

# CORAL REEF CONSERVATION PROGRAM

## NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

### U.S. DEPARTMENT OF COMMERCE

## SUMMARY OF 2003 ACCOMPLISHMENTS

Coral reefs are among the most biologically productive and diverse ecosystems in the world. Healthy coral reefs provide income and food by supporting commercial and subsistence fisheries, as well as jobs and businesses through tourism and recreation. They also save lives as an important source of new medicines being developed to treat cancer, arthritis and infections. Not only are coral reef structures areas of natural beauty and recreation, they are also natural barriers that buffer shorelines from wave action, storms and floods and help protect coastal communities.

The NOAA Coral Reef Conservation Program supports effective management and sound science to preserve, sustain and restore valuable coral reef ecosystems. To successfully accomplish these goals and to reduce the loss and degradation of coral reef ecosystems, the program works with scientific, private, government and non-government partners, from local to international scales.

In FY2003, the NOAA Coral Reef Conservation Program (CRCP) supported a wide variety of activities to conserve and manage coral reef ecosystems. These activities address priorities and requirements identified by the U.S. National Action Plan to Conserve Coral Reefs, the U.S. National Coral Reef Action Strategy, the U.S. Coral Reef Task Force, the Coral Reef Protection Executive Order (13089), and the Coral Reef Conservation Act of 2000. The following are highlights of some of the CRCP's significant accomplishments in fiscal year 2003.

### Map Coral Reefs

Coral reef maps provide important information about the extent and structure of coral reef ecosystems. These types of maps are a critical aspect of effectively managing coastal resources, designing research activities, identifying essential fish habitat, conducting damage assessments, tracking status and trends, and evaluating results of management efforts. NOAA and its partners are applying a variety of technologies to map all U.S. shallow water coral reef ecosystems and associated deeper reefs. The National Coral Reef Action Strategy (NAS) calls for the completion of shallow water coral reef mapping by 2009. To work towards this goal, NOAA:

- Released the *Atlas of the Shallow-Water Benthic Habitats of the Northwestern Hawaiian Islands—Draft*, which provides baseline information on the locations and distributions of the shallow-water (<100 ft.) reefs and other seabed features of the Northwestern Hawaiian Islands (NWHI).
- Conducted the first systematic multibeam sonar mapping of deeper reefs and habitats of the NWHI and compiled initial results in the *Bathymetric Atlas of the Northwestern Hawaiian Islands: A Planning Document for Benthic Habitat Mapping* to be published in FY2004. (<http://crei.nmfs.hawaii.edu/BathyAtlas/>)
- Conducted shallow to moderate depth acoustic mapping of reefs around Midway Atoll, Saipan,

Tinian, Rota, and Guam utilizing the multibeam on the new survey launch *R/V AHI*.

- Prepared draft maps of shallow-water reefs and associated habitats of American Samoa and Saipan. Final benthic habitat maps of American Samoa, Guam, and CNMI are expected in 2004.
- Mapped and characterized key tracts in the Oculina Banks Habitat Area of Particular Concern off the coast of Florida to a depth of 150 meters, mapping of the remaining areas is scheduled for 2004.
- Developed a quantitative measure (“acoustic complexity index”) for classifying Atlantic coral reef habitat characteristics (at moderate depths greater than 20 meters) that are of importance to commercially valuable reef fishes.

### **Monitor and Assess Reef Condition**

Monitoring allows managers to assess reef conditions, diagnose reef problems, prioritize and implement solutions, evaluate the results of management decisions, and forecast future conditions. The NAS calls for an integrated, nationwide coral reef monitoring system to profile and track the health of U.S. coral reefs ecosystems. This system will be used to measure the effectiveness of management actions. NOAA completed a number of actions to enhance monitoring and assessment of U.S. coral reef resources. NOAA:

- Led the first major scientific coral reef assessment and monitoring cruise to the CNMI and Guam. In partnership with local managers and scientists, NOAA surveyed many remote islands and banks for the first time, revealing numerous new species records for the region and observing the influence of recent volcanic activity on coral reef ecosystems at Anatahan Island.
- Led the 4<sup>th</sup> annual multi-agency coral reef assessment and monitoring cruise to the NWHI, which, among other findings, documented

damage to reef ecosystems from the 2002 bleaching event.

