

Mission Report

NOAA/NOS/NCCOS/CCMA/Biogeography Branch

September 9 – September 12, 2007

Biogeographic characterization of fish communities within the Flower Garden Banks National Marine Sanctuary:

A collaboration between the Center for Coastal Monitoring and Assessment's Biogeography Branch and the National Marine Sanctuary Program's Flower Garden Banks National Marine Sanctuary

NOAA
National Ocean Service
National Centers for Coastal Ocean Science
Center for Coastal Monitoring and Assessment
Biogeography Branch
Silver Spring, MD 20910

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Mission Purpose:

The intent of this field mission was to initiate efforts: (1) to spatially and quantitatively characterize the benthic fish communities at depths less than 110 feet throughout the Sanctuary, (2) to correlate this information to *in-situ* data collected on associated habitat parameters, (3) to use this information to provide the Flower Garden Banks National Marine Sanctuary (FGBNMS) staff with information on biogeographic patterns and resource status within the Sanctuary.

This effort will complement earlier studies which provide an important starting point for characterizing the fish community, however, are limited in scope of inference to small portions of the Sanctuary coral cap environment. Unlike the earlier approaches, the current work will lend itself toward calculation of population estimates at the scale of the Sanctuary. Data collected will also assist both the National Marine Sanctuaries Program (NMSP) headquarters staff and FGBNMS staff in addressing two key issues that arose in the course of the Sanctuary undergoing its management plan revision process; boundary expansion and fishing impacts.

Operational Accomplishments:

- ◆ A total of 32 sites were surveyed within the east bank of the Sanctuary (Figure 1), and information on fish distribution, abundance and size (Table 1), benthic habitat composition (Table 2), coral bleaching, and marine debris (Table 3) data were collected. The project team consisted of 10 NOAA Scientific Divers: seven divers from CCMA Biogeography Branch (BB), two from FGBNMS, and one from National Marine Fisheries Service's Office of Habitat Conservation (NMFS/OHC).
- ◆ Two to three small boats were deployed from the R/V Nancy Foster each day and returned upon completion of dives. One to two teams were assigned to each boat, with two to three divers per team.
- ◆ Nitrox (32 %) tanks were used for all dives.
- ◆ Surveys were conducted from the ~110 ft isobath and higher.
- ◆ A new sampling design was used for this mission. It has proven to be an effective approach and will be suggested for future sampling missions.



