Coral Reef News

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FROM THE DESK OF THE PROGRAM MANAGER

On July 30, the two largest protected areas containing coral reefs were inscribed into the list of World Heritage Sites. The World Heritage Committee of the United Nations Educational, Scientific and Cultural Organization (UNESCO) voted to add Papahānaumokuākea Marine National Monument (US, Hawai`i) and the Phoenix Islands Protected Area (Kiribati) to its list of special significant places around the world.

Larger than all of America's national parks combined, Papahānaumokuākea Marine National Monument is comprised of 140,000 square miles of near pristine reefs, atolls, shallow waters and deep seas and is the largest conservation area in the US. Papahānaumokuākea provides refuge and habitat for a wide array of threatened and endangered species and is one of the last predator-dominated coral reef ecosystems on the planet. The designation also recognizes the significant cultural attributes, such as traditional wayfaring, unique to the region. There are only 26 mixed World Heritage Sites on the globe and Papahānaumokuākea is the only mixed World Heritage Site in the nation.

Butterflyfish feeding in the Phoenix Islands.
Photo credit: Cat Holloway

The Phoenix Island Protected Area (PIPA) is a 157,626 square miles expanse of marine and terrestrial habitats in the Southern Pacific Ocean. The property encompasses the Phoenix Island Group, one of three island groups in Kiribati, and is the largest designated Marine Protected Area in the world. The area contains approximately 800 known species of fauna, including about 200 coral species, 500 fish species, 18 marine mammals and 44 bird species.

Designation of these two sites to the prestigious UNESCO World Heritage List helps forward global recognition of the critical heritage values of the sea and global understanding of the importance of protecting our oceans. Adding these exceptional marine protected areas to the list of the world's greatest natural and cultural treasures promotes an increase in public awareness of the sites, demonstrates their outstanding values and shows a dedication to global coral reef conservation.

-Kacky

ANNOUNCEMENTS

WANTED: Lionfish Hunters for Inaugural Florida Keys Lionfish Derby Series. The rapid population growth of invasive lionfish in the waters of the Florida Keys, along with their lack of a natural predator in the Atlantic, have local coral reef managers concerned. Lionfish feed on commercially and ecologically important fish species—including snapper, grouper and shrimp—and can disrupt the balance of the marine ecosystem. The lionfish invasion *(animation, 1.06 mb)* is a rapidly growing problem in the Caribbean and up the Atlantic seaboard, causing concern for reef managers throughout the region as they try to mitigate the invasion. The first confirmed sighting and capture of a lionfish in the Florida Keys National Marine Sanctuary (FKNMS) occurred in January 2009. Successful control of invasive lionfish in National Marine Sanctuaries, such as the FKNMS, will require adaptive management, partnerships and community involvement.

Divers will gather in the Florida Keys on three dates this Fall to help conserve the local coral reef ecosystems while lending a hand in the fight against invasive lionfish. They will compete for more than $10,000 in cash prizes in the categories of most fish, largest fish, and smallest fish during the inaugural series of invasive lionfish roundup derbies. The derbies were organized by the Reef Environmental Education Foundation (REEF) and FKNMS. REEF and the Sanctuary have been working with the Florida Keys dive community to remove invasive lionfish since early 2009. With assistance from NOAA's Center for Coastal Fisheries and Habitat Research, FKNMS and non-profit partners REEF and Mote Marine Laboratory, the Keys launched an early detection/rapid response plan to raise awareness and remove lionfish sighted in the Keys. As sightings increased, FKNMS and partners began encouraging safe, diver-based removal efforts and FKNMS began permitting the removal of lionfish from its no-take zones by SCUBA divers who had received special training in safe handling and collection. The dedicated removal and consumption of lionfish is considered a conservation activity by FKNMS. Invasive species are a threat to protected areas as they endanger biodiversity and the integrity of native ecosystems.

The Florida Keys Derbies are being held in Key Largo on Sept. 11, Marathon on Oct. 16, and Key West on Nov. 13, 2010. Each derby will include a lionfish tasting, a banquet, and an awards ceremony including over $3,000 in cash prizes per event. Two REEF-coordinated lionfish derbies in the Bahamas successfully removed close to 2,500 lionfish, and the FKNMS hopes for similar success in their Fall derbies. To learn more, read the joint FKNMS/REEF press release, or visit the FKNMS and REEF Web pages dedicated to lionfish. Registration for the derbies is available online.