- Strengthened and expanded the National Coral Reef Monitoring Program through enhanced partnerships with States, Territories, and other Federal agencies. Preparations are underway for the 2<sup>nd</sup> report on the State of U.S. Coral Reefs.
- Completed a major assessment of reef fish resources and reef habitat off Broward County, Florida, establishing baselines and trends. Exploitable sized snapper and grouper species were depleted in this area.
- Prepared and distributed a technical report describing the baseline assessment of Navassa Island’s reef resources including the composition and condition of local benthic habitat and fish assemblages.
- Conducted regular monitoring cruises in the Florida Keys enabling scientists to identify early signs of specific threats such as coral diseases, which can lead to more efficient management counter measures.
- Enhanced NOAA’s Coral Reef Watch Program that combines *in situ* and satellite monitoring to provide real-time meteorological and oceanographic data on coral reef bleaching and other coral reef conditions. One additional early warning *in situ* station was deployed in the Caribbean and one in the Pacific. Coral Reef Watch’s Degree Heating Weeks and Tropical Ocean Coral Bleaching Indices are now fully operational and available online at: [http://orbit-net.nesdis.noaa.gov/orad/coral\\_bleaching\\_index.html](http://orbit-net.nesdis.noaa.gov/orad/coral_bleaching_index.html).

### **Conduct Strategic Research**

Research is critical to understanding how coral reef ecosystems function, how human activities impact reef processes, and how managers and the public can reduce or eliminate these impacts, reduce threats and sustain healthy coral reef ecosystems. The NAS calls for strategic research to help identify the causes, consequences and solutions to coral reef

decline. Strategic research includes understanding social and economic factors necessary for effective conservation of coral reef ecosystems. NOAA:

- Supported the Hawai'i Coral Reef Initiative Research Program, the National Coral Reef Institute (Florida), and the Puerto Rico Coral Reef Monitoring Program, which are leading coral reef research efforts in these jurisdictions.
- The Coral Disease and Health Consortium developed a *Coral Health and Disease National Research Plan* that identifies gaps, information needs, priorities and research objectives to improve our understanding of diseases and develop strategies to mitigate their impacts. The Consortium also successfully mobilized and coordinated research efforts in response to the May 2003 coral infectious disease outbreak in the Florida Keys.
- Determined factors that may control the populations of coral-feeding gastropods. Predation by these snails is a contributing factor to coral decline in Florida.
- Completed *the Proceedings of the Acropora Workshop* that summarizes the biology, status, trends, and management of two Caribbean coral candidates for listing under the Endangered Species Act.
- Continued targeted research in Florida, the U.S. Caribbean and Hawai'i, to determine and quantify the impact of land-based sources of pollution, overfishing, and commercial and recreational activities on coral reef ecosystems.
- Provided coral reef resource valuation information to coastal and coral reef resource managers.
- Provided funding and technical assistance to American Samoa in order to assess the economic importance of local coral reef and coastal resources.
- Conducted consultations with local fishers in USVI and Puerto Rico and laid the foundation for resource managers to better understand the

socioeconomic issues to be addressed when establishing marine protected areas.

### **Improve the Use of Marine Protected Areas**

Coral reef protected areas can safeguard these unique and important resources by protecting important habitats, such as those in the Northwestern Hawaiian Islands. In 2000, the National Action Plan proposed the development of a network of coral reef marine protected areas in U.S. waters. NOAA works with stakeholders to strengthen the effectiveness of existing protected areas. In an effort to improve coral reef protected areas, NOAA:

- Provided assistance in developing a Management Plan for the Natural Reserve in Culebra, Puerto Rico.
- Provided research to support the Gulf of Mexico Fishery Management Council's proposed six-year extension of the marine reserves at Madison-Swanson and Steamboat Lumps to protect spawning aggregations of gag grouper.
- Provided assistance to assess the status of coral reef protection in U.S. waters. This information will be used in the 2004 "Coral Reef Protected Area Status Report" for the U.S. States and Territories.
- Continued to support operations and sanctuary designation process for the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve. Reserve managers prioritized key issues from the FY2002 public scoping process and held a broad-based science workshop to identify and prioritize research and monitoring needs.

### **Reduce Adverse Impacts of Fishing**

Overfishing is one of the most common threats to coral reef ecosystems worldwide. NOAA strives to increase stakeholder awareness and participation in fishery management and to strengthen permitting and enforcement of current regulations. The NAS calls for reducing adverse impacts of fishing and increasing sustainable management of coral reef

fisheries through improved scientific information, coordination, enforcement and management approaches. To work towards these goals NOAA:

- Supported workshops for Puerto Rico's Ranger Corps to educate the Rangers about the importance of coral reef ecosystems, proper fish identification and the existing regulations related to fishing and coral reef ecosystem protection, ultimately improving local enforcement efforts.
- Supported two coral reef fishery management workshops for the Pacific Islands, one in Guam and one in Hawai'i. The workshops highlighted needs for increasing enforcement capacity and continuing to build stakeholder involvement into management activities.
- Provided for a NOAA Fisheries liaison in American Samoa to provide technical expertise to enhance local coral reef management efforts.
- Conducted an interdisciplinary study of trap fishing in Puerto Rico and USVI to support the development of appropriate management measures to address overfishing and trap impacts on habitat. In both jurisdictions, fishers mainly target areas adjacent to reefs (sand, seagrass, hard-bottom, and algal habitats).
- Conducted studies to increase the understanding of larval transport of fisheries species from coral reef reserves in the NWHI, American Samoa, Guam and CNMI.

