



## **4** *Projects to Improve or Amend Coral Reef Fishery Management Plans*

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### *Introduction*

The NOAA CRCP provides grants for projects that improve or amend Coral Reef Fishery Management Plans to the four regional Fishery Management Councils—the Western Pacific Regional, Gulf of Mexico, South Atlantic, and Caribbean—with responsibility for Fishery Management Plans that includes shallow water coral reefs or fishery resources dependent on reef ecosystems. The Councils are responsible for developing Fishery Management Plans to meet a variety of standards under the Magnuson-Stevens Fishery Conservation and Management Act.

This program undertakes activities that:

- Provide better scientific information on the status of coral reef fisheries resources, critical habitats of importance to coral reef fishes, and the impacts of fishing on these species and habitats.
- Identify new management approaches that protect coral reef biodiversity and ecosystem function through regulation of fishing and other extractive uses.
- Develop and implement new ecosystem-based fishery management plans for coral reef species.

Activities must fall within at least one of these seven categories:

- Identifying, mapping, characterizing, monitoring, and protecting critically important habitats of coral reef fishes and associated spawning populations.
- Monitoring reef fish stocks.
- Identifying the adverse impacts of fishing gear and fishing methods and implementation of actions to reduce habitat damage.
- Assessing the adequacy of current coral reef fishing regulations and revision of regulations as needed.
- Education and outreach efforts to recreational and commercial fishers.
- Enhancing enforcement of fishery regulations and/or no-take fishery resources.
- Ecosystem-scale studies and inclusion of ecosystem approaches into coral reef fishery management plans.

Since 2002, the CRCP has provided \$5.9M in grants to support projects that improve or amend Coral Reef Fishery Management Plans.





### ***a. Eligibility***

Eligible applicants are limited to the Fishery Management Councils for the Western Pacific Regional, South Atlantic, Gulf of Mexico, and Caribbean.

### ***b. Activities, Outputs and Outcomes***

The following sections describe activities undertaken, outputs generated, and outcomes realized by each Council supported by these grants from 2002 to 2006. These represent projects funded through this grants program, and do not include the full range of coral reef conservation actions and projects supported by the Councils using other funds.

#### ***Caribbean Fishery Management Council***

**Activities.** The activities supported have been related to mapping, assessing, and characterizing deeper water coral reefs around Puerto Rico and the U.S. Virgin Islands (USVI). These include:

- Mapping and habitat characterization of the Red Hind Bank Marine Conservation District (St. Thomas, USVI), the Lang Bank and Mutton Snapper areas within the Exclusive Economic Zone or EEZ (St. Croix, USVI) and the upper reef slope community (Bajo de Cico, Puerto Rico).
- Inventory and development of an atlas of deeper water coral reefs in the U.S. Caribbean EEZ, with initial work completed in Puerto Rico's Puerto Canoas Reef, Isla Desecheo, and the Mona Passage.
- Assessing recreational USVI coral reef fisheries and developing new recreational fisheries regulations.

**Outputs.** With funding from this grants program, the Council has:

- Developed an atlas of deeper water reefs and associated communities located in the U.S. Caribbean EEZ.
- Collected relevant bathymetric data, benthic cover, and fish community structure for deeper reefs, including areas closed to fishing off western Puerto Rico and Hind Bank.
- Assessed coral reef areas between 30 and 50 m and described fish densities in these areas.
- Participated in scientific meetings (oral presentations).
- Equipped, trained, and certified eight advanced divers using closed-circuit rebreathers to enable expansion of research into deeper habitats, where air diving is not possible.

**Outcomes.** The Council has used CRCP funding to:

- Collect information on fish populations in deeper coral reef habitats off the west coast of Puerto Rico, which has enabled the Council to justify maintaining the area closure for red hind indefinitely, instead of reopening the area closure in 2007 as planned.





- Collect information on other commercially important fish species (e.g., the Nassau and yellowfin groupers) that appear to be using the same areas as the red hind. This information will help determine if management measures are sufficient to promote rebuilding of these stocks.
- Collect information on the population dynamics of queen conch and effectiveness of area closures at rebuilding overfished populations.
- Build capacity to assess deeper reefs (40 to 150m) and establish annual monitoring programs at these sites.
- Characterize community structure of commercially important marine ornamental fishes and establish the potential role of deep water habitats as a refuge.
- Begin an effort to revise commercial and recreational fisheries regulations to improve conservation and ensure Federal measures are complementary with those in state or territorial waters.

