

# Coral Reef News

## Volume 8, No. 7

### April 2011

#### FROM THE DESK OF THE PROGRAM MANAGER

On April 22, 1970, the first Earth Day was marked by a nationwide "teach-in" on the environment, community demonstrations in favor of environmental reform, and a CBS News special narrated by Walter Cronkite. Six months later, on October 3, 1970, Congress established the National Oceanic and Atmospheric Administration (NOAA), unifying three of the nation's venerable science agencies—the U.S. Coast and Geodetic Survey, the Weather Bureau, and the Bureau of Commercial Fisheries. Pundits dubbed NOAA “the Whole Earth Agency.” As it turns out, not only does much of America's scientific heritage reside within NOAA; in many ways, every day is Earth Day here.

So, in honor of Earth Day 2011, we wanted to highlight a section of our Website that shows you things you can do—on Earth Day and every day—to help conserve coral reefs, even if you don't live near one. From using compact fluorescent bulbs and making other changes to help combat climate change, to choosing sustainable seafood, to conserving water, to getting involved in reef or beach cleanups, our [‘What You Can Do’](#) page highlights a number of things you can do to help protect reefs. Check it out today and make some changes in your life to ensure every day is Earth Day!



-Steve

#### ANNOUNCEMENTS

**OPPORTUNITY: Professional Development Workshop on Coral Reefs and Climate Change for Teachers from Hawai`i.** This five day professional development workshop for Hawaiian teachers focuses on the science, research and cultural aspects of coral reefs and their susceptibility to climate change. The content of the workshop will follow the National Park Service and COSEE Coastal Trends' educational module on [Coral Reefs and Climate Change](#). Participating teachers will receive a \$600 stipend and some travel reimbursement. The workshop will run from June 20-24 at the [Hawaii Institute of Marine Biology](#), Coconut Island, Oahu (University of Hawaii, Manoa). Register [online](#).

**OPPORTUNITY: Educators' Professional Development Workshops on Coral and Ocean Acidification.** A professional development workshop is being offered to high school and middle school science teachers on three separate dates this June in three Florida locations. The workshop dates and locations are listed in the 'Upcoming Events' section of this newsletter.

## UPCOMING EVENTS

### May

- 14: [2011 Lionfish Derby](#), Long Key, FL.  
14-18: 2<sup>nd</sup> [International Marine Conservation Congress: Making Marine Science Matter](#), Vancouver, BC, Canada.  
26: Webinar: [Coral Reef Scenario Evaluation Tool](#). Register [online](#).  
27: Webinar: [Coral Reef Scenario Evaluation Tool](#). Register [online](#).

### June

- 8: [World Oceans Day](#)  
14: [Teachers' Professional Development Workshop on Ocean Acidification](#), Ft. Lauderdale, FL. Register [online](#).  
15: [Teachers' Professional Development Workshop on Ocean Acidification](#), Miami, FL. Register [online](#).  
17: [Teachers' Professional Development Workshop on Ocean Acidification](#), Key West, FL. Register [online](#).  
20-24: [Hawaiian Teachers' Professional Development Workshop on Coral Reefs and Climate Change](#), Oahu, HI. Register [online](#).

### July

- 17-21: [Coastal Zone 2011](#), Chicago, IL.

### August

- 14: [2011 Lionfish Derby](#), Key Largo, FL.

## CURRENT/UPCOMING MISSIONS

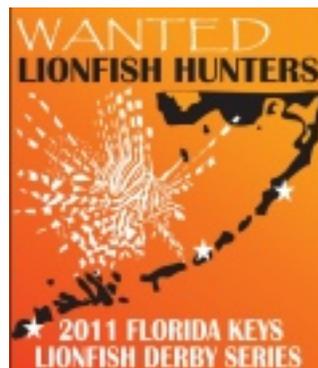
March 10-May 24: [Wake Atoll and CNMI Reef Assessment and Monitoring Program cruise](#), NOAA Ship *Hi'ialakai*.