### **Reduce Impacts of Coastal Uses**

Coastal uses, such as recreational boating, beach re-nourishment, and laying new pipelines or cables, can have negative impacts coral reef ecosystems. For example, vessel groundings can cause injury to the coral reef ecosystems by destroying habitat, releasing pollutants, and entrapping wildlife. The NAS calls for initiation of actions to reduce the impacts of vessel groundings, development and other coastal uses. NOAA supports activities that enable States and Territories to respond to and reduce the habitat destruction. NOAA:

- Continued to assess and build local capacity to manage abandoned vessel issues through legal and technical assistance.
- Enhanced the database of abandoned vessels affecting NOAA trust resources through ground surveys in the Pacific Islands. The database will form the basis of a coordinated strategy to address the array of threats posed by grounded vessels.
- Assisted in installation of mooring buoys and signage within USVI reserves.

### **Reduce Pollution**

Both land-based and sea-based pollution can cause coral reef loss and degradation by increasing the amount of sediments and nutrients in the water column or by increased debris. To improve the health of the Nation's coral reef ecosystems, the concentration and cumulative impacts of pollutants need to be reduced. The NAS calls for action to reduce the quantity of sediments, nutrients, debris, biological, and other pollutants entering coral reef ecosystems and mitigate their impacts to the ecosystem. NOAA:

- Collaborated with the State of Hawai'i, U.S. Fish and Wildlife Service, and numerous other partners, to remove 122 tons of derelict fishing gear from NWHI reefs, bringing the multi-year total to over 351 tons. NOAA also assesses and monitors marine debris accumulation, identifies potential source fisheries, evaluates the impacts of this derelict gear on coral reefs and protected species, and enhances public awareness about the derelict gear affecting these remote islands and atolls.
- Completed and reviewed draft Environmental Sensitivity Index Maps for American Samoa. These maps are key to assessing the potential impact of oil spills and hazardous material releases, and guide the implementation of

effective protective measures and mitigation responses.

- Initiated effort to support the implementation of priority local projects to reduce land-based pollution impacts to coral reef ecosystems.

### **Restore Damaged Reefs**

At times, active restoration is needed to help prevent further degradation or enhance the natural restoration process in injured or damaged coral reef habitats. The NAS calls for increased capability of managers to effectively and efficiently restore injured or degraded coral reefs where appropriate. The NOAA CRCP supports activities that assess and restore damaged coral reef areas. NOAA:

- Assessed seagrass habitat damage in the Florida Keys National Marine Sanctuary, caused primarily by small vessels, and supported restoration of these habitats, which are essential to the health of the entire coral reef ecosystem. Implemented the first of these types of restoration projects and laid groundwork for implementing many more.
- Developed technical guidance for evaluating coral reef restoration success and introduced a convergence prediction model to estimate the time required for restored sites to resemble undamaged reference sites.
- Monitored and assessed coral and reef fish recovery at coral restoration sites in Puerto Rico and Florida.
- Determined that predation continues to limit the re-introduction of the black sea urchin (a beneficial algal grazer that encourages the recovery of damaged reefs) at specific sites in Florida.

### **Reduce Global Threats**

Throughout the world, coral reefs are threatened directly and indirectly by a number of natural and anthropogenic stresses such as increased storm activities, coral bleaching and mortality, resource

extraction, and coastal development. Healthy coral reefs are critical to U.S. efforts to promote economic stability, to improve human health, and to conserve biodiversity in other countries. The NAS calls for U.S. action to reduce threats to coral reef ecosystems internationally and promote sustainable management of reef resources worldwide. NOAA:

- Developed and submitted a successful Convention on International Trade in Endangered Species (CITES) Appendix II listing proposal for all species of seahorses, which will be implemented beginning in May 2004.
- Worked with CITES parties to improve reporting requirements for corals and to address conservation needs of other coral reef species in international trade.
- Partnered with Environmental Protection Agency and the Department of Interior to sponsor an international workshop on *Coral Reefs, Climate Change and Coral Bleaching* and began development of a *Reef Manager's Guide to Climate Change*.
- Worked with national and international partners to develop regional, long-term socio-economic monitoring programs for coral reef managers and establish a network of marine reserve experts and regional action plans in the Caribbean and Southeast Asia.
- Worked with partners to demonstrate the effectiveness of best management practices to reduce and control land-based sources of pollution.

