Coral Reef News
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FROM THE DESK OF THE PROGRAM MANAGER

The 23rd USCRTF Meeting was held at the Department of the Interior building in Washington, DC. Courtesy: NOAA

The 23rd meeting of the US Coral Reef Task Force (USCRTF) was held on February 22-26 in Washington, DC. The Task Force is comprised of 12 federal agencies and the seven US states and territories that contain coral reefs within their boundaries. The USCRTF is charged with coordinating government efforts to protect these valuable resources. Updates on individual and cross-agency conservation initiatives, as well as decisions for the future direction and actions of this body, are a key part of these meetings and contribute to overall US coral conservation successes.

This meeting started on a somber note with the unexpected and sudden passing of one of its own. I wish to express my condolences to the family and colleagues of Sam Hamilton, Director of the US Fish and Wildlife Service.

The week's activities included separate meetings of the US All Islands Coral Reef Committee, the federal agency USCRTF members, and the USCRTF steering committee, followed by the public business meeting on February 24th. Andy Winer, Director of External Affairs, represented NOAA as the co-chair and host of this meeting. Highlights from the business meeting include an update on the status of listing 82 coral species under the Endangered Species Act (see 'Announcements' for more details on this topic) and the announcement of a USCRTF partnership initiative for grant funding from the National Fish and Wildlife Foundation to build local capacity and support for projects that will help restore natural resources in the Guánica/Rio Loco watershed in Puerto Rico. In addition, the White House Council on Environmental Quality (CEQ) gave a presentation that touched on the similarities of the National Ocean Policy that is being created by the White House's Ocean Policy Task Force (OPTF) and the work of the USCRTF. The CEQ expressed the need for the USCRTF to be engaged in this process, including a desire for the USCRTF to share its expertise in the ability to bring together federal agencies, states and territories to work together toward a common goal, link science and research to management and policy, and improve stewardship. While no decisions on USCRTF involvement were decided at this meeting, the members hope to have a discussion at the next meeting on a more formal approach to engaging in the OPTF's activities.

On the evening of February 24th, Chairwoman Bordallo of Guam hosted a reception at the Cannon House Office Building. The reception, as well as many aspects of the meeting, served as a venue for colleagues to have productive face-to-face interactions with contemporaries who are normally widely dispersed around the country.

Monitoring Suggests Some Corals Have Higher Tolerance for Cold. As part of the monitoring efforts to evaluate impacts of the recent cold snap, scientists surveyed some *Acropora* monitoring sites as well as sites containing transplanted corals in Molasses and Conch reefs off of Key Largo, Florida. The transplanted corals are part of the Aquarius Coral Reef Resilience Experiment project and the *Acropora* monitoring sites are part of a long-term demographic monitoring project started in 2004. Both are funded by the NOAA CRCP. The scientists also retrieved temperature loggers deployed at these sites. During the cold snap, sea-surface temperatures at the Molasses Reef Coastal-Marine Automated Network Station off of Key Largo dropped to 60°F—the lethal threshold for tropical corals.

Transplanted *Acropora cervicornis* (staghorn coral) and *Montastraea faveolata* (star coral) at Conch and Molasses reefs were alive and apparently healthy, as were surrounding naturally occurring corals. Temperature data indicate the lowest temperatures experienced by the transplants were still above 70°F at these deeper (45-55ft) fore-reef sites. *Acropora palmata* (elkhorn coral) at a 12ft fore-reef site also appeared un-affected as temperatures fell to just below 60°F for one hour.

However, 97 monitored *Acropora cervicornis* colonies in a 300m^2 area of a patch reef site experienced 100% mortality. This site is approximately 9ft deep and was exposed to temperatures below 60°F for 19 continuous hours, dropping as low as 53.6°F. *Porites astreoides* (mustard hill coral) experienced widespread mortality at this location while some *Montastraea faveolata* experienced partial mortality or were partly bleached and *Diploria labyrinthiformis* (grooved brain coral) colonies were pale. Other species, including *Porites porites* (finger coral) and *Siderastrea siderea* (massive starlet coral) appeared unaffected.

There are widespread reports of substantial cold temperature loss of *Acropora cervicornis* and some other coral species in nearshore habitats of the Florida Keys National Marine Sanctuary. Varying mortality rates between different species at the same reef sites, along with collected temperature data, provide insight into thermal tolerance of coral species and suggest that *Acropora cervicornis* and *Porites astreoides* are less cold-tolerant than other species.