April 15-May 5: Mesophotic Coral Ecosystems Cruise to PR and USVI, Charter *M/V Spree*.

These workshops will introduce the new NOAA [Ocean Acidification \(OA\) Data-in-the-Classroom Module](#) to teachers, including how to incorporate it into their classrooms. Using integrated scalable lesson plans associated with the module, teachers will learn to use real data from NOAA to teach the concept of OA and how it affects coral reefs and other marine calcifiers. Each workshop will include demos and multimedia to use in the classroom, a background science presentation on ocean acidification, and a walk-through of the five scalable lesson plans and data exercises that are part of this Data-in-the-Classroom project. The workshop will also briefly present the [Water Quality Module](#), aimed at the middle school level, to introduce the topics of corals and watersheds, reading water temperature data, understanding dissolved carbon dioxide, and salinity. Participants will receive a \$75 teacher stipend provided for full-day participation, Master Plan Points/In-Service Points, the full printed OA Module Teachers' Guide, multimedia educational materials, beautiful coral reef posters, and more.

Download the workshop [factsheet](#) (*pdf, 115 kb*) to learn more; view eligibility requirements and register [online](#).

**2011 Lionfish Derbies to Help Remove Invasive Lionfish in the Florida Keys.** Starting in May, divers will once again take to the waters of the Florida Keys in the second annual round of "lionfish derbies" hosted by [Florida Keys National Marine Sanctuary](#) and the [Reef Environmental Education Foundation](#) (REEF). The [inaugural series of lionfish derbies](#) held in 2010 resulted in the removal of more than 650 of the invaders from sanctuary waters.



This year, more than \$10,000 in cash and prizes will again be awarded to the divers who bring in the most lionfish, largest lionfish, and smallest lionfish during the sanctuary/REEF series of tournaments. Teams of four may register [online](#) or pick up registration forms at participating tournament venues. The \$120 registration fee provides each team with a pair of

puncture resistant gloves or a capture bag—important protection from lionfish spines—and two tickets to the derby banquet. The dates and locations for this year's derbies are listed below. Learn more about this invasive species and the derbies, or follow links to videos from last year's derbies, by reading the [press release](#). The workshop dates and locations are also listed in the 'Upcoming Events' section of this newsletter.

**Demonstration of Coral Reef Scenario Evaluation Tool (CORSET) in May.** The Coral Reef Scenario Evaluation Tool is a generic, biophysical model for coral reef systems which couples dynamics from local to regional scales. Interactions between benthic and consumer functional groups at local scales (hundreds of metres to kilometres) are linked across regional scales (hundreds of kilometres to thousands of kilometres) by larval dispersal. The approach is bottom-up; simple components are combined to create a portable framework which can be applied for reef systems anywhere in the world. Model components and outputs are understandable for non-experts, but the system is able to generate complex, emergent patterns. Moreover, there is the facility to incorporate larval connectivity data from sophisticated dispersal models. CORSET is equally applicable as a research tool or as a decision support tool for coral reef management. CORSET will be demonstrated in two Webinars on May 26 at 4 pm EDT and 27 at 7 pm EDT; learn more [online](#). Links to registration pages for each Webinar are listed in the ‘Upcoming Events’ section of this publication.

## UPDATES FROM THE ATLANTIC/CARIBBEAN REGION

**NCCOS Marks 8<sup>th</sup> Year of Mapping the U.S. Caribbean Seafloor.** Researchers with the NOAA [National Centers for Coastal Ocean Science](#) completed a successful seafloor mapping [mission](#) in the US Virgin Islands (USVI) and eastern Puerto Rico aboard the [NOAA Ship Nancy Foster](#) on April 16. The three-week expedition documented coral reefs and fish habitats, derelict fishing traps, uncharted shipwrecks, and dozens of invasive lionfish.

