWF and their coral reef programs can be found at: [www.nfwf.org/coral](http://www.nfwf.org/coral).

## US Coral Reef Task Force Meeting

The 25th bi-annual meeting of the United States Coral Reef Task Force (USCRTF) will be held in Washington, DC from February 22-25, 2011. The USCRTF was established in 1998 by Presidential Executive Order to lead U.S. efforts to preserve and protect coral reef ecosystems. The USCRTF includes leaders of 12 Federal agencies, seven U.S. States, Territories, Commonwealths, and three Freely Associated States. The USCRTF helps build partnerships, strategies, and support for on-the-ground action to conserve coral reefs.

The Business Meeting is open to the public and will be held on February 24th at the Department of the Interior Auditorium, 1849 C St, NW, Washington DC 20240. Registration is requested for all events associated with the meeting. More information about the meeting can be found at: <http://www.coralreef.gov/meeting25/welcome.html>.

## Nominations Sought for EPA's Annual Environmental Quality Awards

Each year, the U.S. Environmental Protection Agency (EPA) honors individuals, businesses and organizations that have contributed significantly to improving the environment and protecting public health in New Jersey, New York, Puerto Rico, the U.S. Virgin Islands and eight federally recognized Indian Nations over the past year. EPA is now seeking nominations for this annual award. Winners will be honored at an awards event in April 2011. Each winner will receive a plaque recognizing his or her environmental achievement at a ceremony in late April coinciding with Earth Day. The Agency is accepting nominations for its Environmental Quality Awards until February 22, 2011.

The awards recognize achievement in six categories:

- Individual Citizen
- Non-Profit Organization, Environmental or Community Group
- Environmental Education
- Business and Industry
- Federal, State, Local or Tribal Government or Agency
- Press and Media

For award criteria, prior winners and nomination instructions, visit EPA's Environmental Quality Award webpage at <http://www.epa.gov/region2/eqa>.



Scenes from the Guánica watershed.

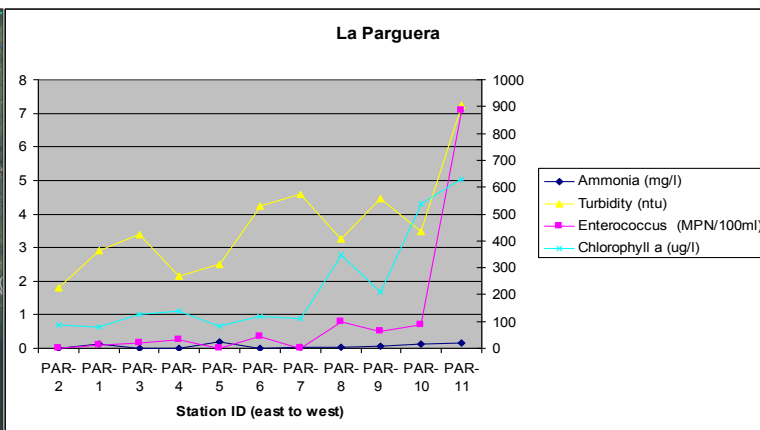
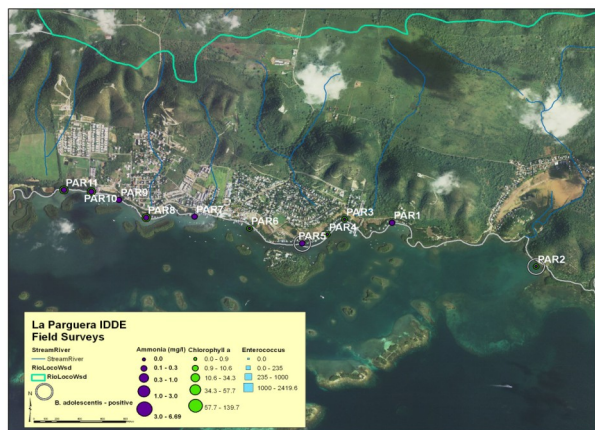
## Sampling in the Guánica Watershed

Nutrient enrichment and fecal contamination can cause environmental degradation to coral reefs, sea grass beds and drinking water and cause significant threats to public health. The Center for Watershed Protection (CWP) and local partners are continuing efforts to work with University of Puerto Rico at Mayaguez and InterAmerican University in San Germán to identify and track land based sources of pollution by tracking sewage, septage and other sources of pollution to their origin so that these sources can be addressed. Existing methodologies developed for the U.S. (<http://cfpub.epa.gov/npdes/>) are being amended to detect illicit discharges in freshwater and the near shore coastal environment in southwest Puerto Rico.