### ***Gulf of Mexico Fishery Management Council***

**Activities.** The activities supported have been related to mapping, assessing, and characterizing mid- and outer-shelf banks in the Gulf of Mexico to aid in the determination of essential fish habitat (EFH) and determine the effectiveness of existing Fishery Management Plans. These activities included:

- Collecting high-resolution bathymetry of the Florida Middle Grounds (FMG).
- Characterizing and assessing the mid-shelf of Sonnier Bank and the outer-shelf banks in the northwestern Gulf of Mexico.
- Assessing population dynamics, community structure, and patterns of recovery of sessile invertebrates after a mass mortality event caused by the dinoflagellate, *Karenia brevis*.

**Outputs.** With funding from this grants program, the Council has:

- Mapped, assessed, and characterized biodiversity and habitat structure of mid- and outer-shelf banks in the Gulf of Mexico.
- Implemented a monitoring program for benthic resources within the FMG.
- Completed stock assessments of commercially important fisheries species and characterized fish habitat use patterns of different life stages inside and outside of MPAs within the Gulf of Mexico.
- Completed publications and presentations including:
  - Friess, C., R. T. Kraus, J. R. Rooker, and R. L. Hill. 2006. *Biotic diversity of a mid-shelf bank in the northwestern Gulf of Mexico*. Oral presentation at the 109<sup>th</sup> annual meeting of the Texas Academy of Science, Lamar University, Beaumont, Texas, 2 – 4 March.
  - Friess, C., R. T. Kraus, J. R. Rooker, and R. L. Hill. 2006. *Biotic diversity of a mid-shelf bank in the northwestern Gulf of Mexico*. Poster presentation at the 14<sup>th</sup> annual





meeting of the Southern Division of the American Fisheries Society, San Antonio, Texas, 8 – 12 February.

- Kraus, R. T., Ronald L. Hill, and J. R. Rooker. 2005. *Comparison of ROV and SCUBA approaches to quantify reef fish abundances in the NW Gulf of Mexico*. Poster presentation at the 135<sup>th</sup> annual meeting of the American Fisheries Society, Anchorage, Alaska, 11 – 16 September.
- Kraus, R. T., R. L. Hill, J. R. Rooker, and T. Dellapenna. In Review. *Preliminary characterization of a mid-shelf bank in the northwestern Gulf of Mexico as essential habitat of reef fishes*. Proceedings of the Gulf and Caribbean Fisheries Institute.

**Outcomes.** With funding from this grants program, the Council has:

- Characterized Madison-Swanson and Steamboat Lumps MPAs and conducted annual monitoring of fish community structure. This information was used to justify permanent closure of these areas, which were scheduled to reopen in 2007.
- Supported development of a monitoring program for the FMG to compare benthic community structure between impacted and unimpacted sites and assess recovery in sites affected by a 2005 mass mortality event.
- Completed habitat and bathymetric maps of the entire FMG Habitat Area of Particular Concern (HAPC).

### ***South Atlantic Fishery Management Council***

**Activities.** The activities supported have included:

- Verifying near shore coral live/hard bottom habitat for designating EFH.
- Mapping the outer continental shelf and upper slope deep reef systems to designate HAPCs for deepwater coral.
- Developing and maintaining the Council's Habitat and Ecosystem Internet Map Server ([http://ocean.floridamarine.org/efh\\_coral/ims/viewer.htm](http://ocean.floridamarine.org/efh_coral/ims/viewer.htm)) and Comprehensive Habitat and Ecosystem Plan Homepage ([www.safmc.net/ecosystem](http://www.safmc.net/ecosystem)).
- Developing a Deepwater Coral Research and Monitoring Plan for the South Atlantic.

**Outputs.** With funding from this grants program, the Council has:

- Developed an Internet Map Server (IMS) to provide access to spatial data, imagery, videography, and documents related to coral and other habitats of the South Atlantic. The IMS incorporates GIS data from a variety of Federal, state, academic, and private sources including fish and habitat distributions (MARMAP/SEAMAP), environmental sensitivity indexes, deepwater coral (*Oculina* and *Lophelia*), proposed deepwater MPAs, special management zones, and artificial reefs.