During the expedition, led by the [Center for Coastal Monitoring and Assessment’s](#) (CCMA) [Biogeography Branch](#), scientists gathered a comprehensive suite of sonar and ground-truthing data that will be used to create seamless seafloor habitat maps for use by local managers and researchers. The team surveyed more than 145 km<sup>2</sup> of seafloor, logged 50 remotely operated vehicle dives and visited more than 200 drop camera sites. These data revealed evidence of live and derelict fish traps both inside and outside the [Virgin Islands Coral Reef National Monument](#), the presence of coral disease in certain areas, and over 30 invasive lionfish. The team also observed threatened staghorn and elkhorn coral, and located six uncharted shipwrecks. Work with local agencies is underway to determine if any of the shipwrecks are historically significant.



Mission scientists prepare for a nighttime remotely operated vehicle (ROV) launch. Photo courtesy: NCCOS/CCMA/Biogeography Branch



While at a mid-cruise port visit to St. Thomas, scientists and leaders from the CRCP and CCMA presented the ‘Advanced Underwater Technologies for Sea Floor Mapping & Marine Resource Management Seminar at Sea’ to a group of regional VIPs including Congresswoman Donna Christensen and staff, as well as members of the USVI Senate. Other education and outreach events during the cruise and port visit were aimed at engaging fishermen from the [St. Thomas Fishermen’s](#)

Congresswoman Donna Christensen (center) and several local senators visited the ship on April 8. Photo courtesy: NCCOS/ CCMA/Biogeography Branch

[Association](#), local graduate researchers, and grade school students. Additionally, a freelance videographer reporting for [National Geographic](#), [Getty Images](#) and the [Associated Press](#) joined the mission during leg one of the mission. The mission was also highlighted by [The JASON Project](#) and the [CRCP](#) in online features; view these links for additional information and multimedia from the mission.

**Field Mission Supports Mapping of Coral Reef Ecosystems in SW Puerto Rico.** Scientists with the [National Centers for Coastal Ocean Science](#) traveled to Puerto Rico to collect ground validation data in support of mapping of shallow water benthic habitats (<30m) from March 14-22. The new shallow-water benthic habitat maps will encompass southwest Puerto Rico from Guánica Bay to Cabo Rojo, as well as the Belvedere Natural Reserve on the west coast. The ground validation data collected during the field mission will be used to improve map generation. A combination of drop-camera video and digital pictures was collected at over 500 locations within the two study areas. This work builds on previous digital maps developed by NOAA in 1999. Improvements include a reduced minimum mapping unit, a refined classification scheme and increased coverage into areas formerly classified as unknown. All maps, a satellite imagery mosaic, underwater video, and associated data will be made available online in late 2011.



This *Porites porites* field on a shallow back reef in southwest Puerto Rico was documented by divers during the March survey mission.. Photo courtesy: NCCOS/ CCMA/ Biogeography Branch

This [project](#) represents 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 project is a multi-disciplinary effort with numerous federal and territorial partners, including the CRCP, NOAA's [Restoration Center](#), and the [Center for Watershed Protection](#). The new benthic habitat maps will be included in a [baseline assessment of the ecological resources of Guánica Bay](#) and the surrounding ecosystem; they will also enable change detection in an assessment of the effectiveness of restoration activities on the condition of adjacent coral reef ecosystems.

## UPDATES FROM THE PACIFIC REGION

**Maui Sites Surveyed to Develop Tool for Assessment of Coral Bleaching and Disease Risks in HI.** The [Coral Reef Ecosystem Division](#) of the NOAA [Pacific Islands Fisheries Science Center](#) continued a series of coral disease surveys in partnership with the [Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources](#). During the period of April 18-22, surveys were conducted at Honolua Bay, Kahekili, Keawakapu, and Molokini crater. These surveys are part of the CRCP-funded project, "Environmental Monitoring of Coral Bleaching and Disease in the Hawaiian Islands." This continuing project is aimed at better understanding

the occurrence, abundance, and outbreak of coral bleaching and disease in the Hawaiian Islands through expanded field surveys and in situ and remotely-sensed temperature data. These surveys are intended to provide a better understanding of the annual and seasonal patterns of bleaching and disease prevalence at selected sites across the state of Hawai`i. The results from these surveys will be added to the data previously collected by this project in April–September 2010, as well as the 2010 Pacific Reef Assessment and Monitoring Program surveys around the Hawaiian Archipelago. Comparable surveys are planned for later this year for the islands of Hawai`i and O`ahu.



