Semi-Annual Report

Summary of Accomplishments to Date (April 1, 2012 – September 30, 2012)

Project ID#:	NA11NMF4410061
Title:	**South Atlantic MPAs and Deepwater Coral HAPCs: Characterization of Benthic Habitat and Fauna**
PIs and co-PIs:	Stacey Harter, Andrew David, John Reed
Duration of Project:	3 years

South Atlantic MPAs

The annual South Atlantic MPA cruise was completed on the NOAA Ship Pisces from 6 July to 19 July 2012. Daytime operations consisted of ROV dives and CTD casts, while night operations consisted of multibeam mapping and/or transiting from one MPA to another. Participants on the cruise came from NOAA Fisheries - Panama City Laboratory, CIOERT - HBOI/FAU, CIOERT - UNCW, NOAA NOS/NCCOS – Charleston Laboratory, as well as a teacher-at-sea from Olathe, KS.

Cruise Objectives:

The primary objectives of the cruise were to gather additional data on habitat and fish assemblages in five of the South Atlantic Grouper/Tilefish MPAs as part of a long term sampling program to document changes in these areas before and after fishing restrictions were implemented. Efficacy testing of this management tool will aid fishery managers in future use of area restrictions for the protection of valuable habitat and fishery resources. Specific objectives included:

- Conduct remotely operated vehicle (ROV) transect surveys of habitat and fish assemblages
- Collect bathymetric data with the ME-70 multibeam mapping system on the ship to locate hard-bottom features and potential ROV dive sites
- Conduct total water column Conductivity-Temperature-Depth (CTD) profiles
- Collect midwater fisheries acoustic data with the EK-60 split beam system

Methods

ROV: ROV transect locations were selected by four methods; analysis of the limited multibeam bathymetric and acoustic backscatter maps produced within the preceding decade, reef locations provided by colleagues, sites found during previous years of this survey, and analysis of areas mapped on the current cruise. ROV dives ranged from 1 to 4 hours in length, covering an average length of 1.5km. Downward looking still images were taken at regularly timed intervals to provide a randomized dataset of percent cover by habitat type. Both forward looking video and forward and down looking still imagery incorporated paired lasers to allow measurements of targets.

Environmental: CTD casts were made prior to the first and after the last ROV dive each day. The instrument collected salinity, temperature, and depth. A smaller unit measuring only depth and temperature was attached to the ROV during dives.

Multibeam Mapping: Multibeam mapping was conducted each night. For all areas mapped, we collected both bathymetry from the ME-70 multibeam system and midwater fisheries data from the EK-60 split-beam system.

RESULTS:

Thirty-seven ROV dives were completed including areas both inside and outside the MPAs (see figure 1). The breakdown of dives was as follows: 8 associated with the North Florida MPA, 1 with the Georgia MPA, 11 with the Northern South Carolina MPA, 7 with the North Carolina MPA including 1 dive made on the Snowy Wreck, and 10 with the Edisto MPA. Sea surface and atmospheric conditions were favorable during the cruise, however high currents precluded several dives attempted off Florida and Georgia. Many of the targeted reef fish species were seen in several of the MPAs including snowy grouper, speckled hind, blueline tilefish, and warsaw grouper. Lionfish were seen in all MPAs with particularly high numbers in the two South Carolina MPAs. A total of 4,464 digital still images were taken. Overnight mapping resulted in the collection of both bathymetry and fisheries data for approximately 196 square kilometers. CTD casts were made at 13 stations. Detailed analysis of the video imagery, digital stills, and multibeam data began in September, 2012 and require several months to complete. Results will be presented to the Southeast Fisheries Science Center (SEFSC) and the South Atlantic Fishery Management Council (SAFMC).