At White Bank Dry Rocks, approximately 90 percent of the Porites astreoides *(mustard hill coral) were completely dead leaving only white exposed skeleton while* Porites porites *(finger coral) and* Siderastraea siderea *(massive starlet coral) were apparently healthy. Courtesy: Dana Williams, NOAA/NMFS*

OF SPECIAL NOTE: FLORIDA COLD BLEACHING

Results from the Multi-agency Monitoring Efforts. During the first two weeks of January, Florida experienced a cold snap resulting in record low air and water temperatures. Water temperatures in some parts of the Keys dropped into the upper 40s and lower 50s — about 20 degrees lower than the typical winter water temperatures. Water temperatures of sixty degrees are considered a lethal threshold for tropical corals. According to an assessment by reef biologists, the influx of cold water from Florida and Biscayne bays appears to be responsible for January's coral deaths in nearshore waters of the Florida Keys National Marine Sanctuary (FKNMS). Fortunately, offshore reefs most frequented by divers and sportfishers were buffered by the warmer waters of the Florida Current and spared severe impact.

Staghorn coral colonies exhibiting 100 percent mortality. The slight degree of algal colonization on the white exposed skeletons is consistent with an acute stress event in the past month. Courtesy: Dana Williams, NOAA/NMFS

Thirty one scientists representing 13 organizations surveyed 78 sites throughout the Florida reef tract from Martin County south through the lower Florida Keys, assessing coral health in the wake of the record low temperatures. Their surveys, conducted January 25 – February 12, revealed that the inshore and mid-channel reefs from Biscayne Bay to Summerland Key were the hardest hit. While all coral species were affected, the impact of the cold water was very distinct from location to location. The Florida Keys sit at the intersection of the warm tropical waters of the Caribbean and the cooler temperate waters of the Gulf of Mexico and the Atlantic Ocean. Water normally changes tidally between the two through channels between the islands. In January, those channels brought in cooler water from Florida and Biscayne bays, resulting in more dramatic temperature drops and subsequent coral death.

The Florida Reef Resilience team, a multi-organization effort spearheaded by The Nature Conservancy (TNC), is normally mobilized for surveys following warm-water bleaching events, and was again called to action for this

cold-water disturbance response monitoring effort. FKNMS, the manager of most Florida Keys coral reef resources, is working with the science community and limiting certain consumptive activities in the hardest hit areas until stressful conditions subside. Survey program partners include TNC, Mote Marine Laboratory, FNMS, the US National Park Service, Florida Department of Environmental Protection, Florida's Fish and Wildlife Conservation Commission, the University of Miami, Nova Southeastern University, John Pennekamp Coral Reef State Park, Broward County, and Miami-Dade County. For more information, read the press release or contact Scott Donahue.

ANNOUNCEMENTS

Public Comment Opportunity: 90-day Finding on a Petition to List 83 Coral Species Under the ESA. On October 20, 2009, the Center for Biological Diversity filed a formal petition seeking to protect 83 coral species under the Endangered Species Act (ESA). These corals, all of which occur in US waters ranging from Florida and Hawai`i to US territories in the Caribbean and Pacific, face a growing threat of extinction due to rising ocean temperatures and the related threat of ocean acidification, both caused by climate change.

NOAA published its 90-day finding in the *Federal Register* (vol 75, pg 6616, *pdf (64 kb)*) on February 10; the agency found that listing of 82 of these species under the ESA "may be warranted." The "may be warranted" finding means that a formal status review of these 82 species will begin and NOAA National Marine Fisheries Service (NOAA Fisheries) has until October 2010 to decide whether to propose to list any or all of these 82 species under the ESA. However, the listing of the 83rd species in the petition, the deep-sea coral *Oculina varicose*, was found not to be warranted.

NOAA Fisheries is soliciting scientific and commercial information from the public regarding the historical and current distribution and abundance, the short- and long-term effects of climate change and other potential threats on their condition, and existing conversation efforts for the other 82 species. More details are available online. The deadline to submit public comments is April 12.