Field crews conducted initial surveys in Guánica Bay, the Rio Loco, Lajas Valley, Yauco and La Parguera in September, 2010. Results of the field work indicate nutrient and bacteria hotspots throughout the surveyed areas. Hotspots were determined based on water quality and physical indicators such as ammonia, bacteria, nutrients and other parameters. Additional field work will be performed in February, 2011, to further isolate the sources of contamination by more intensive sampling of problem areas and conducting drainage area investigations of stormwater infrastructure and tributaries of concern.



Field crews from the Center for Watershed Protection and partner agencies collecting samples.



Station locations (left) and results. Note station #11 is a hot spot for bacteria (Enterococci), sediments (turbidity) and nutrients (chlorophyll a).



## EPA Seeks Applicants for \$1.2 Million in Environmental Justice Grants to Address Local Health and Environmental Issues

The U.S. Environmental Protection Agency (EPA) is accepting grant applications for \$1.2 million in funding to support projects designed to research, educate, empower and enable communities to understand and address local health and environmental issues. Eligible applicants from non-profit, faith-based and tribal organizations working in the community of the proposed project are encouraged to apply.

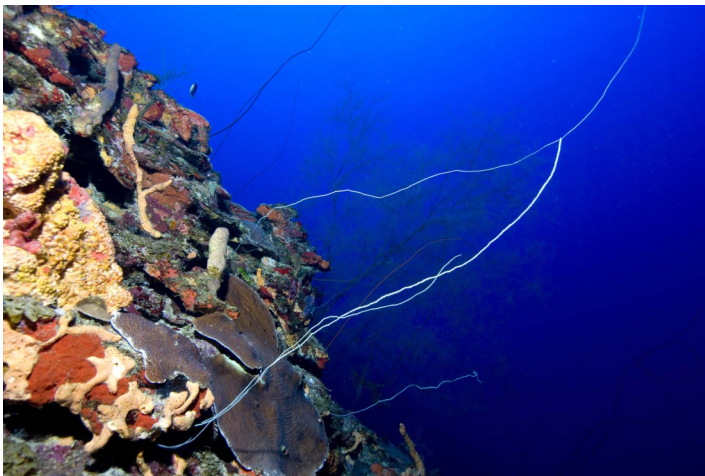
Environmental Justice Small Grants funding is available for two categories of projects:

- 40 grants of up to \$25,000 each to support projects that address a community's local environmental issues through collaborative partnerships, and;
- four grants of up to \$50,000 each to gather better science on the environmental and health impacts of exposure to multiple sources of pollution in communities.

Environmental justice means the fair treatment and meaningful involvement of all people, regardless of race or income, in the environmental decision-making process. Environmental justice issues often involve multiple sources of contamination, like pollution from several industrial facilities within one neighborhood, environmental hazards at the workplace or home, or contamination resulting from the consumption of fish or other subsistence food.

Environmental contamination can lead to costly health risks and can discourage investments and development in low-income, minority, and indigenous communities disproportionately impacted by pollution. Understanding the impacts of multiple environmental risks can help communities develop more effective solutions to their environmental and health concerns.

More information on eligibility and how to apply: <http://www.epa.gov/environmentaljustice/resources/publications/grants/ej-smgrants-rfp-2011.pdf>.



Another view of the Mesophotic corals off the southern coast of Puerto Rico.



Peggy Harris (EPA) and a large Elkhorn coral (*A. palmata*) off the southern coast of Puerto Rico

