

Dry Tortugas Research Natural Area Implementation

National Park Service
U.S. Department of the Interior

South Florida Natural Resources Center
Everglades and Dry Tortugas National Parks



The newly-established Research Natural Area (RNA) of Dry Tortugas National Park is a 46-square mile marine reserve designed to restore ecological integrity and capacity for self-renewal by minimizing human disturbance. The RNA complements the adjacent Tortugas Ecological Reserve of the Florida Keys National Marine Sanctuary (FKNMS) established by the National Oceanic and Atmospheric Administration (NOAA) and the state of Florida, and thereby contributes to a region-wide effort to strengthen resource protection. Together, the RNA and the larger Tortugas Ecological Reserve will help to ensure the success of both marine and terrestrial ecosystems while offering outstanding opportunities for scientific research and public education. Implementation of the RNA will require collaboration among federal and state agencies, nongovernmental organizations, and the academic community to ensure that sampling protocols are standardized and to provide a mechanism for cost-sharing. Specific activities include studies that document pre-RNA ecological conditions, establishment of RNA infrastructure and protection measures, and ongoing monitoring of the response of marine resources to protection. Studies of the impacts of RNA implementation on cultural resources and the quality of visitor experiences also will be conducted.

Science Supporting the RNA

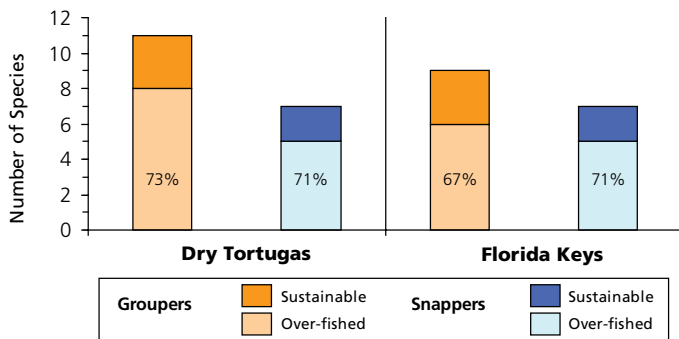
Reef Fish Assessment. Major declines in reef gamefishes illustrate the vital need for the RNA. The Reef Fish Assessment Project — initiated in 1999 to establish baseline gamefish information for the RNA — revealed that over 70% of the grouper and snapper species in the park are over-fished. Project results also suggested that the reef fishery inside the park is in worse condition than in the surrounding area. The National Park Service (NPS), in collaboration with the Florida Fish and Wildlife Conservation Commission (FFWCC), NOAA, U.S. Geological Survey, and University of Miami, will continue to monitor reef gamefishes after RNA implementation. Results will be critical for evaluating the effects of protection on these important species.

Acoustic Tracking of Reef Fish. Because they have the largest home ranges of any of the reef fishes, groupers were selected as the focus of a study to examine fish movements into and out of the RNA. Prior to the reserve's establishment, thirty-two of the animals were tagged with acoustic telemetry devices and monitored. Their movements will be compared to the movements of groupers tagged after the RNA is implemented to examine the impacts of the RNA on these fish. The tracking project is being conducted in collaboration with the NOAA Tortugas Ecological Reserve Biogeographic Assessment project and the FFWCC.

Coral Monitoring. The Dry Tortugas has undergone an extensive decline in stony corals. Staghorn corals (*Acropora cervicornis*) have declined more than 99% since 1977, and live brain coral (*Colpophyllia natans*) cover on Bird Key reef declined 69% between 2001 and 2002. In 2003, the largest known thicket of fused staghorn coral (*Acropora prolifera*) in Florida experienced mass mortality due to disease. In 2004, disease and/or bleaching were observed at 19 of 21 monitoring stations. The goal of the coral monitoring and assessment project is to evaluate the ecological status of the common and rare reef coral communities in the park before and after RNA implementation. The project is being conducted in collaboration with an interagency south Florida coral reef evaluation and monitoring project.