CITES CoP15 to Vote on Proposal to List Red and Pink Corals. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement signed by 175 nations designed to ensure that international trade in wild animals and plants does not threaten their survival. Species covered by CITES are listed in different appendices according to the level of protection that is needed. The CITES Conference of the Parties (CoP) meets every three years; the 15th CoP will meet in Qatar from March 13-15. This meeting will include votes on the petition by the US and Palau to list several shark species, including Hammerheads and Oceanic Whitetip, under Appendix-II. In addition, a vote will be held on the petition by the US and Sweden (on behalf of the European Union) to list all species of red and pink corals of the genera *Corallium* and *Paracorallium* in Appendix II.

A petition to restrict trade in Corallium *species will be voted upon in March. Courtesy: Andy Bruckner, NOAA/NMFS*

The coral petition includes approximately 31 described species and several undescribed species. The proposal includes information on unique life history traits, ecology, population status, threats, extent of harvest and trade for jewelry and curios, and existing management and conservation activities. The US previously proposed *Corallium* for an Appendix-II listing at the 14th CoP in 2007. The proposal was initially adopted; the proposal was then reopened for debate during the plenary session and narrowly defeated. In response to issues raised during that CoP, the CRCP provided partial funding for, and participated in, two workshops on the science, management, and trade in

species in the family Coralliidae. The full workshop proceedings will be available in PDF format and hard copy at CoP 15.

The primary threat to red and pink corals is intensive harvest to supply international demand for jewelry and other products. Their life-history characteristics—extreme longevity, late age of maturity, slow growth and low fecundity—make them particularly vulnerable to over-exploitation. International demand has contributed to serial depletions of most known populations of pink and red corals, and new stocks have been rapidly exhausted shortly after their discovery. Once stocks are depleted, they are not known to recover in an ecologically meaningful time frame. The purpose of the proposal is to ensure that the harvest of specimens from the wild is not reducing wild populations to levels at which survival might be threatened by continued harvesting or other influences.

Currently, over 33,000 species of flora and fauna are listed in CITES. Several types of coral reef species are listed on Appendix-II, including all giant clams (*Tridacna* and *Hippopopus* spp.), queen conch (*Strombus gigas*), seahorses (*Hippocampus* spp.), humphead wrasse (*Cheilinus undulates*), all scleractinian corals, blue coral (*Heliopora*), organ pipe coral (*Tubipora*) and hydrozoan corals (*Millepora* and *Stylaster* spp.). China has listed four species of *Corallium* and *Paracorallium* on CITES Appendix-III.

Species listed in Appendix-II are not threatened with extinction but they may become so if international trade is not regulated. International trade is permitted for Appendix-II species if the exporting country is able to make findings that the specimen was legally acquired and that the export will not be detrimental to the survival of the species. Adoption of an amendment to CITES Appendix-II requires support from a two-thirds majority of the Parties present and voting. Click here to see the full text of the US proposals.

CRCP Places Fellows in Caribbean and Pacific to Conserve Corals. The CRCP is working to groom the next generation of marine resource managers and fill critical support roles in conserving US coral resources on the ground and in the water. The fourth cohort of Coral Reef Management Fellows has been selected to support island coral reef management efforts in American Samoa, the Commonwealth of Northern Mariana Islands (CNMI), Florida, Guam, Hawai`i, Puerto Rico and the US Virgin Islands (USVI). The Coral Reef Management Fellowship program addresses capacity deficiencies in the US Flag jurisdictions by providing technically proficient fellows who have the necessary experience to provide specialized support to jurisdictions in their coral reef conservation efforts. Fellows are provided with professional training and work experience in coastal and coral reef resource management.

Clare Shelton will be working with the Department of Commerce, Resource Management Division in American Samoa; Aric Bickel will be working with the CNMI Division of Environmental Quality; Todd McCabe will be working with Florida's Department of Environmental Protection; Tammy Jo Anderson will be working for Guam's Coastal Management Program; Rina Hauptfeld will be working for the Department of Natural and Environmental Resources in Puerto Rico; Luna Kekoa will work for the Hawaii Division of Aquatic Resources; and Marija Micuda will work for the Division of Coastal Zone Management in the USVI.