## Recently Added to the ESC

**Black P and Stockton T. 2009.** Chapter 1- Basic Steps for the Development of Decision Support Systems. In: A. Marcomini et al. (eds.), *Decision Support Systems for Risk-Based Management of Contaminated Sites*, Springer Science Business Media, LLC. There is a growing desire to develop effective and efficient computational methods and tools that facilitate environmental analysis, evaluation and problem solving. Environmental problems of interest may include concerns as apparently dissimilar as revitalization of contaminated land, and effective management of inland and coastal waters. The approach to effective problem solving in both of these examples can involve the development of what are commonly called Decision Support Systems (DSSs). This chapter lays out the rationale for a DSS, the types of DSSs and the steps for developing a DSS. ESC Folder: Reading Room\Decision Support Literature\Decision Analysis Folder (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Borsuk M, Clemen R, Maguire L and Reckhow K. 2001.** Stakeholder Values and Scientific Modeling in the Neuse River Watershed. *Group Decision and Negotiation* 10: 355–373. In 1998, the North Carolina Legislature mandated a 30% reduction in the nitrogen loading in the Neuse River in an attempt to reduce undesirable environmental conditions in the lower river and estuary. The paper describes a decision-analytic approach to modeling the Neuse River nutrient-management problem, focusing on linking scientific assessments to stakeholder objectives. The paper also discusses how the model can then be used by local decision makers as a tool for adaptive management of the Neuse River system. ESC Folder: Reading Room\Decision Support Literature\Objectives Hierarchy (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Bruins RJF, Franson SE, Foster WE, Daniel FB and Woodbury PB. 2009.** *A Methodology for the Preliminary Scoping of Future Changes in Ecosystem Services, With an Illustration from the Future Midwestern Landscapes Study*. US Environmental Protection Agency, EPA/600/R-09/134. This paper presents a new methodology for constructing hypotheses about the potential effects of future change scenarios on ecosystem services. This new methodology offers a well-defined procedure for managing ecological complexity and improving study design. ESC Folder: Reading Room\Decision Support Literature\Objectives Hierarchy (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Keeney RL. 1988.** Structuring Objectives for Problems of Public Interest. *Operations Research* 36(3):396-405. The analysis of problems of public interest requires a broad range of objectives. This paper outlines and illustrates a procedure to constructively involve stakeholders in the process of identifying these objectives. Objectives hierarchies were developed to represent various stakeholders. From these, a combined hierarchy was structured that addressed health and safety; economics; equity; environmental, social, and political impacts; flexibility; and scheduling. ESC Folder: Reading Room\Decision Support Literature\Objectives Hierarchy (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Labiosa WB, Leckie JO, Mumley T, Rytuba J, and Bernknopf R. 2003.** A Decision Analysis Approach to TMDL Implementation Decisions: Mercury TMDLS in the San Francisco Bay Area. *Proceedings of the National TMDL Science and Policy 2003 Specialty Conference*. Water Environment Federation. Environmental decision situations (such as TMDL load allocation) are often rife with uncertainty and controversy, requiring the integration of diverse kinds of information and compromises between diverse interests. This paper describes a decision analysis approach to TMDL implementation decisions for mercury using a hypothetical mine-impacted tributary in the San Francisco Bay as an example. The paper focuses on the use of the Bayesian (subjective) definition of probability, which treats uncertainty as a probability and allows the decision maker to combine various kinds of information into a unified probabilistic framework. ESC Folder: Reading Room\Decision Support Literature\Decision Analysis Folder (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Maguire LA. 2004.** What Can Decision Analysis Do for Invasive Species Management? *Risk Analysis* 24(4) 859-868. Decisions about management of invasive species are difficult for all the reasons typically addressed by multi-attribute decision analysis: uncertain outcomes, multiple and conflicting objectives, and many interested parties with differing views on both facts and values. This article illustrates how the tools of multi-attribute analysis can improve management of invasive species, with an emphasis on making explicit the social values and preferences that must inform invasive species management. ESC Folder: Reading Room\Decision Support Literature\Decision Analysis Folder (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))