### **Improve Outreach and Education**

A key element of coral reef protection is a strong outreach effort to inform the public about the value of coral reef ecosystems and how to minimize impacts to them. Effective outreach requires reliable access to and efficient sharing of information with all stakeholders. The NAS calls for increased awareness and understanding of ecological, cultural, and socioeconomic importance of coral reef



ecosystems among the widest possible audience. To aid in these efforts NOAA:

- Launched the Coral Literature Education and Outreach ([www.coral.noaa.gov/cleo/](http://www.coral.noaa.gov/cleo/)) website as a source of literature resources, educational modules, and outreach information.
- Continued to enhance the Coral Reef Information System ([www.coris.noaa.gov/](http://www.coris.noaa.gov/)) website by working with stakeholders to refine usability of the system. CoRIS now provides online access to over 8,000 coral reef data products and an extensive number of coral reef references and publications.
- Initiated production of bilingual outreach materials for use in Puerto Rico and the USVI and continued the NOAA Fisheries' workshop series in the U.S. Caribbean.
- Released new Spanish language videos on coral reef ecosystems in Puerto Rico, and released a Spanish Atlas of coral reefs in Cabo Rojo, Puerto Rico.
- Continued to Chair and support the activities of the US Coral Reef Task Force Education and Outreach Working Group. This support included significant efforts to increase outreach to and coordination with local coral reef stakeholders during the Task Force meetings, as well as intensified efforts to foster Working Group participation across all sectors and stakeholder groups.
- Served as a primary partner in the funding and design of educational exhibits developed in conjunction with MacGillivray Freeman's Coral Reef Adventure IMAX film.
- Continued to share information on coral reef conservation through brochures, exhibits, and participation in educational conferences and workshops that build on NOAA resources and activities.

### **State and Territory Management Capacity Building**

The States and Territories have indicated that targeted technical assistance will help them address nine of the top ten threats to coral reef ecosystems including tourism and recreational overuse, overfishing, and land-based pollution. In an effort to help build capacity at the local level NOAA:

- Initiated the State and Territory Coral Management Assistantship program to address priority local coral management capacity needs in U.S. Flag Pacific and Caribbean Islands.
- Supported the All Islands Coral Reef Secretariat to interface with Federal agencies and other partners regarding All Islands priorities and to assist with planning.
- Provided support to assist in the development of three-year local action strategies to address key threats including overfishing, lack of awareness, recreational overuse, land based sources of pollution, climate change, and disease.

### **Coral Reef Conservation Fund**

The partnerships created through the Coral Reef Conservation Fund (a partnership between NOAA and the National Fish and Wildlife Foundation) are important for on-the-ground conservation of coral reefs throughout the world. Through the partnerships, grant recipients are able to generate substantial matching funds for the conservation of coral reefs.

- Through NFWF, this Fund awarded grants to 26 applicants. The program uses Federal funds to leverage non-Federal resources for coral reef conservation initiatives. (In 2003, \$0.89 M in NOAA funds leveraged \$1.7 M in non-Federal matching funds for a total of \$2.59 M.)

### **Coral Reef Conservation Grant Program**

The Coral Reef Conservation Act of 2000 requires that NOAA establish and administer the Coral Reef

Conservation Grant Program as part of a national effort to conserve coral reefs. This program is supported in part by the Department of Interior and provides grants to U.S. State and Territory governments, Regional Fishery Management Councils, non-government agencies (NGO), and academia for local on-the-ground work. In FY2003 \$5.5 million in NOAA/DOI funds leveraged more than \$1.9 million in matching funds. NOAA continued to build the Coral Reef Conservation Grant Program and:

- Supported State and Territory efforts to develop and implement priority local coral reef management projects.
- Strengthened grant-funded State and Territory monitoring, including increased support for the Freely Associated States in Micronesia.
- Implemented a new competitive research grants

program, in partnership with National Undersea Research Program and the Environmental Protection Agency.

- Supported coral reef conservation actions by Regional Fishery Management Councils in the South Atlantic, Gulf of Mexico, Caribbean, and Western Pacific, including increased outreach by Councils for collaborative projects with States and Territories.
- Provided matching funding for innovative coral reef conservation projects by academic institutions, NGOs and other partners.
- Funded international projects in support of watershed management, effectiveness of coral reef MPAs, regional approaches to further marine reserves, and socioeconomic monitoring.

Additional information on NOAA's Coral Reef Conservation Program and other NOAA coral reef activities can be found on NOAA's Coral Reef Information System at [www.coris.noaa.gov](http://www.coris.noaa.gov).

For current news and highlights of NOAA's coral reef activities, visit NOAA's Coral Reef online at [www.coralreef.noaa.gov](http://www.coralreef.noaa.gov).

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