The new fellows, along with their supervisors, the fellowship coordinator, and a trainer, met in Hawai`i for their orientation in January. Courtesy: Marci Wulff, NOAA CRCP

They bring with them a diverse set of skills and knowledge, such as technical expertise in watershed and marine protected area management,

UPCOMING EVENTS

March
9-10: Environmental Training for USVI Law Enforcement, St. Thomas, USVI. *By invitation only*.
13-14: Environmental Fair, Cabo Rojo, Puerto Rico.
13-25: CITES Fifteenth Meeting of the Conference of the Parties (CoP15), Doha, Qatar.
18-21: 2010 National Science Teachers Association National Conference, Philadelphia, PA.
18-31: Mapping mission: "Characterization of seafloor habitats of the US Caribbean", eastern PR and USVI waters
20-27: Coral Reef CSI: Underwater Forensics, Little Cayman, Cayman Islands.
27: Education Open House Aboard the NOAA Ship *Nancy Foster*, Charlotte Amalie, USVI. *By invitation only*.
29: VIP/Media Day Aboard the NOAA Ship *Nancy Foster*, Charlotte Amalie, USVI. *By invitation only*.

April
10-11: Environmental Fair, Toa Baja, Puerto Rico.

June
1-5: Coral Disease Outbreak Rapid Response Training, Little Cayman, Cayman Islands.

Research Missions
January 21-April 21: American Samoa and the Pacific Remote Islands Reef Assessment and Monitoring Cruise, NOAA Ship *Hi`ialakai*.

February 11-March 12: Fish 250: mapping and study of fisheries research methods in the Mariana Archipelago to 250 m depth, NOAA Ship *Oscar E. Sette*.

March 18-April 6: Characterization of seafloor habitats of the US Caribbean, NOAA Ship *Nancy Foster*.

coastal planning and permitting, education and outreach strategy design and implementation, and ecotourism development. These skills will be utilized in their respective positions to support coral reef conservation. An orientation took place for new fellows and their supervisors the week of January 18-23.

UPDATES FROM THE ATLANTIC/CARIBBEAN REGION

MPA Effectiveness Studied in the Gulf of Mexico. Long-term monitoring of marine protected areas (MPAs) in the Gulf of Mexico is used to assist with evaluation of the MPAs' effectiveness in increasing numbers and sizes of the resident reef fish. From February 10-26, the Gulf of Mexico MPA monitoring cruise was conducted aboard the *R/V Caretta*. The mission was conducted on behalf of the Gulf of Mexico Fishery Management Council (GMFMC) and funded jointly by NOAA Fisheries Service, its Southeast Fisheries Science Center, and the GMFMC through an award from the CRCP.

Despite severe winter weather, three cruise legs were completed during the 17 days of vessel availability. Scientists were able to survey 33 sites within the Madison-Swanson MPA. Sites were surveyed with a combination of methods, including stereo-video cameras deployed in a random-stratified design. Stereo cameras were used exclusively for the first time this year; they enabled measurements of the majority of fish observed. Fish length data collected during this mission will provide valuable information on the size composition of the reef fish population; once analyzed this dataset will be particularly useful for evaluating the efficacy of the MPAs

Environmental Fairs Target PR Beachgoers to Improve Public Awareness. In collaboration with the Puerto Rico National Parks Company and the Puerto Rico Tourism Company, environmental fairs are being held in Puerto Rico as part of a multi-year CRCP-funded project to educate public beach visitors and local tourists regarding the importance of marine resources. Three environmental fairs are being held at the most popular public beach facilities managed by the Puerto Rico National Parks Company. The first fair was held at the Punta Santiago facilities in Humacao on February 20-21. It was attended by over 500 people of all ages and was the first event of its kind targeting beachgoers to promote public awareness about Puerto Rico's coastal resources. NOAA Fisheries used the opportunity to present the new Caribbean Reef Etiquette video to teach attendees how to interact with reef resources in an environmentally conscious manner. For the Sea Productions, the creator of the video, also gave a presentation that included the video "Learning to Sea." Additional fairs are planned in Boquerón and Toa Baja in March and April.

Participants and sponsors for the events include NOAA Fisheries Caribbean Field Office, Puerto Rico National Parks Company, Puerto Rico Department of Natural and Environmental Resources, Jobos Bay National

Estuarine Research Reserve, Humacao Municipality, Solid Waste Authortiy, Puerto Rico Electric Energy Authority, the Puerto Rico Department of Sports and Recreation, the University of Puerto Rico's Agricultural Extension Service, Banco Popular, Caguas Municipal Band, Toca de Todo radio station, and a newspaper, *Primera Hora* . Announcements and advertising for the event have utilized local newspapers and radio stations, including those listed above as sponsors.