Funding Opportunity for States and Territories to Support *Acropora* Conservation. This summer, NOAA's National Marine Fisheries Service (NMFS) announced availability of up to $15 million in funding through the Protected Species Cooperative Conservation Program. This program supports States' and territories' conservation programs for species listed under the Endangered Species Act (ESA). In addition to this opportunity, the NOAA Restoration Center within NMFS Office of Habitat Conservation may provide funding for applications selected

through this competition specifically to support larger scale habitat restoration benefiting threatened and endangered species. The deadline for applications is October 4, 2010. Caribbean elkhorn (*Acropora palmata*) and staghorn (*A. cervicornis*) corals were listed as threatened under the ESA in May 2006 and conservation projects for these species are eligible for this funding source. Conservation programs receiving support through this program can involve research, monitoring, management, restoration, and outreach activities. For more about this program and how to apply, click here.

Coastal Zone 2011: Call for Abstracts & Save the Date. Coastal Zone 2011 will be held July 17-21, 2011, at the Hyatt Regency in Chicago, Illinois. In keeping with the location and acknowledging our changing coastal and ocean landscape, the overall conference theme is "Winds of Change: Great Lakes, Great Oceans, Great Communities." Sessions will be organized around four conference tracks: Planning for Resilient Great Lakes, Coasts, and Ecosystems; Healthy Habitats, Healthy Coastal and Great Lakes Communities; Observing, Modeling, and Monitoring; and Vibrant Coastal, Great Lakes, and Marine Economies. Abstracts for panel and oral presentations, posters, cafe conversations, and training workshops must be submitted online by October 8, 2010. Conference partners include NOAA, the Department of Interior, the US Environmental Protection Agency, the US Army Corps of Engineers, and the Illinois Department of Natural Resources. To subscribe to the CZ11 listserv, send an email message with a subject of: subscribe CZ11 (leave message body blank).

5th International Marine Debris Conference: Save the Date. The Fifth International Marine Debris Conference will take place March 20-25, 2011, in Honolulu, Hawai`i. NOAA and the United Nations Environment Programme are co-organizers of the conference, the first of its kind in over a decade. This conference will highlight research advances, allow sharing of strategies and best practices to assess, reduce, and prevent the impacts of marine debris, and provide an opportunity for the development of specific bilateral or multi-country strategies. With a variety of tracks, themes, and session types, this conference will build new partnerships, further raise public awareness and support, and inspire follow-up actions that will take us closer to a world free of the impacts of marine debris.

Marine debris is a historical problem that continues to grow, with a global scope and numerous sources and impacts. The world's oceans and waterways are constantly polluted with a variety of marine debris items ranging from soda cans and plastic bags to derelict fishing gear and from tiny microplastics to large abandoned vessels. Many animals mistake marine debris for food, including sea turtles, seabirds, and marine mammals. This may lead to internal injuries, starvation, and even death. Derelict fishing gear, such as fishing nets and lines, may entangle marine life, smother the living substrate upon which it settles (e.g., coral), or transport alien

UPCOMING EVENTS

September

11: First Annual Florida Keys Lionfish Derby Series, Key Largo, FL.
15-16: Business Meeting, 24th US Coral Reef Task Force Meeting, Saipan, CNMI.

October

16: First Annual Florida Keys Lionfish Derby Series, Marathon, FL.
16: Coral Fest Family Festival, Washington, DC.

November

11: First Annual Florida Keys Lionfish Derby Series, Key West, FL.

Research Missions

September 2-27: Northwestern Hawaiian Islands Reef Assessment and Monitoring Cruise, NOAA Ship *Hi`ialakai*. .

September 9-13: Baseline assessment of fish and benthic communities of the Flower Garden Banks, NOAA Ship R/V *Manta*.

October 2010: Main Hawaiian Islands Reef Assessment and Monitoring Cruise, NOAA Ship *Hi`ialakai*

CURRENTS: WHAT'S NEW ON OUR WEBSITE

Miscellaneous: Fiscal Year 2011 Grant Announcement, Guam Ecosystem Essay , Chagos Islands Professional Exchange

species. Marine debris is also a navigational hazard and poses a risk to human health and safety. Each of these impacts come with a cost. International cooperation is needed to create public awareness while developing ways to decrease the impacts of debris in oceans around the globe.

UPDATES FROM HEADQUARTERS

NOAA, SeaWeb Communicate the Value of Coral Reefs. NOAA and SeaWeb have entered into a partnership to enhance understanding of the nation's valuable but increasingly vulnerable coral reef ecosystems in the Caribbean, Florida, Hawai`i and the Pacific Islands. The three-year agreement will dedicate $850,000 in NOAA funding and $865,000 in matching funds from SeaWeb to help the US coral jurisdictions implement powerful communications strategies for motivating better protection, conservation and management of coral reef ecosystems. The agreement was the result of a competitive request for proposals issued by NOAA in early 2010.