The NPS is collaborating with the U.S. Environmental Protection Agency, NOAA, and FFWCC to monitor and assess coral abundance and health (disease and bleaching) and the associated benthic community throughout the Tortugas. In particular, the FFWCC is helping the NPS to inventory, map, monitor, and assess the distribution and abundance of federally-endangered *Acropora* species. This information will be integrated with similar *Acropora* assessments conducted by NOAA throughout the rest of south Florida.

Bermuda chubs (*Kyphosus sectatrix*)
photo by William Perry, Everglades National Park



Data from populations of grouper and snapper species in the Florida Keys and Dry Tortugas regions. The number of species that are over-fished far exceeds the number of species with sustainable populations.

Sea Turtle Monitoring. Loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles commonly nest on the beaches of the Dry Tortugas. Sea turtle nesting, hatching success, and stranding incidence were monitored from 1995 to 2004, excluding 2002. A total of 2,125 nests produced an estimated 121,589 hatchlings entering the Gulf of Mexico. An unusually high number of tropical storms, including four major hurricanes, negatively affected the 2004 nesting season. That year, 96 nests were lost and salt water inundated many of the remaining nests. Still, 134 loggerhead and 59 green sea turtle nests were documented and, for the first time ever recorded at Dry Tortugas National Park, leatherback sea turtles (*Dermochelys coriacea*) nested, producing three nests. This study will continue after RNA implementation and will evaluate the impacts of the reserve on sea turtle reproduction.

Monitoring of sea turtle nesting, hatching success, and stranding is conducted in collaboration with the FFWCC, National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (FWS). These three agencies are training NPS personnel to use methods that are compatible with those being used elsewhere in Florida, so that data and findings can be shared.



Loggerhead (*Caretta caretta*) sea turtle hatchling near Fort Jefferson in Dry Tortugas National Park. photo by Brett Seymour, NPS

Dive Site Mooring Buoy Survey. A survey will be conducted to identify potential diving and snorkeling sites for designation throughout the RNA. These sites will require mooring buoys because anchoring will not be permitted in the RNA. Ideally, these buoys will be located in areas that do not include sensitive resources, such as federally-endangered coral species, but that represent the range of habitats found in the RNA. Buoys also will be located close to other areas of interest to visitors, such as shipwrecks.



Mooring buoys provide an alternative to substrate-damaging boat anchors. photo by FKNMS

New Initiatives and Program Support. Additional science projects that have recently begun include seagrass community monitoring and assessment and evaluation of the long-term effects of the 2004-2005 hurricanes on the Dry Tortugas marine ecosystem. Other science needs will likely arise as more is learned about this important region. The RNA implementation effort will require long-term support by NPS stewardship and science staff.

Research Permits. The NPS supports natural and social science studies in the RNA, provided that they enhance understanding of the reserve's natural, cultural, and social resources, processes, and values, or serve to assess how use of the park impacts the ecosystem. Scientists may obtain permits to conduct research in the RNA through the South Florida Natural Resources Center's website (<http://www.sfnrc.ever.nps.gov>).

Infrastructure and Protection

RNA Protection Program. Protecting the RNA from activities that hamper the mission to restore the preserve's ecological function and capacity for self-renewal, such as fishing and boat anchoring, will require enforcement. Currently, the NPS plans to develop an agreement with the FFWCC to allow the law enforcement personnel of each agency to enforce authority in both the RNA and the FKNMS waters. Dual authority will significantly streamline the law enforcement function in the boundary areas between the reserves.

Compliance for Mooring Buoys. Mooring buoys are necessary to protect sensitive coral reef communities from anchor damage. An Environmental Assessment (EA) will be prepared that analyzes the potential environmental effects of implementing a mooring buoy system. Interested and affected stakeholders and the general public will have the opportunity to participate in the mooring buoy planning process and EA.

Mooring and Boundary Buoy Installation. In addition to the boundary buoys that will be installed, up to 15 mooring buoys will be located throughout the RNA near dive and snorkel sites, which will allow visitors to access the preserve without negatively impacting the ecosystem. Global Positioning Satellite (GPS) coordinates for each of the buoys will be provided to visitors and a program will be implemented to monitor the effects of visitor use on the ecosystem.