- Developed online resources within the Comprehensive Habitat and Ecosystem Homepage to disseminate information on deepwater corals, in particular *Oculina* and *Lophelia* corals ([www.safmc.net/HabitatManagement/DeepwaterCorals/tabid/229/Default.aspx](http://www.safmc.net/HabitatManagement/DeepwaterCorals/tabid/229/Default.aspx)).
- Mapped key portions of the outer continental shelf and upper continental slope, including critical areas within Oculina Bank.
- Supported research that resulted in the proposed designation of four deepwater coral HAPCs in the South Atlantic region.
- Developed a Deepwater Coral Research and Monitoring Plan.
- Developed a general-purpose, high-resolution DVD about the deepwater coral banks of the South Atlantic region.

**Outcomes.** With funding from this grants program, the Council has:

- Completed characterization and mapping of the Oculina Experimental Closed Area, a necessary step to protect and enforce the closed area.
- Developed a Deepwater Coral Research and Monitoring Plan ([www.safmc.net/Portals/0/Lophelia/SADWCResMonPlanJuly07-final.pdf](http://www.safmc.net/Portals/0/Lophelia/SADWCResMonPlanJuly07-final.pdf)).
- Supported research directed towards the identification of ecosystem approaches to manage deep-sea coral ecosystems.
- Characterized the distribution, habitat and associated fauna of deep water coral reefs off Florida, Georgia, South Carolina and North Carolina and used this information to identify possible locations for several new HAPCs.
- Produced a number of detailed reports to the Council including:
  - Reed, J. 2004. *Deep-water coral reefs of Florida, Georgia and South Carolina: a summary of the distribution, habitat, and associated fauna*. Ross, S. 2004. *General description of distribution, habitat, and associated fauna of deep water coral reefs on the North Carolina Continental Slope*.
  - Reed, J. 2006. *Habitat and fauna of deep-water coral reefs off the southeastern USA*.
  - Ross, S. 2006. *Review of distribution, habitats, and associated fauna of deep water coral reefs on the southeastern United States Continental Slope (North Carolina to Cape Canaveral, FL)*.

### ***Western Pacific Regional Fishery Management Council***

**Activities.** The activities supported have been located throughout Hawai'i, American Samoa, CNMI, and Guam and include community forums, workshops, symposiums, fish stock assessments, mapping and habitat characterizations, assessment of non-native or invasive species, and targeted research on recreationally and commercially important fisheries species.

Examples of activities include:

- Supporting a Coral Reef Program Manager to assist in the day-to-day coordination and management activities related to coral reefs (*American Samoa*).





- Researching parrotfish spawning aggregations and movement of three commercially important species throughout the Managaha Reserve (*Guam/CNMI*).
- Compiling and analyzing historical data and grey literature on the Mariana Archipelago, including creel survey forms (*CNMI and Guam*).
- Mapping and assessment of bottomfish populations in Kaho’olawe Island Reserve and other sites around Maui (*Hawai’i*).
- Developing technologies (visual and acoustic) to identify and refine EFH for important recreational and commercial species.
- Researching population biology of parrotfish (*Hawai’i*).
- Supporting the Ulua (Carangid) Tagging Project (*Hawai’i*).
- Working with indigenous communities to document cultural practices and place-based resource management tenure systems (*Hawai’i*).