Working with the seven US states and territories containing coral reefs (American Samoa, the Commonwealth of the Northern Mariana Islands, Florida, Guam, Hawai`i, Puerto Rico, and the US Virgin Islands), NOAA and SeaWeb will identify initial priority areas in which to build a foundation for social marketing and strategic communications campaigns. During the course of the partnership, campaign strategies will be designed, carried out and evaluated within target jurisdictions, with the aim of increasing public dialogue on coral conservation topics. The decline and loss of coral reefs has significant social, cultural, economic, and ecological impacts on people and communities in the US and throughout the world. As the 'rain forests of the sea,' coral reefs provide services estimated to be worth as much as $375 billion each year. Coral ecosystems are at serious risk due to a variety of human activities; protecting and conserving them is an urgent issue that must be addressed with engaged communities taking part in the solutions. To learn more, read the NOAA press release.

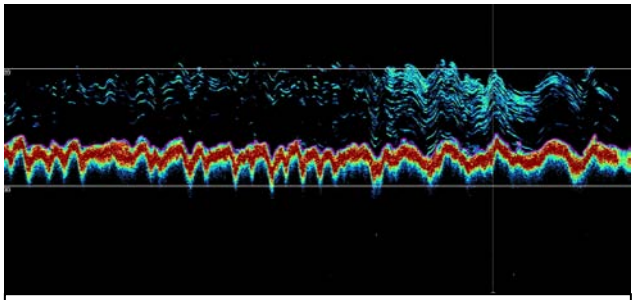
UPDATES FROM THE ATLANTIC/CARIBBEAN REGION

NOAA Scientists Investigate What's Killing Threatened Elkhorn Coral in Puerto Rico. *Acropora palmata* (commonly known as Elkhorn coral) was listed as 'threatened' under the Endangered Species Act in 2006. Critical habitat was designated in 2008 along with regulations prohibiting the import, export, take, and all commercial activities involving elkhorn corals. Puerto Rico's northwest coast has one of the territory's most robust populations of elkhorn coral. In this region, Vega Baja has been identified by National Marine Fisheries Service's Office of Protected Resources (NMFS OPR) as a priority area needing protection and study in order to conserve this species. While most of this area appears healthy, portions of the near-shore reefs in Vega Baja have recently been impacted by algae overgrowth, disease lesions and mortality from unknown causes. This site provides an ideal case study for conducting an environmental assessment to pinpoint probable stressors.

A cross-disciplinary team launched an environmental investigation August 1-7, to document impacts to the reefs of Vega Baja, identify stressors, and determine their source and relative contributions. The research team members came from the NOAA National Centers for Coastal Ocean Science's Center for Coastal Environmental Health and Biomolecular Research, NMFS OPR, NOAA Restoration Center, the University of Central Florida, the University of Puerto Rico, Surfrider Foundation, and Haereticus Environmental Lab. Data collected, including sediment and tissue samples, will be tested for exposure to toxins and biological effects of toxin exposure, respectively. A subset of the science team is in the midst of a series of return visits to document the rate at which coral colonies are recovering from the removal of tissue samples; this rate of healing is a metric for the health of the immediate environment of those corals.

This study is a follow up to a similar study conducted last year. That study found noted impacts on the coral ecosystems which were greater on the eastern side of Vega Baja (which is close to some obvious runoff points). Last year's findings led to the expansion of the type and location of this year's sampling. The findings of this study can be used to guide mitigation of specific localized hazards affecting these threatened populations; thus increasing their protection. The outcome of this work also can be used as a model for conducting an environmental investigation in other areas that can be used to inform watershed management plans and help local jurisdictions identify best management practices for their area.

Reef Fish Spawning Aggregation Research in the Florida Keys. Fish spawning aggregations (FSAs) are a vital part of the life cycle of many reef fish species; however, in many cases, a lack of knowledge of the location of FSA sites prohibits their protection and effective management. NOAA researchers and managers from the National Centers for Coastal Ocean Science's Center for Coastal Fisheries and Habitat Research, the National Marine Fisheries Service's Southeast Fisheries Science Center, and the



Sonar echogram of a school of large fish, later identified as gray snapper. Photo Credit: NOAA, Chris Taylor

Divers spot counted over 700 fish in this aggregation of gray snapper. Photo Credit: NOAA, Todd Kellison

Florida Keys National Marine Sanctuary, in cooperation with researchers and managers from the State of Florida Fish and Wildlife Conservation Commission and the University of Miami, are continuing work in the Florida Keys focusing on reef fish aggregation sites. The purpose of the research is twofold: to (1) characterize potential similarities in geomorphological characteristics of aggregation sites, with a goal of identifying consistent features that could be used to identify other potential aggregation sites, and (2) determine the extent to which fish are currently utilizing these sites, some of which were reported by commercial fishers to have been "fished out" decades ago. Research has focused on sites off of Key Largo (upper Keys) and Key West (lower Keys). Surveys at two sites off Key West in June and July, timed to coincide with predicted full moon spawning periods, identified aggregated snappers–one site characterized by gray snapper (*Lutjanus griseus*) and another site by both gray and mahogany (*L. mahogoni*) snappers. The aggregation at the gray snapper site, which included schools of hundreds of snappers 20 feet off the seafloor, was located and intensively surveyed using fisheries sonar, and verified with photographic and video surveys by scuba divers. The coupling of sonar surveys, diver observations, photos and video will enable quantitative estimates of gray snapper abundance and biomass at the site. Additional surveys were planned at both sites during the August full moon. Results will be conveyed to FKNMS managers.