CURRENTS: WHAT'S NEW ON OUR WEBSITE

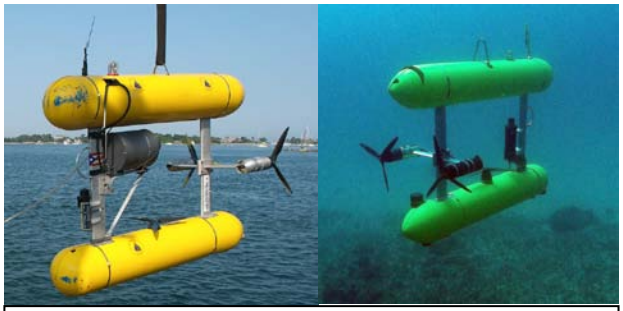
Featured Stories: Corallidae: In the Red, Podcast: Value of Reefs, Cold Coral: Florida's Response,
Corals in the News: February 2010
Miscellaneous: *Implementation of the Deep Sea Coral Research and Technology Program 2008-2009* report, PDF of CRCP grants awarded in fiscal year 2009.

Ten years of FKNMS monitoring show increase in fish density. NOAA's Southeast Fisheries Science Center, along with state, academic, and other federal partners, have been monitoring the the Florida Keys National Marine Sanctuary's 23 small no-take marine reserves, established in 1997 from Key Largo to Key West. Reef fish densities were visually monitored annually inside and outside of no-take zones and compared to a four-year baseline period before the zones were established. Results of this monitoring show statistically significant increases in population densities of seven exploited reef fish species within the protection of the reserves. In contrast, densities of two reference parrotfish species not targeted by fishing remained essentially unchanged in reserves and fished areas over the study period. The study also found that hurricanes and other severe storm disturbances significantly impacted population densities within reserves. These data demonstrate the value and importance of conducting CRCP management relevant science.

Workshops Teach Agencies how to Minimize Impacts of Development to Marine and Coastal Resources. The NOAA Fisheries Caribbean Field Office offered workshops in San Juan and Mayagüez, Puerto Rico to assist local and federal government agencies in minimizing their impacts to marine and coastal resources from the steps of project design through permitting. The workshops are part of the project supporting the creation of a guide entitled: *Guide to Minimizing Impacts of Development to Marine and Coastal Resources: from Project Design to Permitting* funded by the CRCP. The workshops include Commonwealth and federal regulatory and natural resources agencies in Puerto Rico and Territorial and federal agencies in US Virgin Islands (USVI). The workshops are the first time local and federal government agencies have been at the same table presenting the permit process and making recommendations to limit potential project impacts to coastal and marine resources. Additional workshops will be held in St. Croix and St. Thomas, USVI in the future.

UPDATES FROM THE PACIFIC REGION

Mapping and Study of Fisheries Research Methods in the Mariana Archipelago. The NOAA Ship *Oscar E. Sette* left Guam on February 11 with 19 scientists from the Coral Reef Ecosystem Division (CRED) of theNOAA Pacific Islands Fisheries Science Center (PIFSC), the University of Hawaii's Joint Institute for Marine and Atmospheric Research, the Northwest Fisheries Science Center (NWFSC), the Woods Hole Oceanographic Institute (WHOI), the University of Western Australia (UWA), the University of Guam (UoG), and Guam public schools. This 30-day cruise will map fishing areas around Guam and the Commonwealth of the Northern Mariana Islands (CNMI), provide ecosystem basemaps, and compare a variety of non-extractive methods to estimate fish populations in the Mariana Archipelago. Specific areas of interest include Galvez Bank, which lies 27 km southwest of Guam; Rota Island; Farallon de Medinilla; and offshore banks to the west of Saipan. These activities will improve the assessment of fish populations and increase the extent of benthic



The SeaBed AUV above water and in use surveying fish. Courtesy: NOAA

habitat that has been mapped in the Mariana Archipelago. Such assessment, monitoring, and mapping work is required for sustainable management and long-term conservation of coral reef ecosystems in the Pacific

During the first week of the cruise, maps were made of three banks south of Guam and maps around Rota, CNMI, were expanded to cover the 50-300 m depth range. Five fisheries catch-independent methods were used to determine which one is the most effective system to determine the species composition and quantity of reef fish on these three banks and Rota. The five methods used were: two baited camera stations (CRED's BotCam and UWA and UoG's baited remote underwater video stations (BRUVs); the SeaBed autonomous underwater vehicle (AUV), which is jointly owned and operated by the PIFSC and NWFSC in collaboration with WHOI; a towed optical assessment device (TOAD), and the ship's EK-60 acoustic water column sonar. Although biological data have not yet been analyzed, preliminary impressions are that the coral and reef fish communities on and near Galvez Bank are significantly more abundant and diverse than expected. The ship is currently using the pole-mounted Reson 8101ER multibeam sonar to complete maps of Farallon de Medinilla, a US military training area north of Saipan.