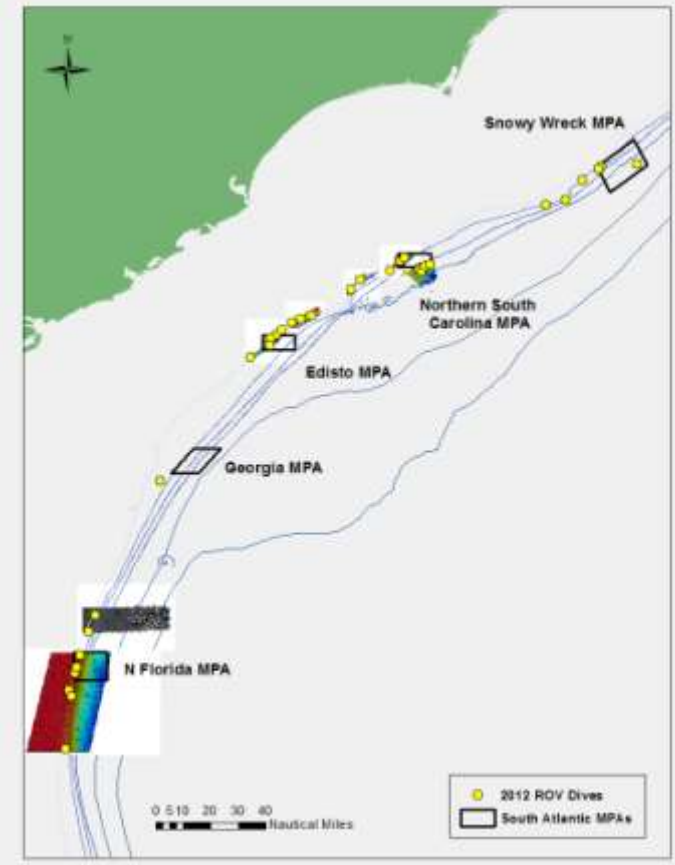

Figure 1. ROV dive locations.

Deepwater Coral HAPCs: Pourtalès Terrace CHAPC and Stetson-Miami Terrace CHAPCs (J. Reed)

A database and ArcGIS shapefiles (Fig. 2) have been compiled of deepwater, hard-bottom sites (deepwater coral/sponge habitat) on Pourtalès Terrace and Miami Terrace regions and within the deepwater coral HAPCs:

1. Sites on the Pourtalès Terrace and within the Pourtalès Terrace CHAPC,
2. Sites on the Miami Terrace and within the Stetson-Miami Terrace CHAPC,
3. Sites off northern Florida and proposed for addition to the Stetson-Miami Terrace CHAPC,
4. Sites off northern Florida and proposed for addition to the deepwater *Oculina* Coral HAPC.

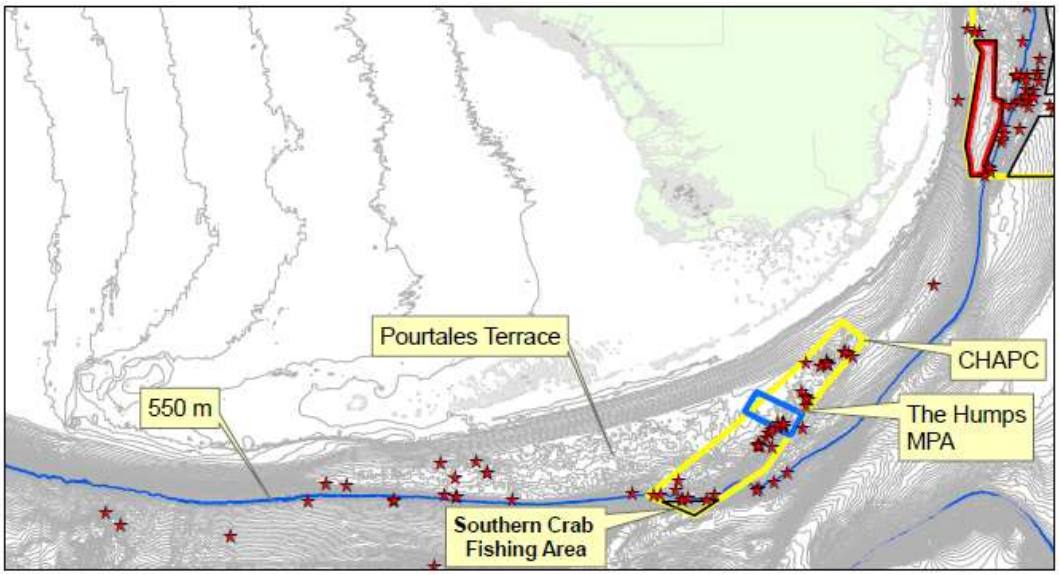

Figure 2. Deepwater, hard-bottom, coral/sponge habitat sites off south Florida and in particular within and adjacent to Pourtalès Terrace CHAPC and Miami Terrace CHAPC. Red stars= potential and confirmed DSCE sites; yellow polygons= Deepwater Coral Habitat Areas of Particular Concern; blue polygon= 'East Hump' Shelf-edge Marine Protected Area; red and black polygons off Miami = Crab Fishing Areas B and C. (Reed et al., in press).

These consist of data collected by the author (JR) from 1999 to the present from ROV and submersible dives. Most of these dives were funded from the following sources which had various objectives: 1) NOAA CIOERT, 2) NOAA OE, 3) NOAA DSCRTP, 4) HBOI-Biomedical Research Division, 5) State of Florida Center of Excellence, 6) U.S. Navy Surface Weapons Testing Center, Carderock Division (SFWTCCD), and 7) Dept. of Energy (DOE).

