

Title: Assess and monitor coral reef MPAs: Summary of FY2011 Activities

Names of PIs and co-PIs:

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Duration of Project

5th year

Project Category:

Reduce Adverse Impacts of Fishing

Improve Use and Effectiveness of MPAs

Brief description of activities conducted in FY2011:

The FY11 goals of this project were to continue long-term monitoring efforts of coral reef fish and habitat in the FL Keys and the Dry Tortugas region. Results are used to (1) assess the effects of marine reserves and other management zones in the FL Keys and Tortugas regions, and (2) improve understanding of ecosystem dynamics and guide ecosystem management, including the maintenance of sustainable fisheries. Sampling uses non-destructive visual assessments based on a stationary-diver technique deployed in a two-stage, stratified random sampling design.

Sampling in the FL Keys has occurred since 1979. Beginning in FY08, the State of Florida's Fish and Wildlife Research Institute (FWRI) and the National Park Service (NPS) agreed to perform cooperative sampling and subsequent data sharing with NOAA SEFSC, and this collaboration began in earnest in FY09. Sampling in the Dry Tortugas region occurred irregularly from 1994-1999, and has occurred every two years since 2000. However, a no-take marine reserve was implemented in Dry Tortugas National Park in early 2007, with an agreement to evaluate its effectiveness in 5 years. Sampling for FY11 began in May, and included 410 sites and over 1544 research dives in the Florida Keys and Biscayne National Park, and 224 sites and 888 research dives in the Dry Tortugas Region. Staff from NOAA SEFSC, NPS, FWRI, UM-RSMAS, NOVA and FIU participated in field research efforts

All data have been entered and passed through the initial quality assurance/quality control procedures, and we are in the final stages of QA/QC procedures. We anticipate distributing FY11 data to all partners by April, and we will use FY11 data to generate sampling points for FY12 surveys by late April or early May 2012.

Description of accomplishments & results:

In FY11, divers conducted photo-documentation, RVC fish surveys, and habitat assessments at 410 sites in the Florida Keys and 224 sites in the Dry Tortugas (4 divers/site). NOAA SEFSC divers collaborated with the University of Miami and RSMAS, FKNMS, Florida Fish and Wildlife Department/FWRI, and the National Park Service (South Florida and Caribbean Network). In the Florida Keys, approximately 33.9% of the RVC dives were made by NOAA

divers and the remaining 66.1% completed by contract, university, National Park Service, and Florida FWRI divers. In total, 1544 dives were needed to complete the 2011 mission to monitor reef fish community composition, habitat composition, and abundance and size structure for more 300 reef fish species on Florida's coral reef tract. Additionally, in the Dry Tortugas (National Park Service cruise), 28.9% of the dives were completed by NOAA personnel, and the remaining 71.1% completed by other agencies. Data are used to assess population and habitat trends (e.g., whether species are overfished) and ecosystem responses to fisheries management actions, including determining the effectiveness of no-take MPAs

How project supports goals & objectives of CRCP:

Monitoring of coral reef fish and habitat resources is critical to the assessment of ecosystem status and the effectiveness of management actions, particularly as they relate to MPAs and the effects of fishing on coral reef ecosystems.

How project supports management of coral reef resources (please include how research plans, progress and accomplishments are articulated to managers):

Data and analytical results are shared with State of Florida, the National Park Service, and FKNMS managers to support and guide management decisions within Florida's coral reef ecosystems. In particular, data from FY11 was critical because the governor and cabinet of the State of Florida will evaluate the effectiveness of the no-take zone in Dry Tortugas National Park in 2012.

List of project Partners and their roles:

Rosenstiel School of Marine and Atmospheric Science, University of Miami: create survey design; assist with data collection and with data analyses and writing of technical reports
State of Florida, Fish and Wildlife Research Institute of the Florida Fish and Wildlife Conservation Commission: assist with data collection
U.S. National Park Service: assist with data collection

Communications, media exposure, capacity building, education and outreach activities:

Partnered with the State of Florida and the National Park Service has resulted in a significant increase in sampling power and project benefits to NOAA, the State of Florida, the National Park Service, and FKNMS managers.

Submissions to CoRIS:

Metadata for RVC sampling 2011 has been completed and submitted to CoRIS

Publications during FY2011 (including reports, tech Memos, etc): * Peer reviewed

- *Ault, J.S. 2011. Overfishing has reduced fish stocks in south Florida. South Florida Marine Environments: An ecological synthesis. In 'Tropical Connections: South Florida's marine environment', W. Kruczynski and P. Fletcher (eds.). IAN Press, College Park, MD.
- *Ault, J.S. 2011. Marine and estuarine habitats in south Florida are physically and biologically connected. South Florida marine environments: An ecological synthesis. In 'Tropical Connections: South Florida's marine environment', W. Kruczynski and P. Fletcher (eds.). IAN Press, College Park, MD.
- *Ault, J.S. 2011. Marine and estuarine habitats in south Florida are physically and biologically connected. South Florida marine environments: An ecological synthesis. In 'Tropical Connections: South Florida's marine environment', W. Kruczynski and P. Fletcher (eds.). IAN Press, College Park, MD.
- *Ault, J.S. and J.A. Bohnsack. (In press) Benefits of no-take marine reserves for exploited reef stocks in southern Florida. *In* South Florida Marine Environments: An ecological synthesis. B. Kruczynski and P. Fletcher, eds. Florida Sea Grant.
- *Ault, J.S., Bohnsack, J.A. 2011. No take marine reserves can improve south Florida's reef fisheries. South Florida marine environments: An ecological synthesis. In 'Tropical Connections: South Florida's marine environment', W. Kruczynski and P. Fletcher (eds.). IAN Press, College Park, MD.
- *Ault, J.S., S.G. Smith and J.T. Tilmant. 2010. Are the coral reef finfish fisheries of south Florida sustainable? Proceedings of the 11th International Coral Reef Symposium 11: 989-993.
- *Bohnsack, J.A. (In press). Reef Fishes in the Florida Keys. *In* South Florida Marine Environments: An ecological synthesis. B. Kruczynski and P. Fletcher, eds. Florida Sea Grant.
- *Brandt, M., Zurcher, N., Atkinson, A., Acosta, A., Ault, J.S., Bohnsack, J.A., Feeley, M.W., Harper, D.E., Hunt, J.H., Kellison, G.T., McClellan, D.B., Patterson, M.E., Smith, S.G. 2010. The Opportunities and Challenges in Development of a Multi-agency Program to Monitor and Assess Reef Fish Populations in the Florida Keys Coral Reef Ecosystem. *Proc. Gulf Carib. Fish. Inst.* 62: 348-357.
- *Karnauskas, M., D.B. McClellan, J.W. Wiener, M.W. Miller and E.A. Babcock. (2011). Inferring trends in a small-scale, data-limited tropical fishery based on fishery-independent data. *Fisheries Research* 111(1-2):40-52.
- *Ruttenberg, B. I. and E. F. Granek. 2011. Bridging the marine-terrestrial disconnect in coastal zone science and management. *Marine Ecology Progress Series* 434:203-212.

- *Ruttenberg, B. I., S. L. Hamilton, S. M. Walsh, M. K. Donovan, A. Freidlander, E. DeMartini, E. Sala, and S. A. Sandin. 2011. Demographic shifts in coral reef fish communities across a gradient of human disturbance. *PLoS One* 6(6): e21062.
doi:10.1371/journal.pone.0021062
- *Smith, S.G., J.S. Ault, J.A. Bohnsack, D.E. Harper, J. Luo, and D.B. McClellan. 2011. Multispecies survey design for assessing reef-fish stocks, spatially-explicit management performance, and Ecosystem condition. *Fisheries Research* 109: 25-41.
- *Smith, S.G., Swanson, D.W., Chiappone, M., Miller, S.L., Ault, J.S. 2011. Probability sampling of stony coral populations in the Florida Keys. *Environmental Monitoring and Assessment* 183(1-4): 121-138.

Presentations (oral/posters/moderator/editorial responsibilities etc.):

- Acosta, A., P Barbera and J Colcovoreses. (Poster). “Mutton snapper (*Lutjanus analis*) abundance indices based on a fishery-independent visual census survey from the Florida Keys”, Florida. Linking science to management. A conference and workshop on the Florida Keys Marine ecosystem. October 19-22, 2010. Duck Key, Florida.
- Ault, J.S., Smith, S.G., Kellison, G.T. 2010. “Coral reef fish-habitat modeling to support ecosystem-based management”. Gulf & Caribbean Fisheries Institute Annual Meeting. San Juan, Puerto Rico. September 2010.
- Ault, J.S., Smith, S.G., Luo, J., Bohnsack, J.A., Ruttenberg, B., Kimball, D. 2011. “Assessing reef fish changes and marine reserve dynamics in the Dry Tortugas, Florida”. In ‘Assessing the Role of Marine Protected Areas In Restoring, Sustaining, and/or Enhancing Fisheries’. American Fisheries Society 141st Annual Meeting, Seattle, Washington. September 2011.
- Ault, J.S. 2011. “Establishing acceptable biological catches (ABCs) for reef fish”. In ‘Developing Annual Catch Limits Guidelines for Pacific Island Reef Fisheries: Defining Issues and Arriving at Prioritized Actions’. Western Pacific Regional Fishery Management Council workshop. Honolulu, Hawaii. February 2011.
- Ault, J.S., Smith, S.G., Vaughan, N.R., Nadon, M.O., Zurcher, N. 2011. “A quantitative toolbox for sustaining coral reef fisheries of Puerto Rico”. Workshop sponsored by Puerto Rico Department of Natural Resources and the National Fish & Wildlife Foundation. San Juan & Joyuda, Puerto Rico. August 2011.
- Ault, J.S. 2011. “Length-based assessment of exploitation status and sustainability benchmarks for coral reef fish”. NOS Science Seminar Series. NOAA Headquarters SSMC-4. Silver Spring, Maryland. April 2011.