While half of the scientists disembarked to be replaced by the next science party during a mid-cruise port stop in Saipan, education and outreach activities were conducted aboard the ship. Additional education and outreach activities will be conducted in Guam post-cruise. A high school teacher from Guam is participating in the mission and writing the mission blog as part of the NOAA's Teacher at Sea Program.

Mass coral bleaching was observed for the first time at Howland and Baker Islands in February. Courtesy: Kara Osada-D'Avella, NOAA

Mass Coral Bleaching Observed at Howland and Baker Islands. Between February 3-7, scientists observed the first documented occurrence of mass coral bleaching at Howland and Baker Islands during the first leg of the biennial Pacific Reef Assessment and Monitoring Program (Pacific RAMP) expedition to the Pacific Remote Islands Marine National Monument and American Samoa.

This expedition on the NOAA Ship *Hi`ialakai* is led by the Coral Reef Ecosystem Division (CRED) of the NOAA Pacific Islands Fisheries Science Center.

Bleaching events can seriously impact the health of coral reefs, leaving them more susceptible to coral disease and other threats. Prolonged bleaching, or the increased susceptibility to other threats, can lead to coral mortality. CRED divers found widespread coral bleaching in excess of 30 percent of the coral cover at both Howland and Baker Islands, with greater incidences on the eastern sides of these islands compared to their western reefs. Overall, no substantial differences in the extent of bleaching were observed between these islands. Branching and table corals (*Acropora* spp.) appeared to be more affected by this bleaching episode than did massive corals at the time of these observations. CRED scientific staff members are working on a manuscript to formally report this event.

As part of their monitoring work, CRED divers also recovered eight subsurface temperature recorders (STRs) that had been attached to the reefs around Howland and Baker Islands for the past two years. Data from these STRs, installed at depths of seven–37 m, show that surface-water temperatures around the islands have been elevated to levels of more than 30°C since mid-November 2009. Such warming episodes have occurred for at least the past 500 years as part of the El Niño-Southern Oscillation, a coupled ocean-atmosphere event that occurs on average every two–seven years. During an El Niño year, warm water from the western Pacific spreads eastward. Strong El Niño events, such as those occurred in 1982–83, 1997–98, and now 2009–2010, can have devastating consequences for tropical marine communities, including coral reefs.

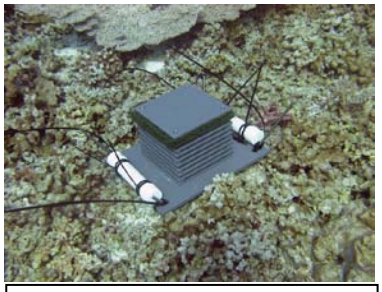
Other recent activities during this mission include a day of public outreach activities and mapping and monitoring in American Samoa. On February 15, during an inport in Tutuila, the crew and scientific personnel welcomed students and the public for tours of the *Hi`ialakai* and discussions of the data being collected during the American Samoan portion of this mission. During the subsequent two weeks, the scientists conducted multibeam sonar mapping at a bank south of Tutuila and collected an expanded set of fisheries data and biodiversity information. On March 1, the ship traveled to Rose Atoll, a National Wildlife Refuge and Marine National Monument in the territory, to conduct the full suite of RAMP protocols around that island. The protocols currently being conducted at Rose Atoll include Rapid Ecological Assessments, towed-diver surveys, oceanographic data collection, and Autonomous Reef Monitoring Structures deployment and recovery. Follow the mission blog to learn more about daily activities and observations from this mission.