Left: Ciliate infections (red arrows) on *Montipora capitata* at Molokini, Maui. Right: Tissue loss lesion on a colony of *Porites lobata* at Honolua Bay, Maui. Photos courtesy: NOAA photos by Bernardo Vargas-Ángel

The ultimate aim of this project is the development of an experimental predictive tool, based on satellite-derived sea-surface-temperature metrics, to assess the risk of bleaching and [coral disease](#) in the region. An enhanced understanding of coral disease events and their

likelihood of occurring will allow managers to make better-informed decisions pertaining to the use of the reef ecosystems that they administer.

**PIFSC Mission Removes 15 Metric Tons of Marine Debris in NWHI.** Marine debris, a majority of which is derelict fishing gear, poses a hazard to coral reefs, since it can get caught on corals and other reef biota and potentially introduce alien species, threats to which the highly isolated Hawaiian Archipelago is especially vulnerable. On April 22, the [Coral Reef Ecosystem Division](#) (CRED) and [Protected Species Division](#) (PSD) of the [Pacific Islands Fisheries Science Center](#) (PIFSC) completed a 23-day [mission](#) that included surveys and removal of marine debris in nearshore coral reef environments and shorelines at Midway Atoll and, based on the [NOAA Ship Oscar Elton Sette](#), at other areas in the Northwestern Hawaiian Islands (NWHI), [Papahānaumokuākea Marine National Monument](#). The main focus of this cruise was to resupply or transport personnel and equipment to field camps at six locations in the NWHI where PSD personnel assess and monitor monk seal populations for three-to-six month periods.



CRED staff remove derelict fishing gear from the beach at Midway Atoll. Photo courtesy: NOAA

CRED staff also removed more than 15 metric tons of marine debris, primarily derelict fishing gear, during efforts at Midway, Pearl and Hermes, and Kure Atolls, Lisianski and Laysan Islands, and French Frigate Shoals. Accompanying survey work aids assessment of marine debris accumulation rates in the Hawaiian Archipelago. Since 1996, the CRED [Marine Debris Project](#) and partner organizations have removed 704 metric tons of marine debris in the NWHI. Removing marine debris from coral reefs, surrounding waters, and nearby shorelines reduces habitat destruction, the risk of wildlife mortality, and the potential for introduction of alien species.



CRED staff removes fishing nets and other debris caught on corals in nearshore waters off Midway Atoll. Photo courtesy: NOAA

In a rescue that highlights the threat that debris poses to wildlife, PSD staff at the field camp at Kure Atoll found and freed a Hawaiian monk seal pup (*Monachus schauinslandi*) entangled in a rope the day after the *Oscar Elton Sette* left that atoll. A second pup was freed from entanglement in late April. The first was a younger, yet weaned pup; the second was a yearling. One of the rarest marine mammals in the world, the Hawaiian monk seal is listed as endangered under the *Endangered Species Act*. Most of the 1100 remaining Hawaiian monk seals are located in the NWHI, and this species suffers the greatest reported entanglement rates (averaging 11 seals per year) of any seal or sea lion.