UPDATES FROM THE PACIFIC REGION

Current RAMP Cruise to the Northwestern Hawaiian Islands. Scientists from the NOAA Pacific Islands Fisheries Science Center (PIFSC) are on a 26-day expedition to study coral reef biota and habitats in the remote Northwestern Hawaiian Islands (NWHI). The research is part the Pacific Reef Assessment and Monitoring Program (Pacific RAMP) conducted by the PIFSC Coral Reef Ecosystem Division (CRED). Joining PIFSC scientists on the NOAA Ship *Hi`ialakai* are research colleagues from the University of Hawaii Joint Institute for Marine and Atmospheric Research, Ocean Associates, San Diego State University, and the Papahānaumokuākea Marine National Monument.

Coral reefs of the remote Northwestern Hawaiian Islands support diverse communities of fishes. Photo credit: NOAA, Jason Helyer

Teams of scientists will monitor a variety of reef and oceanographic parameters, continuing biennial studies that began in 2000. As with previous Pacific RAMP cruises in the NWHI, the research team will visit established, long-term Rapid Ecological Assessment (REA) sites at French Frigate Shoals, Lisianski Island, Pearl

and Hermes Atoll, and Kure Atoll to survey populations of corals, algae, and targeted invertebrate fauna, and investigate diseases of coral and algae.

The CRED's oceanography team will retrieve and deploy a suite of scientific instruments, conduct hydrographic surveys, and collect water samples to better understand spatial and temporal variations of oceanographic and water-quality parameters. In addition, ecological acoustic recorders will be deployed to gain a sense of what reefs sound like under healthy and possibly stressed conditions. Calcification acidification unit plates will be deployed to establish a baseline of information on crustose coralline algae and scleractinian coral in the NWHI, information necessary to understand expected changes in these critical reef-building organisms, including their growth rates, as oceans become more acidic. Autonomous reef monitoring structures will be collected and deployed to gain a better grasp of cryptic invertebrate populations that are difficult to study using other survey methods.

This year, an alert has been issued for possible coral bleaching in the NWHI. CRED scientists, who observed and reported massive bleaching events in the NWHI during the past decade, will continue to record bleaching event parameters to improve understanding of the response of coral reef ecosystems to elevated sea-surface temperatures. Follow the cruise's daily blog here.

Cruise Discovers Unparalleled Reef Fish Endemism in NWHI Mesophotic Coral Ecosystems. The NOAA Ship *Hi`ialakai* returned home on Aug. 20 after 30 days in the Papahānaumokuākea Marine National Monument. The cruise, run by NOAA's Office of National Marine Sanctuaries, conducted mixed gas dives to depths of 75 meters to survey fish assemblages of the mesophotic coral ecosystems (MCEs) in the Northwestern Hawaiian Islands (NWHI). Endemic Hawaiian fishes were found to comprise nearly 50 percent of all fish species reported from the MCEs of the NWHI, compared with 23percent for the Hawaiian Archipelago overall. Scientists found increasing levels of endemism with increasing latitude on the deep coral reefs. At the northernmost three atolls of the archipelago (Pearl and Hermes Atoll, Midway Atoll, Kure Atoll), Hawaiian endemic species were found to comprise up 80 percent of the MCE species, and over 90 percent of the individual fishes at these depths. This may be the highest level of endemism ever recorded in any marine ecosystem. Scientists on the cruise discovered seventeen new records or range extensions of scleractinian corals, and another ten undescribed species of coral. About half of these were from MCEs; the remainder were found on shallow coral reefs. Researchers also conducted conductivity, temperature, depth transects and took water samples at sites ranging from inshore areas to offshore waters and depths of 1000m to establish carbonate chemistry profiles and seawater acidification baselines for waters around the major atolls of the NWHI. This underscores the importance of ecosystem-level protections and large scale MPAs; they protect the known biodiversity in a region, and they also protect the biodiversity that has yet to be discovered, recorded, and documented. In the face of climate change, we are at risk of losing species (e.g. new species of deep-water corals) before we even know that they exist. Thus, these attempts to characterize MCEs take on a new sense of urgency.