## ESC Additions, Continued

**Maloney KA, Maguire LA and Lind EA. 2000.** *Neuse River Estuary Modeling and Monitoring Project Stage 1: Assessment of Stakeholder Interest and Concerns to Inform Long-Term Modeling.* Nicholas School of the Environment, Duke University, Durham, North Carolina. As input to water quality management models of nutrient cleanup in the Neuse, the authors used public meetings, written questionnaires, and personal and telephone interviews to learn what goals stakeholders have for the cleanup and how they would measure achievement of those goals. ESC Folder: Reading Room\Decision Support Literature\Objectives Hierarchy (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Maxim L, Spangenberg JH and O'Connor M. 2009.** An analysis of risks for biodiversity under the DPSIR framework. *Ecological Economics* 69:12–23. This paper reviews definitions and uses of the Driving Forces–Pressures–State–Impacts–Responses (DPSIR) framework and reframes ‘DPSIR’ using a complex system methodology based on the distinction between four ‘spheres’ of sustainability (environmental, economic, social and political) and the analysis of their functioning and relationships. Within the resulting conceptual framework, each of the five D, P, S, I and R concepts are specified, for application in integrative analysis of relationships between policy, society, economy and biodiversity in one of the world's largest European integrated research projects on biodiversity (ALARM). ESC Folder: Reading Room\Decision Support Literature\Decision Analysis Folder (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Reckhow KH.** *A Primer on Decision Analysis.* Nicholas School of the Environment and Earth Sciences, Duke University, Durham, NC. Decision analysis provides a prescriptive approach for analyzing decisions when outcomes are uncertain. This paper uses everyday and hypothetical examples to illustrate the techniques for rigorous quantitative analysis of decision problems. ESC Folder: Reading Room\Decision Support Literature\Decision Analysis Folder (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Rehr A. 2010.** *The Decision Landscape.* This is a graphic of the generic decision landscape. ESC Folder: Reading Room\Decision Support Literature\Decision Landscape (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Rehr A and Small M.** *Decision Landscape Primer: A Tool for Structuring a Multi-Stakeholder Decision Problem.* This document provides a suite of questions that can be used to help develop a decision landscape, and a decision landscape schematic. ESC Folder: Reading Room\Decision Support Literature\Decision Landscape (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Rehr A and Small M. 2010.** *Decision Landscape for Implementing Additional Wastewater Treatment in the Florida Keys to Reduce Nutrient Loading to Nearshore Waters.* This document provides an example of how the questions in the Decision Landscape Primer can be answered, using information contained in the Florida Keys National Marine Sanctuary (FKNMS) Management Plan. ESC Folder: Reading Room\Decision Support Literature\Decision Landscape (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Smeets E and Weterings R. 1999.** *Environmental Indicators: Typology and Overview.* Technical report No 25. European Environment Agency (EEA). The purpose of this paper is to introduce the EEA ‘Typology of indicators’ and the DPSIR framework (Driving forces, Pressure, State, Impact, Response) used by the European Environment Agency in its reporting activities. This report should help policy-makers to understand the meaning of the information in indicator reports. In addition, we hope the paper will be useful in helping to define common standards for future indicator reports from the EEA and its member states. ESC Folder: Reading Room\Decision Support Literature\Decision Analysis Folder (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

**Von Winterfeldt. 2000.** *Developing Performance Measures for Complex Evaluations: An Introduction and an Application to Upgrading Infrastructure Systems* (draft). School of Policy, Planning, and Development University of Southern California. Performance measures define how decision alternatives should be measured to determine how well they achieve decision making objectives. This paper describes some concepts, suggests some guidelines, and illustrates their use for performance measurement. Throughout the paper, the concepts and guidelines are illustrated with an example that illustrates that the choice of a performance measure can have a powerful effect on the analysis results. The paper concludes by suggesting that the development and choice of appropriate performance measures for complex decisions should be a deliberate step, involving technical experts, decision makers, and external stakeholders. ESC Folder: Reading Room\Decision Support Literature\Objectives Hierarchy (contact: Brian Dyson, [dyson.brian@epa.gov](mailto:dyson.brian@epa.gov))

## In Memory of Madeleine Cancel and Bob Quarles

We are saddened to report the passing of two stalwart protectors of the Guánica Bay watershed and our nation's coral reefs.

Madeleine Cancel, the Executive Director of Camared, passed away on December 24<sup>th</sup>. Madeleine was committed to educating people and raising the consciousness about the coastline and sea. She organized and participated in coastal clean-ups, bringing together people passionate about protecting the beautiful natural resources of Guánica. One of Madeleine's last organized events was the September 2010 cleanup of the Rio Loco outlet, when a group of volunteers from Camared and Puerto Rico DNRA pruned overgrown vegetation and cleaned up trash. Another recent cleanup was in March 2010 when 63 volunteers removed 118 old car tires and 1013 pounds of trash from the Las Pargas Beach. Madeleine was a powerful force in the Guánica community and will be truly missed. The GuanicaUS website has a place to remember Madeleine (<http://www.guanica.us/guanica/?p=229>)



Madeleine Cancel and her husband, Norman, at Global Clean Water Day 2009 ( left), cleaning up Guaypao in 2008 (center) and the beautiful clean shoreline of Las Pargas after the 2010 cleanup.

Robert L. Quarles, an Aquatic Biologist with EPA's Gulf Ecology Division, passed away December 6th while fighting a long illness at the age of 41. Bob joined EPA in 1995, and had a love of work in the field and at sea. Bob was an active SCUBA diver and a long time participant in EPA coral reef surveys. He was a EPA boat operator, earned the title of Captain from the United States Coast Guard, headed field operations for nutrients and seagrass research, and earlier provided support for EMAP coastal condition surveys. Bob will be remembered for his commitment to EPA's mission, his enthusiasm, and joy of nature, as well as the camaraderie he so willingly shared with his team mates. We will all miss Bob's love of work, family and friends.



Bob Quarles, with his children—Ben and Ashley (left), diving with Jed Campbell (center), and with fellow EPA divers Buddy LoBue and Bill Fisher (right).