<u>Pourtalès Terrace CHAPC Results and Products:</u>

Archived deepwater, hard-bottom site data compiled by the author (JR) for Pourtalès Terrace region were specifically used to select sites for the recent 2011 Nancy Foster cruise (NOAA CIOERT, NOAA DSCRTP). As a result, 14 ROV dives were conducted specifically to characterize and map deep sea coral/sponge habitat in this region and ten sites were selected for multibeam sonar surveys which covered a total of 397.1 km^2. The majority of these sites were within the Pourtalès Terrace CHAPC (Fig. 3).

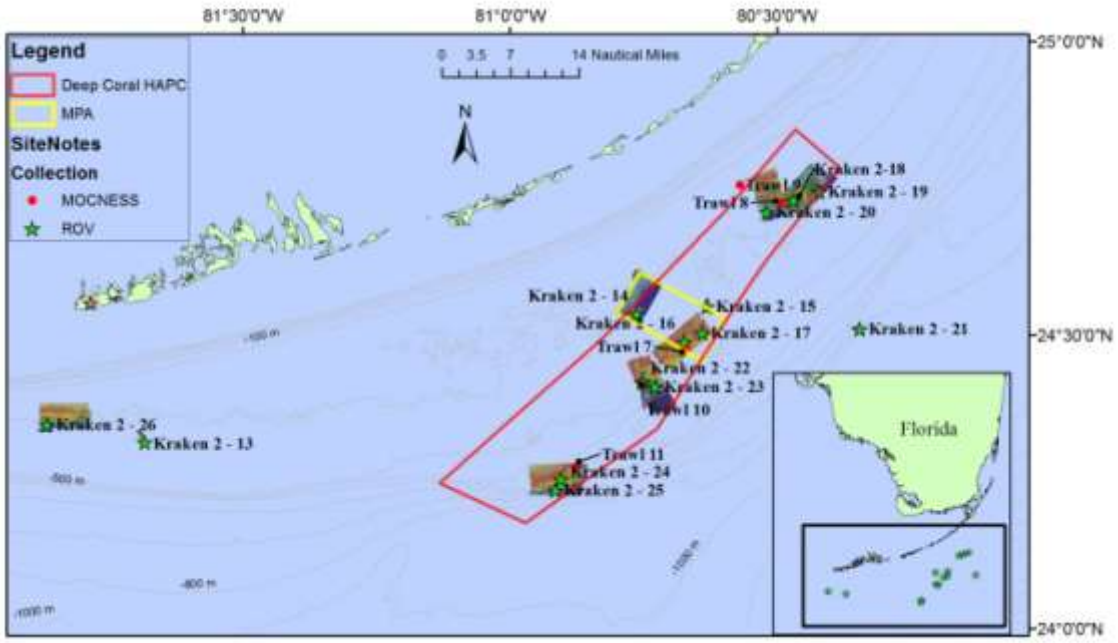

Figure 3. Map of Pourtalès Terrace showing all *Kraken* ROV dive sites (star), MOCNESS trawls (red dots), and 2011 *Nancy Foster* multibeam sonar surveys (color boxes) during Leg 2 of the CIOERT FLoSEE II Cruise on the NOAA Ship *Nancy Foster*, September 23-30, 2011. Yellow polygon= 'East Hump' MPA Site; red polygon= Deepwater Coral Habitat Areas of Particular Concern.

A total of 2,866 *in situ* digital images were taken documenting habitat and fauna, 150 specimens were collected documenting biodiversity of benthic fauna, and MOCNESS trawls and CTD casts were conducted at five sites. The new sonar maps and ground truthing by ROV dives, MOCNESS trawls, and CTD casts have provided data characterizing for the first time the newly designated 'East Hump' MPA site and eight additional sites within the newly designated deepwater coral HAPC on Pourtalès Terrace. New information was also collected on several high-relief features outside of the CHAPC which showed that extensive essential fish habitat and coral/sponge habitat exists outside the protected CHAPC boundaries. These areas outside the current CHAPC should be of priority for future research cruises. The new multibeam maps also provided a wealth of information of potential sites within the CHAPC for future ROV dives especially in the regions where we found *Lophelia* coral mounds for the first time on Pourtalès Terrace.

Products:

The attached cruise report includes the SEADESC Level I data analysis of each dive site which describes in detail each ROV dive including: cruise metadata, figures showing each dive track overlaid on the new multibeam sonar maps, dive track data (start and end latitude, longitude, depth), objectives, general description of the habitat and biota, and images of the biota and habitat that characterize the dive site.

The Final Report will include the SEADESC Level II Report of these data which will provide quantitative analyses for each dive site detailing the densities of the benthic biota and CPCE 4.0© Coral Point Count for percent cover of substrate type and sessile biota. Additional dive sites with sufficient data from the archives within the Pourtales Terrace CHAPC will also be selected for site characterization.