INTERNATIONAL UPDATES

The Coral Triangle's First Temperature Recorders Provide Near Real-time Data for Kimbe Bay. Beginning in late January, near real-time sea-surface temperature (SST) data was made available for the Coral Triangle. The Coral Triangle is the center of global marine biodiversity and one of the world's top conservation priorities. The Coral Reef Ecosystem Integrated Observing System, a monitoring and mapping program that includes a network of *in situ* instrument arrays and is supported by the CRCP, expanded to Papau New Guinea last September.

Through the CRCP, and in collaboration with The Nature Conservancy and local stakeholders, NOAA's Pacific Islands Fisheries Science Center Coral Reef Ecosystem Division (CRED) and the National Environmental Satellite, Data, and Information Service Coral Reef Watch (CRW) program deployed one SST buoy and nine subsurface temperature recorders (STRs) across key reefs in Papua New Guinea's Kimbe Bay. They represent the first such instruments installed in the Coral Triangle. SST buoys provide high-resolution, site-specific temperature information to validate satellite-derived SST products. CRW will use this information to improve bleaching alert algorithms for the network of marine protected areas in Kimbe Bay.

CRED deployed two other types of instruments in September, both of which are also firsts for the region. An archival Ecological Acoustic Recorder will assist local resource managers in identifying the level of motorized vessel activity at a key reef site. Finally, as part of the Census of Marine Life's Census of Coral Reef Ecosystems project, the CRED deployed an array of nine Autonomous Reef Monitoring Structures (ARMS) in Kimbe Bay in an effort to establish a global baseline of cryptic invertebrate biodiversity. ARMS mimic the reef environment and attract colonizing coral reef organisms; once recovered, the structures can be studied to assess spatial patterns and monitor temporal trends in coral reef biodiversity.



An ARMS unit installed on a reef. Courtesy: NOAA

DIVE DEEPER: DEEP-SEA CORALS

West Coast Deep-Sea Coral Research Priorities Workshop. On January 20-21, scientists and resource managers met in Portland, Oregon to further define the exploration and research priorities laid out in the *NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems*, and to identify critical information needs for deep-sea coral and sponge ecosystems on the US West Coast. The ultimate goal of the workshop was to identify steps to improve the understanding, conservation, and management of these ecosystems for the next three years. The workshop brought together over 35 representatives from the Federal Government, Northwest Treaty Tribes, the Pacific Fishery Management Council (PFMC), academia, private industry, and nongovernmental organizations. This workshop is part of the CRCP's strategic planning efforts to ensure that deep-sea coral and sponge research activities address management needs, maximize opportunities to utilize regional expertise, and

leverage and complement existing regional efforts. A workshop report is being developed. The workshop results will inform NOAA's deep-sea coral research and exploration activities on the West Coast for the next three years.

Why the West Coast? The seafloor off Washington, Oregon, and California is home to extensive deep-sea coral communities as documented in NOAA trawl survey catch records and supplemented by museum collection records and underwater vehicle explorations[1]. Records of deep-sea corals off the West Coast occur from Mexico to Canada, and from shallow waters down to nearly 4000 m or deeper along the continental slope. In total, 101 species of corals from six Cnidarian orders have been identified off the West Coast, including 18 species of stony corals, seven species of black corals, 36 species of gorgonians, eight species of soft corals, 27 species of pennatulaceans, and five species of lace corals. Additionally, glass-sponge reefs, once thought to be unique to British Columbia, Canada, have recently been identified off of the coast of Washington.

NOAA scientists and their partners are well positioned to conduct the research needed to learn more about these ecosystems. NOAA manages five National Marine Sanctuaries on the West Coast: the Channel Islands, Monterey Bay, Gulf of the Farallones, Cordell Bank, and Olympic Coast sanctuaries, all of which contain deep-sea corals. Furthermore, the NOAA Deep Sea Coral Research and Technology Program works in consultation with the PFMC, the advisory body that recommends management measures for fisheries in federal waters of this region. The PFMC has already implemented sweeping measures to protect Essential Fish Habitat in areas totaling over 130,000 square miles (336,700 km^2) in 2006. Upcoming West Coast research efforts will aim to arm the PFMC with robust scientific information that will inform their decision making to protect additional areas where deep-sea coral and sponge habitat occurs.