- Ault, J.S., Franklin, E.C. 2011. "Fisheries resource status and management alternatives for the Southeast Florida coral reef region". Florida Department of Environmental Protection (FDEP) Coral Reef Conservation Program (CRCP) & NOAA Project meeting. Dania Beach, FL. September 2011.
- Ault, J.S. 2010. "Fishery dynamics of the south Florida marine ecosystem". Plenary Session III: Present State and Change Over time of the Keys Ecosystem. Florida Keys Science Conference. October 2010.
- Bohnsack, J.A., Ault, J.S., Smith, S.G., McClellan, D.B., Harper, D.E., Javech, J., Zurcher, N. 2010. "Impacts of the 1997 FKNMS management zones on coral reef fish populations over 10 years". Florida Keys Science Conference. October 2010.
- Brock, R.J., Ault, J.S., Bohnsack, J.A. 2010. "Ecological scorecards: A powerful communication tool capable of distilling complex technical information into a format useable by many". Theme 'Science Related to Spatial Management of the Florida Keys Marine Ecosystem'. Florida Keys Science Conference. October 2010.
- Johnson, A and M Tellier. (Poster) "Habitat Preferences of Redband parrotfish (*Sparisoma viride*) and Stoplight parrotfish, (*Sparisoma aurofrenatum*) as determined by Fishery-Independent Visual Census Surveys in the Florida Keys". Linking science to management. A conference and workshop on the Florida Keys Marine ecosystem. October 19-22, 2010. Duck Key, Florida
- Miller, MW, M Karnauskas, D McClellan, and DE Williams. 2011. (Abstract). "Catastrophes and phase shift on reefs of remote Caribbean Island". Marine Benthic Ecology Meeting. Mobile. AL.
- Rios, A. "Tropical Cyclone Effects on Fish Stocks and Fisheries in the Florida Keys." American Fisheries Society Annual Meeting, Sept 2011, Seattle, WA.
- Ruttenberg, B. I. "Thirty years of change in reef fish communities in the Florida Keys: causes and effects." College of Marine Sciences Seminar Series, University of South Florida, St. Petersburg, FL. Sept. 2011.
- Ruttenberg, B. I. "Thirty years of change in reef fish communities in the Florida Keys: where do we go from here?" Florida Keys National Marine Sanctuary-Sanctuary Advisory Committee Meeting. Marathon, FL. Aug. 2011.
- Ruttenberg, B. I. "Thirty years of change in reef fish communities in the Florida Keys: short- and long-term trends." Smithsonian Marine Station Seminar Series, Fort Pierce, FL. Jan. 2011.

Ruttenberg, B. I., J. A. Bohnsack, J. S. Ault, S. G. Smith, D. B. McClellan, D. E. Harper, J. Serafy, and K. Huebert. "Thirty years of change in reef fish communities in the Florida Keys driven by habitat loss and marine reserves." American Fisheries Society Annual Meeting, Sept 2011, Seattle, WA.

Ruttenberg, B. I., J. A. Bohnsack, J. S. Ault, S. G. Smith, D. B. McClellan, D. E. Harper, J. Serafy, and K. Huebert. "Thirty years of change in reef fish communities in the Florida Keys: importance of the long view." International Marine Conservation Congress, May 2011, Victoria, Canada.

Ruttenberg, B. I., J. A. Bohnsack, J. S. Ault, S. G. Smith, D. B. McClellan, D. E. Harper, J. Serafy, and K. Huebert. "Thirty years of change in reef fish communities in the Florida Keys: results from a long-term monitoring program." Linking Science to Management: A Conference & Workshop on the Florida Keys Marine Ecosystem, Oct 2010, Duck Key, FL.

Vaughan, N.R., Ault, J.S., Gedamke, T. 2011. "New developments in length-based mortality estimation for data limited fisheries". American Fisheries Society 141st Annual Meeting, Seattle, Washington. September 2011.

Zurcher, N. 2011. Annual Multi-agency Reef Fish Visual Census Training. South Florida National Park Service Headquarters, Palmetto Bay Village Center, 18001 Old Cutler Road, Palmetto Bay, FL 33157. April 2011.

Setbacks or challenges encountered in FY12:

N/A in FY11

Comments on future direction of project (outyear plans and notes on how project (or future projects) will align with new CRCP priorities going forward):

This project will continue to provide data to assess effects of natural and anthropogenic impacts to FL coral reef ecosystems, with an emphasis on the effects of MPAs and the effects of fishing on target species, the fish community in general, and on ecosystem resilience.

Image/Photo - feel free to include a great figure, table, image or photo that best represents your project (optional):

This figure shows the location of survey locations along the Florida Keys reef tract during FY11, including the Dry Tortugas region. Sites include all those surveyed by NOAA, the State of Florida, and the National Park Service. Four data collection dives occurred at each site