Papahanaumokuakea Marine National Monument Becomes First Mixed UNESCO World Heritage Site in the US. Delegates to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) 34th World Heritage Convention in Brasilia, Brazil, agreed to inscribe Papahānaumokuākea Marine National Monument as one of only 26 mixed (natural and cultural) World Heritage Sites in the World. Inscription of this remote oceanic expanse is a win for the United States on its first nomination of a site in 15 years. The vote also establishes the first mixed World Heritage Site in the nation, which covers an area of nearly 140,000 square miles. Papahānaumokuākea's globally significant natural attributes incorporate its living, indigenous, cultural connections to the sea—where modern Hawaiian wayfinders still voyage for navigational training on traditional double-hulled sailing canoes; an aspect of inscription unique to the Monument. Additionally, World Heritage status places this traditional skill, which was used to navigate across the world's largest ocean—one of the greatest feats of human kind—onto the world stage.

> *"We hope Papahānaumokuākea's inscription will help expand the global view of culture and the contributions of Oceanic peoples to World Heritage and underscore that for so many indigenous peoples, nature and culture are one."*
>
> *– Aulani Wilhelm, NOAA Superintendent, Papahānaumokuākea Marine National Monument*

Papahānaumokuākea is the second World Heritage Site in the State; Hawai'i Volcanoes National Park was inscribed in 1987. Together, the two sites emphasize one of the six criteria for which the Monument was designated. The small islands, reefs, and shoals of Papahānaumokuākea represent the longest, clearest, and oldest example of island formation and atoll evolution in the world, spanning 28 million years, which contrasts strikingly with Hawai'i Island's continued volcanic growth at the southeastern end of the Hawaiian Archipelago. The near pristine remote reefs, islands, and waters of the Monument provide refuge and habitat for a wide array of threatened and endangered species and is one of the last predator-dominated coral reef ecosystems on the planet; manō (sharks) and 'ulua (jacks) dominate the underwater landscape. The region also provides critical nesting and foraging grounds for 14 million seabirds, making it the largest tropical seabird rookery in the world. World Heritage designation does not change the Monument's cooperative federal-state management mission, plan or structure, nor does it impose, change or add regulations or restrictions. The management philosophy and regulations have always been designed to "bring the place to the people" through education, virtual exposure, and extremely limited visitation. Although inscription has increased tourism at other World Heritage sites, for Papahānaumokuākea, the situation is quite different. All human access and activity will remain by permit only, with visitation by the public restricted to Midway Atoll under strict carrying-capacity guidelines.

A great diversity of fish can be found at Pearl and Hermes Atoll. Photo credit: Louiz Rocha

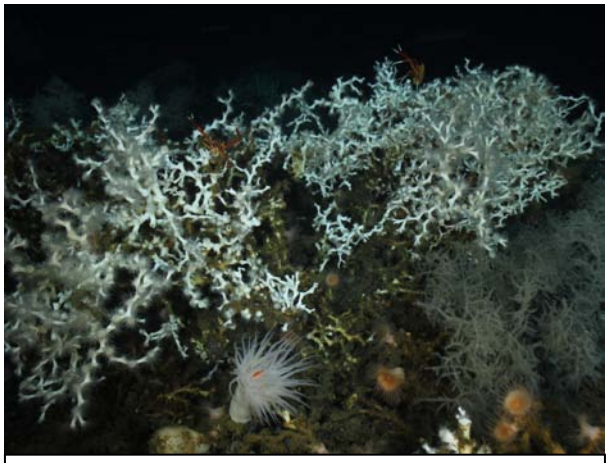
Monument Releases a Seasonal Forecast for Coral Bleaching. Papahānaumokuākea Marine National Monument has issued a seasonal forecast to estimate the risk of a mass coral bleaching event this year. The forecast was developed in concert with a network of leading scientists, and in close collaboration with NOAA's Coral Reef Watch (CRW) Program.

Globally, 2010 has been a significant year for mass coral bleaching. Severe events in Thailand, Malaysia, and Indonesia have caused up to 100 percent bleaching in some areas, resulting in high levels of coral mortality. The regional heat event that caused this extreme event in Southeast Asia has recently moved toward Micronesia, with reports of bleaching already reported in Palau. Climate forecasts raise concern that a similar heating event may warm sea temperatures in the Monument beyond bleaching thresholds.

Based on available information, the threat of widespread coral bleaching within the Monument is currently rated as low to moderate. Predictions developed by CRW suggest that the bleaching risk is greatest to Papahānaumokuākea's northern atolls: Kure, Pearl and Hermes, and Midway. The highest temperature stress is likely to occur in September 2010. However, local weather conditions, including either storms or doldrums, will strongly influence the actual sea temperatures and could either prevent or worsen a mass bleaching event. Current measurements of sea temperature by both satellites and in-water instruments indicate slightly above average temperatures and a very minor accumulation of heat stress. Upcoming research cruises will provide an update on sea temperatures and coral condition, which will be described in subsequent condition reports.