[1] Whitmire CE and Clarke ME (2007) State of Deep Coral Ecosystems of the US Pacific Coast: California to Washington. Pages 109-154. In: Lumsden SE, Hourigan TF, Bruckner AW and Dorr G (eds.) The State of Deep Coral Ecosystems of the United States. NOAA Tecnhical Memorandum CRCP-3, Silver Spring, Maryland

NEW DATA IN CoRIS

Product Name	**Description**
Impervious Surface Data for American Samoa	These layers represent a baseline inventory of impervious surfaces for American Samoa. This data set utilized 2003-2005 Quickbird multispectral scenes which were processed to detect impervious features.
Sample Link: http://coris.noaa.gov/metadata/records/html/ccap_2005_era_tutuila_as_is.html	
C-CAP Land Cover Data, Commonwealth of the Northern Mariana Islands	This data set consists of land cover derived from high resolution imagery and was analyzed according to the Coastal Change Analysis Program (C-CAP) protocol to determine land cover. These datasets utilized Quickbird multispectral scenes. All scenes were processed to detect C-CAP land cover features.
Sample Link: http://coris.noaa.gov/metadata/records/html/ccap_2004_medinilla_landcover.html	
2009 Fish and Habitat Assessment and Monitoring Data from the Caribbean Coral Reef Ecosystem Monitoring Project	This dataset includes information on fish distribution, abundance and size; benthic habitat composition; and macroinvertebrate (conch, lobster, Diadema) abundance and distribution.
Sample Link: http://coris.noaa.gov/metadata/records/html/stj_habitat_metadata_1209.html	

2003 Optical Validation Data from Farallon de Pajaros (Uracas) in the Commonwealth of the Northern Mariana Islands	Optical validation data were collected using a Tethered Optical Assessment Device (TOAD), an underwater sled equipped with an underwater digital video camera and lights. Data were collected in the Commonwealth of the Northern Mariana Islands (CNMI), around 18 different islands and banks, to support Benthic Habitat Mapping efforts during NOAA Ship Oscar Elton Sette cruise OES0307, from August 22 through September 21, 2003.
Sample Link: http://coris.noaa.gov/metadata/records/html/cred_toad_farallon_de_pajaros_oes0307_2003.html	
Gridded multibeam bathymetry of Farallon de Pajaros (Uracas), Commonwealth of the Northern Mariana Islands (CNMI)	Gridded bathymetry shelf, bank and slope environments of Farallon de Pajaros Island (Uracas), CNMI. Bottom coverage was achieved in depths between 4 and 3275 meters, but this 10 m grid contains data to 800 m. The netCDF and Arc ASCII grids include multibeam bathymetry from the Simrad EM300 and Reson 8101 multibeam sonars collected as of June 2007 by the NOAA Coral Reef Ecosystem Division.
Sample Link: http://coris.noaa.gov/metadata/records/html/farallon_de_pajaros_10m.html	

PUBLICATIONS

Tsuda RT, Fisher JR, Vroom PS, Abbott IA (2010) New records of subtidal benthic marine algae from Wake Atoll, Central Pacific. *Botanica Marina* 53: 19-29.

Vroom, PS., Musburger CA, Cooper SW, Maragos JE, Page-Albins KN, Timmers MAV (2010) Marine biological community baselines in unimpacted tropical ecosystems: spatial and temporal analyses of reefs at Howland and Baker Islands. *Biodiversity and Conservation* 19: 797-812. doi 10.1007/s10531-009-9735-y

Selected Contributions to the Proceedings of the 11th ICRS. The 11th International Coral Reef Symposium took place in 2008, but the proceedings were not published online until late December 2009. CD and print versions of the proceedings will be distributed in March. A number of CRCP scientists participated in the 11th ICRS; a selection of articles appearing in the proceedings are included below.

Braun CL, Smith JE, Vroom PS (2009) Examination of algal diversity and benthic community structure at Palmyra Atoll, US Line Islands. Proceedings of the 11th International Coral Reef Symposium, 7-11 July 2008, Ft. Lauderdale, Florida, Session Number 18: 865-869.

Kenyon JC (2009) Coral recruits to settlement plates at remote locations in the US Pacific. Proceedings of the 11th International Coral Reef Symposium, 7-11 July 2008, Ft. Lauderdale, Florida, Session Number 14: 415-419.

Vargas-Angel B, Wheeler B (2009) Coral health and disease assessment in the US Pacific territories and affiliated states. Proceedings of the 11th International Coral Reef Symposium, 7-11 July 2008, Ft. Lauderdale, Florida, Session Number 7: 175-179