**Outputs.** With funding from this grants program, the Council has:

- Led community outreach and capacity building efforts among fishers.
- Compiled historical information and collected limited new information on movement patterns, growth and mortality for coral reef fish species from the families Acanthuridae, Scaridae, Mullidae, Carangidae, and Holocentridae, and for lobsters.
- Compiled and analyzed historical data on reef fisheries in Guam, CNMI, Hawai’i and American Samoa.
- Conducted workshops and community forums in support of the development and implementation of ecosystem approaches to monitor and manage coral reef fisheries, including identification of indicators, ecological impacts, socioeconomic considerations, and stock assessment needs.
- Determined the effect of introduced species on native fauna, including feeding interactions and ecological impacts.
- Compiled fishery dependent data for bottomfish, lobsters, and other commercial marine landings.
- Supported the publication of a status report on commercial coral reef fisheries:
  - Demello, J.K. 2004. *Commercial marine landings from fisheries on the coral reef ecosystem of the Hawaiian archipelago*. In: Status of Hawai’i’s coastal fisheries in the new millenium. A.M. Friedlander (ed.). Proceedings of the 2001 Fisheries Symposium. American Fisheries Society, Chapter Honolulu, Hawai’i. p. 157-170.
- Supported scientific symposiums that resulted in a number of detailed reports on activities prepared for the Council under the grant including:
  - Amesbury, J. R., 2005. *Information on indicators for the Mariana Archipelago Fishery Ecosystem Plan*. 102 pp.
  - Ault, J., G. Begg, N. Gribble, M. Kulbicki, B. Mapstone and P. Medley. 2004. *Coral reef fish stock assessment workshop: Interim Final Report*. 10-13 February 2004. 30 pp.
  - Bartram, P. 2003. *Findings and recommendations on pilot studies supporting the proposed Mariana Archipelago fishery ecosystem plan*. 10 pp.
  - Hawhee, J. 2006. *Western Pacific Coral Reef Ecosystem Report*. 185 pp.





- Hunter-Anderson, R. L. 2005. *Ecological notes in support of designing ecosystem-based fishery management plans for the Mariana Islands, Micronesia*. 51 pp.
- Impact Assessment Inc. 2006. *Ecosystem Social Science Workshop Proceedings*. 17-20 January 2006. 138 pp.
- Kelly, K. and A. Messer. 2005. *Main Hawaiian Island lobsters: commercial catch and dealer data analysis (1984-2004)*. 42 pp.
- Kahng, S.E. 2007. *Ecological impacts of *Carijoa riisei* on black coral habitat*. 5 pp.
- Munro, J. L. 2003. *The assessment of exploited stock of coral reef fishes*. 55 pp.
- Parrish J.D. and B.D. Schumacher. 2005. *Feeding interactions of the introduced blue-line snapper with important native fishery species in Hawaiian benthic habitats*. 31 pp.
- Polunin, N. and N. Graham. 2003. *Review of the impacts of fishing on coral reef populations*. 45 pp.
- Ralston, S., S. Cox, M. Labelle and C. Mees. 2004. *Bottomfish Stock Assessment Workshop: Final Panel Report*. 13-16 January 2004.
- Western Pacific Fishery Management Council. 2006. *Ecosystem Science and Management Planning Workshop: development of ecosystem-based approaches to marine resource management in the Western Pacific Region*. 18-22 April 2005. 158 pp.
- Zeller, D. S. Booth and D. Pauly. 2005. *Reconstruction of coral reef and bottomfish catches for U.S. Flag Island Areas in the Western Pacific, 1950 to 2002*. 113 pp.

**Outcomes.** With funding from this grants program, the Council has:

- Compiled historical and recent information on coral reef fisheries, including stock assessment data and fisheries landings for reef fishes and lobsters, to help improve management of these stocks.
- Increased community involvement, including indigenous communities, in fisheries management by convening numerous community forums, workshops, and public meetings to share technical information and to discuss threats affecting state and Federal waters, including non-fisheries impacts.
- Evaluated the potential for ecosystem overfishing of shallow water fishery resources throughout the U.S. Pacific Islands and impacts of fishing and fisheries gear on coral reefs and associated organisms.
- Initiated efforts to identify the science requirements (biological and social) to support ecosystem-based approaches to fisheries management, including development of ecosystem indicators for inclusion in future ecosystem-based fishery management plans.
- Supported development of new technologies to assess and monitor coral reef fish stocks and habitats.





### *c. Challenges*

- Proposals contain multiple projects, each with very short descriptions of the activity, sometimes making it difficult to evaluate the methodology or judge the merits of the work.
- The Councils were involved in the development of the Fisheries LAS in certain jurisdictions (e.g., Hawai'i), but only a limited number of projects undertaken by the Councils in state waters are LAS projects. Because LAS activities are supposed to be the top priorities identified for each jurisdiction, the Councils should consider supporting these projects when conducting activities in state waters.
- In some jurisdictions (Pacific Islands), there is limited human capacity making it difficult to undertake even basic fisheries science research. There is also limited availability of assets (vessels) which makes projects costly and difficult to complete.
- The funding from these grants is used in part to provide the science needed to amend or develop fisheries management plans, yet the CRCP has limited control over the specific changes that are adopted.