DIVE DEEPER: DEEP-SEA CORALS

Assessing the Potential Impacts of the Gulf Oil Spill on Deepwater Coral Communities. The northern Gulf of Mexico is home to rich and varied deepwater habitats, including mesophotic coral and deep-sea coral communities and chemosynthetic communities. One of the key questions arising from the Deepwater Horizon oil spill has been the fate of oil and dispersants released a mile below the surface, and what impacts these releases may have, if any, to deepwater habitats in the Gulf of Mexico.



This image of deep-sea coral habitat at a Vioska Knoll, showing the coral *Lophelia pertusa*, black coral (right), anemones, and a squat lobster, was taken in 2009. The 2010 NRDA cruise revisited sites surveyed in 2009. Photo courtesy: Ian MacDonald, Lophelia II 2009: Deepwater Coral Expedition: Reefs, Rigs and Wrecks. NOAA Ocean Exploration and Bureau of Ocean Energy Management, Regulation, and Enforcement

NOAA, as trustee of deepwater natural resources, is collaborating with other Federal agencies, academic researchers, and BP – the responsible party – to conduct a Natural Resource Damage Assessment (NRDA) for these deepwater habitats. In July and August, the NOAA Ship *Nancy Foster* conducted a two-

week NRDA cruise to survey and resample deepwater communities near the Deepwater Horizon wellhead. The cruise targeted some of the most important known deep-sea and mesophotic coral communities for which there are existing baseline data and sample collections. Remotely operated vehicle operations were successfully conducted at several deep-sea coral and chemosynthetic habitats previously studied by the Bureau of Ocean Energy Management, Regulation, and Enforcement (formerly the Minerals Management Service) and the US Geological Survey. Resampling these areas and comparing the post-spill condition with the pre-spill baseline studies affords an opportunity to evaluate possible impacts, if any, of oil or dispersants to these vulnerable biological communities.

NOAA and its partners are currently evaluating the results of this initial cruise and planning subsequent activities needed to understand and protect these unique habitats. Recent water column sampling and modeling efforts on the location and fate of underwater plumes of hydrocarbons from the wellhead will help guide future efforts to determine whether injury to public trust resources has occurred. NOAA, as trustee of deepwater natural resources, is collaborating with other partners to conduct a Natural Resource Damage Assessment of deep-sea coral communities in the wake of the Deepwater Horizon oil spill.

NEW DATA IN CoRIS

Product Name	**Description**
Environmental Sensitivity Index (ESI) Atlas, Gulf of Mexico, Upper Coast of Texas 1996, Louisiana 2003, Mississippi 2009, Alabama 2007, Florida 1995-2003 maps and geographic information systems data (NODC Accession 0064870) Sample Metadata Link	Environmental Sensitivity Index (ESI) maps serve as quick references for oil and chemical spill responders and coastal zone managers. This ESI atlas updates and consolidates data previously released on individual ESI atlases for the Gulf of Mexico and Florida. Data are available from the NOS Office of Response and Restoration and are also archived at the NOAA National Oceanographic Data Center. The product includes files for both GIS and non-GIS users.
Kahekili, West Maui, Hawaii Fish and Benthic Data from Surveys in January and August 2008 (NODC Accession 0065597) Sample Metadata Link	Fish and benthos baseline surveys were made at 155 sites of the near shore region off Kahekili Beach Park, West Maui in January and August, 2008. Survey sites were grouped into six broad habitat categories, and herbivore biomass in a range of functional groups was calculated per habitat category.
Gridded Geomorphology data files for Rose Atoll Sample Metadata Link	The geomorphological data layers of slope, rugosity, bathymetric position index (BPI) structures and BPI zones produced at the Pacific Islands Benthic Habitat Mapping Center (PIBHMC) were derived from multibeam bathymetry and bathymetry derived from multispectral IKONOS satellite imagery. This data set is for Rose Atoll, American Samoa.