## DIVE DEEPER: DEEP-SEA CORALS

The [Deep Sea Coral Research and Technology Program](#), in collaboration with internal and external researchers, has developed and field tested a new Site Characterization reporting format for information derived from deep-sea surveys. The Site Characterization reporting format is modeled after a successful approach developed by researchers at the [University of North Carolina Wilmington](#), who created the [Southeastern United States Deep-Sea Corals](#) (SEADESC) Initiative with support from NOAA's [Office of Ocean Exploration & Research](#). The establishment of the Site Characterization report will enable researchers from across the country to conduct field surveys in a variety of habitats using a wide range of equipment and techniques and still produce comparable summaries of results that communicate effectively with managers.

The new format includes information on the abundance and density of deep-sea corals, their habitat, and associated species. The Site Characterization report also links information about the physical environment with biological observations. The new report is being used by researchers on the west coast to effectively communicate observations from last year's research cruise aboard the [NOAA Ship McArthur II](#). These reports will be used to inform the [Pacific Fishery Management Council](#) as it conducts a five year review of Essential Fish Habitat (EFH). Thanks go out to the west coast research team for their efforts to pilot and refine the Site Characterization report.

## PUBLICATIONS

**NCCOS Seascape Ecology Research Published in Top Marine Science Journal.** Seascape ecology is a newly emerging multi-disciplinary area of marine science with important implications for the understanding and management of coastal environments. *Marine Ecology Progress Series* (MEPS) Volume 427 has published a theme section titled “[Seascape Ecology: Applications of landscape ecology to the marine environment](#)” coordinated and edited by a researcher from the [National Centers for Coastal Ocean Science](#). Eight manuscripts, several authored by the [Center for Coastal Monitoring and Assessment’s Biogeography Branch](#) scientists, highlight the latest advances in the emerging research frontier of seascape ecology.

This MEPS Theme Section emerged from a special full-day conference symposium at the Coastal and Estuarine Research Federation 20th Biennial Conference held in November 2009. The Biogeography Branch is a global leader in marine spatial analysis and is at the forefront of advancement of seascape ecology research, with particular focus on the ecology and management of coral reef ecosystems.

**Highly Diverse Reef Fish Systems Found Most Vulnerable to Human Threats.** In a two-year, global study, 55 researchers collected the necessary data to determine whether biodiversity influences the efficiency of reef fish systems to produce biomass and, if so, elucidate the role of humans in such a linkage. This study was one of the largest-scale analyses of coral reef fish data and of human influence completed to date. The [Coral Reef Ecosystem Division](#) of the NOAA [Pacific Islands Fisheries Science Center](#) contributed data from surveys of reef fish assemblages conducted as part of its Pacific Reef Assessment and Monitoring Program (Pacific RAMP), which is primarily funded by the CRCP. Pacific RAMP data constituted a significant portion of the total data from the Pacific and contributed greatly to the range of locations included in the study.

In the resulting collaborative analysis, “[Global Human Footprint on the Linkage between Biodiversity and Ecosystem Functioning in Reef Fishes](#),” published in the journal *PLoS Biology*, scientists from 49 nations demonstrated that the ability of reef fish systems to produce goods and services to humanity increases rapidly with the number of species. However, growing human populations hamper the ability of reefs to function normally, and, counterintuitive to expectation, the most diverse reef fish systems suffer the greatest impairments from stressors triggered by human populations. The study documented that the extent of this distress is widespread and likely to worsen because 75% of the world’s reefs are near human settlements and because about 82% of the tropical countries with coral reefs could double their human populations within the next 50 to 100 years. For photos, a press release, and more information, click [here](#).

### *Citations for Additional Publications:*

- Hoeke RK, Jokiel PL, Buddemeier RW, Brainard RE (2011) Projected changes to growth and mortality of Hawaiian corals over the next 100 years. *PLoS ONE* 6(3):e18038. doi:10.1371/journal.pone.0018038
- Hoeke R., Storlazzi C, Ridd P (2011) Hydrodynamics of a bathymetrically complex fringing coral reef embayment: wave climate, in situ observations, and wave prediction. *J Geophys Res* 116, C04018, doi:10.1029/2010JC006170