Permitting System. Permits will be required for all activities conducted in the RNA, including research and recreational snorkeling and diving, and may also be required for activities located within the RNA on Loggerhead Key. Permits also will be required for mooring buoy reservations. Initially, these permits will only be issued in person at Garden Key, but the ultimate goal is to make them available via the Internet, telephone, and mail. Eventually, permits will be available through Dry Tortugas and Everglades National Parks and the Florida Keys EcoDiscovery Center in Key West. Fees may be implemented to help cover the costs of the permit program. An education program will be developed that includes a fact sheet and personal interaction with park staff to educate visitors and researchers about the permitting process.



Black Grouper (*Mycteroperca bonaci*), an important reef gamefish.
photo by Douglas Morrison, Dry Tortugas National Park

Visitor Use and Cultural Resources

Crowding and Conflicts. Changing patterns of visitor use may have both positive and negative ecological effects on the park's natural and cultural resources, as well as on the quality of visitor experiences. The Visitor Experience and Resource Protection (VERP) plan will link natural resource data with social science tools to provide park managers with clear guidance for managing visitor use. Two methods will be used: (1) a photographic simulation that examines visitors' preferences for various management alternatives, and (2) a simulation model that identifies the maximum number of daily visitors that the park can sustain without violating crowding and conflict standards. Results will help to ensure long-term resource protection and high-quality visitor experiences.



A visitor discovers coral colonies growing at the base of historic Fort Jefferson in Dry Tortugas National Park. photo by Brett Seymour, NPS

Submerged Resources Baseline Condition Assessment and Monitoring. Park scientists will develop a Geographic Information System (GIS) that results in datasets and tools for managing the park's extensive submerged cultural resources (SCR), such as shipwrecks. This information is essential for documenting baseline conditions and monitoring changes over time. Data will be used to define indicators, standards, and monitoring protocols associated with the SCR component of the VERP plan.

Develop and Implement Outreach Program. An outreach program designed to educate the public about the park and the RNA will be carried out by interpretive rangers through in-person visits, the Internet, and print, radio and television outlets. Key venues for ranger visits will include recreational fishing clubs, fishing guide organizations, and commercial dive operators who visit the Dry Tortugas. Outreach also will be conducted at events such as the Miami Boat Show, and rangers will appear as guests on Florida Keys radio shows. An episode of the NPS-produced Waterways Television program will describe the RNA. The

episode can be copied to DVDs and distributed as needed. Finally, web content will be posted on the Dry Tortugas National Park website, and brochures and an RNA guide will be printed.

Memorandum of Agreement

The NPS will enter into a Memorandum of Agreement with the FFWCC to implement a joint research, monitoring, and enforcement program for the RNA. This work will be coordinated with similar efforts by the FKNMS and will provide a status report on marine fisheries at least every five years to the Florida Governor and Cabinet (Board of Trustees). These efforts will document the status and trends of the fisheries, determine the efficacy of the RNA, and provide for informed decisions regarding any future changes in the RNA. Implementing the RNA

represents a significant step forward in the protection of marine resources. The NPS is committed to working with its partners to conduct research, education, enforcement, and adaptive management of the Dry Tortugas ecosystem.

Funding

Over time, the marine resources of the Dry Tortugas National Park have become increasingly threatened by human activities, such as over-fishing and boat anchoring. The RNA offers the potential to protect this sensitive environment from further degradation, yet the current level of the park's annual funding is insufficient to implement the reserve in a timely manner. The park has commenced efforts to secure the necessary funding to implement the RNA, ensuring that the park's pristine subtropical ecosystem will be restored and preserved for future generations.



Dry Tortugas National Park lies 70 miles west of Key West, Florida. The islands and waters of the Dry Tortugas are recognized for their seagrass beds, fisheries, coral reefs, and sea turtle and bird nesting habitat, as well as for Fort Jefferson. Built in the nineteenth century, Fort Jefferson is the largest masonry coastal fort in the country.