Benthic data for corals, macroalgae, invertebrates, and non-living bottom types from Fagatele Bay, Pago Pago, and Fagasa, American Samoa, 2004-2008. (NODC Accession 0066319) Sample Metadata Link	This data set was derived from surveys in Fagatele Bay National Marine Sanctuary, Pago Pago (Rainmaker and Aua), and Fagasa (Sita Bay and Cape Larsen) conducted in 2004 and 2007-2008. Parameters include coral, algal, or invertebrate species, coral colony diameter size, and non-living bottom type.
FBSAD Recruit and Predator Reef Fish Belt Transect Surveys and Reef Fish-Habitat Quadrat Surveys at Hawaii and Midway 2008 Sample Metadata Link	These data represent the fourth spring-summer surveys in a multi-year project using in situ diver observations at sites of differing habitat structure, to descriptively test predictions relating to the use of specific habitats by recruits of various species of coral reef fishes at select locations in Hawaii.
CRED Coral Reef Early Warning System (CREWS) Enhanced Buoy data for the Pacific Remote Island Areas Sample Metadata Link	CREWS Enhanced (CREWS-ENH) buoys are equipped to measure sea surface water temperature and conductivity (Sea-Bird Model SBE37-SM, Sea-Bird Electronics, Inc., www.seabird.com); PAR, UV305 nm, UV330 nm and UV380 nm (Biospherical BIC2104U) at 1 m (nominal) below the water line and air temperature (R.M Young Model 41342); barometric pressure (Heise DXD); wind vectors (Vaisala WAS425A); PAR, UV305 nm, UV330 nm and UV380 nm (Biospherical BIC2104R) at 2 m (nominal) above the water line. A compass (KVH C100 SE-25) is used in the calculation of wind direction and a GPS system provides geolocation.
CRED Subsurface Temperature Recorder (STR) data for the Northwestern Hawaiian Islands, American Samoa and the PRIAs Sample Metadata Link	Data from Coral Reef Ecosystem Division (CRED), NOAA Pacific Islands Fisheries Science Center (PIFSC) Subsurface Temperature Recorders (STR) provide a time series of water temperature at coral reef sites. Data is typically collected at 1800 second intervals for a duration of 2 years using a SBE39 Temperature Recorder (Sea-Bird Electronics, Inc., www.seabird.com). Time series data combining multiple deployments from a given site may also be available.
CRED Wave and Tide Recorder (WTR) data for the Northwestern Hawaiian Islands, American Samoa and the PRIAs Sample Metadata Link	Data from Coral Reef Ecosystem Division (CRED), NOAA Pacific Islands Fisheries Science Center (PIFSC) Wave and Tide Recorders (WTR) provide a time series of temperature, wave and tide data at coral reef sites. Data is typically collected for a duration of 2 years using a SBE26 or SBE26plus SEAGAUGE Wave and Tide Recorder (Sea-Bird Electronics, Inc., www.seabird.com). Sensors include: Real-time clock, thermistor, and Digiquartz temperature-compensated pressure sensor. Time series data combining multiple deployments from a given site may also be available.

CRED Sea Surface Temperature (SST) Buoy data for American Samoa and the PRIAs. Sample Metadata Link	Data from Coral Reef Ecosystem Division (CRED), NOAA Pacific Islands Fisheries Science Center (PIFSC) Sea Surface Temperature (SST) Buoys provide a time series of surface water temperature at coral reef sites. The SST buoy (Model SST-001, Sound Ocean Systems, Inc., www.soundocean.com) with external temperature recorder (Sea-Bird Model SBE39, Sea-Bird Electronics, Inc., www.seabird.com) telemeters a subset of the daily data in Near Real Time (NRT) via a Telonics ST-13 or ST-20 ARGOS PPT transmitter and internally records higher resolution temperature data from the SBE39, typically at a 600 second sampling interval for a duration of 2 years. Time series data combining multiple deployments from a given site may also be available.

PUBLICATIONS

New Experimental Coral Disease Outbreak Risk Product Released, Published in *PLoS ONE*. A journal article was published on August 17 describing the algorithm that underpins the regional Coral Disease Outbreak Risk product just released by NOAA Coral Reef Watch (CRW). Led by Dr. Scott Heron, the paper refines links between White Syndrome disease abundance and warm stress, focusing on the need to consider not only warm summer temperatures, but also temperatures during the preceding winter. The winter assessment provides a Seasonal Outlook for outbreak risk three to six months prior to near-real-time monitoring of Outbreak Risk during the subsequent summer. The study also establishes a method for determining the abundance threshold for White Syndrome outbreaks. The paper is the result of an international collaboration and utilizes disease data from the Great Barrier Reef collected by the Long-Term Monitoring Program of the Australian Institute of Marine Science, considered to be one of the best datasets available due to its longevity and large spatial domain. *Summer Hot Snaps and Winter Conditions: Modelling White Syndrome Outbreaks on Great Barrier Reef Corals* was published in *Public Library of Science–ONE* (*PLoS ONE*), which is a high impact-factor, peer-reviewed, interactive, open-access journal for the communication of scientific and medical research from all fields.

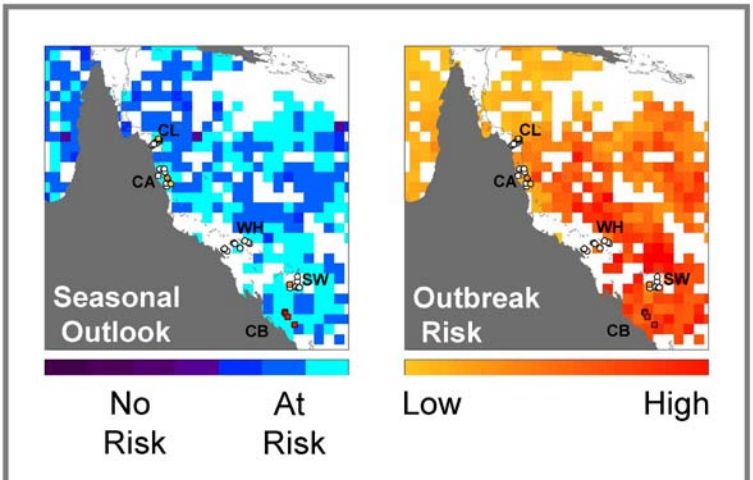


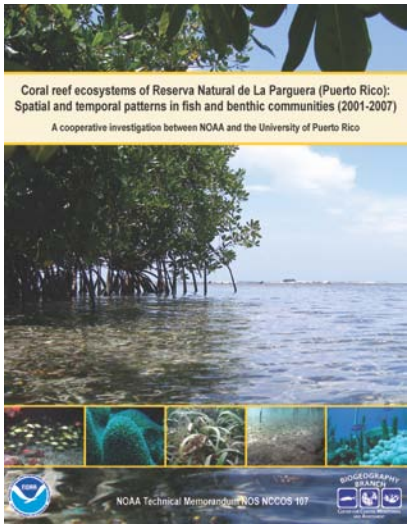
Figure 1: Advance risk assessment for coral disease prior to summer (left panel, Seasonal Outlook) and monitored in near-real-time during summer (right panel, Outbreak Risk), overlaid with disease observations. Circles and squares indicate observed low and high coral cover, respectively; symbol color represents abundance of disease (white: no outbreak; yellow: mild outbreak; orange: moderate outbreak; red: severe outbreak). Adapted from Fig. 6 of Heron et al. (2010).

The regional Coral Disease Outbreak Risk product is currently available

for the Great Barrier Reef and the Hawaiian archipelago. Testing and validation of the experimental product continues in both regions, and an expansion to the Caribbean region is also planned. NOAA's Coral Reef Watch is at the forefront of truly integrated operational coral reef observations and provides the tools and products used around the world to predict and assess coral bleaching and the thermal stress that causes it. CRW works with international and regional scientists to develop and disseminate remote sensing tools to improve resource management.

Red Coral Workshop Report Available in Print. Released initially as an electronic document, the printed version of *Proceedings of the International Workshop on Red Coral Science, Management, and Trade: Lessons from the Mediterranean* is now available. Please contact Glynnis Roberts if you would like to receive a copy.

Report Offers Insight in to the Coral Reef Ecosystems of La Parguera, Puerto Rico. A new report by NOAA's National Centers for Coastal Ocean Science and partner scientists provides managers with a comprehensive characterization of the fish and benthic communities of southwestern Puerto Rico, primarily within the La Parguera Natural Reserve. The report, entitled *Coral reef ecosystems of Reserva Natural de La Parguera (Puerto Rico): Spatial and temporal patterns in fish and benthic communities (2001-2007)*, presents analysis of a long-term data set that is intended to provide essential baseline biological information to support future management decision making. The reserve is a multiuse area that spans the continental shelf from the extensive mangrove forests fringing the shoreline to the complex shelf edge coral reefs that support a diverse and productive fish community. The coral reef ecosystem of La Parguera supports a locally important fishery, as well as recreational activities such as boating, snorkeling and diving. The project is a component of NOAA's Caribbean Coral Reef Ecosystem Monitoring project of NOAA's CRCP and was conducted through an ongoing multi-agency collaboration between NOAA's Center for Coastal Monitoring and Assessment Biogeography Branch, the University of Puerto Rico and the Puerto Rico Government's Department of Natural and Environmental Resources.



New Deep-sea Coral Report and Database. The US Geological Survey's (USGS) Coastal and Marine Science Center has recently released a new report and accompanying database of deep-sea coral observations for the Western North Atlantic and the Gulf of Mexico: *USGS Cold-Water Coral Geographic Database - Gulf of Mexico and the Western North Atlantic, Version 1.0*. The database is also available through the Website and contains over 1600 geospatial records with complete citations. The database is being expanded to include additional surveys and more geographic regions as a partnership effort between the USGS and NOAA's Deep-Sea Coral Research and Technology Program. The current version has been developed with support from the CRCP.