East Bank Flower Garden Banks National Marine Sanctuary

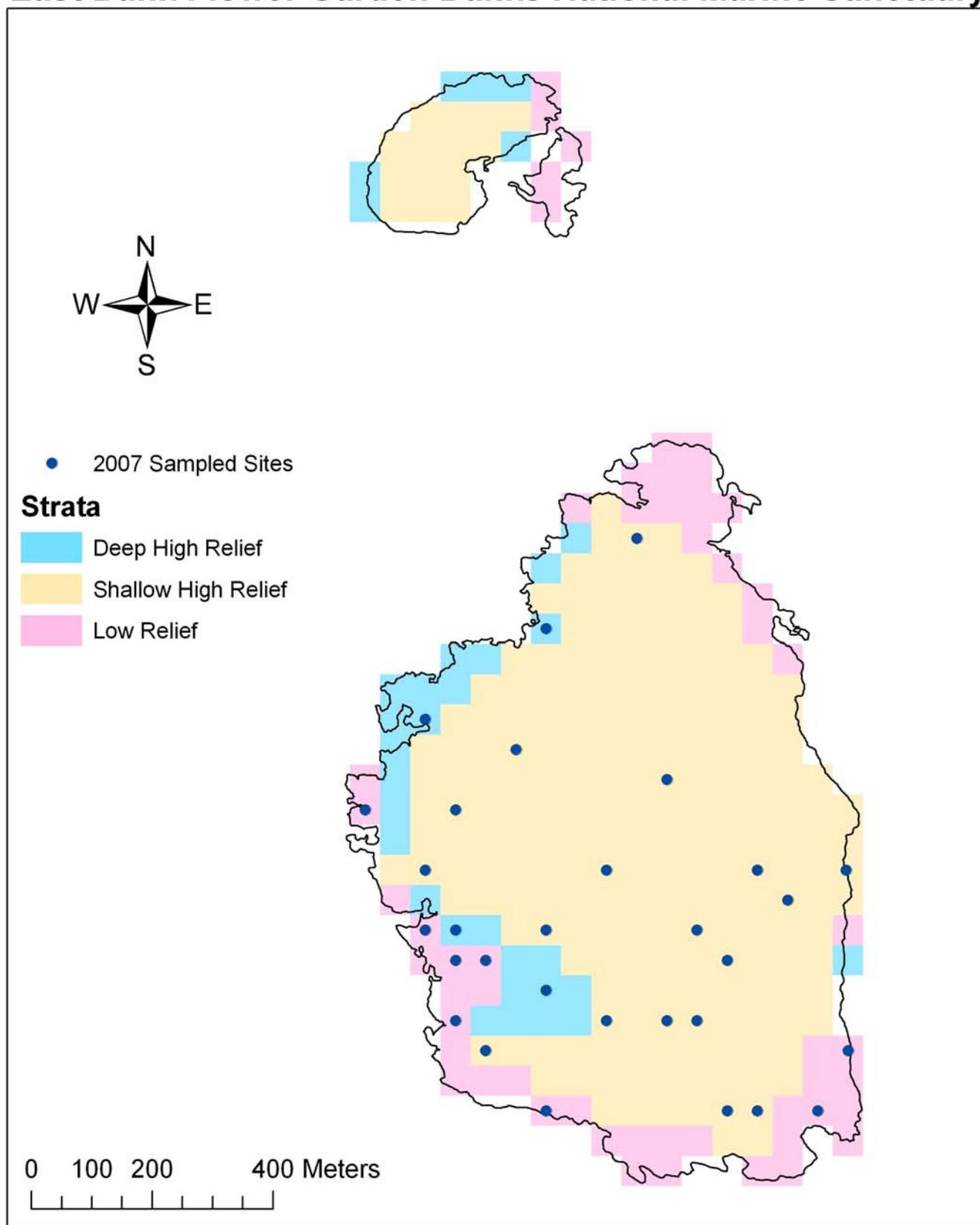


Figure 1. Map of the East Bank of Flower Garden Banks National Marine Sanctuary detailing relief characteristics and selected survey points sampled for the September 2007 mission.

Summary of Surveys:

Fish

- ◆ Fish species abundance, size and distribution were characterized using the belt transect survey method (http://ccma.nos.noaa.gov/ecosystems/coralreef/reef_fish/protocols_fgb.html) at 32 sites. The data are summarized in Table 1. **Due to Hurricane Humberto the data presented below do not represent a random sampling of the bank. These data should not be used for monitoring.**

Table 1. Fish abundance, biomass, richness and diversity (per 100m²). Data are from the September 2007 mission.

| Location | Relief | # of Surveys | # indiv / 100m ² | | Biomass (kg) / 100m ² | | # species /100m ² | | Mean Diversity* | |
|-----------|----------------|--------------|-----------------------------|-------------|----------------------------------|-------------|------------------------------|------------|-----------------|-------------|
| | | | Mean | (± SE) | Mean | (± SE) | Mean | (± SE) | Mean | (± SE) |
| East Bank | High | 24 | 469.8 | 78.3 | 26.67 | 4.76 | 25.4 | 0.7 | 2.16 | 0.09 |
| | Low | 8 | 437.3 | 135.0 | 18.59 | 5.92 | 23.8 | 1.5 | 2.10 | 0.17 |
| | Overall | 32 | 443.0 | 94.0 | 20.01 | 4.17 | 24.0 | 1.0 | 2.11 | 0.12 |

*Shannon Diversity Index



Counterclockwise from left: marbled grouper (*Dermatolepis inermis*), red hind (*Epinephelus guttatus*), tiger grouper (*Mycteroperca tigris*), blue angelfish (*Holacanthus bermudensis*), chub (*Kyphosus sectatrix*), threespot damselfish (*Stegastes planifrons*) with bluehead wrasse (*Thalassoma bifasciatum*).

Habitat

- ◆ Benthic composition data were collected at 32 hard bottom sites and are summarized in Table 2. Detailed methodology of benthic characterization data collection can be found at http://ccma.nos.noaa.gov/ecosystems/coralreef/reef_fish/protocols_fgb.html. **Due to Hurricane Humberto the data presented below do not represent a random sampling of the bank. These data should not be used for monitoring.**

Table 2. Average percent cover of habitat locations for 32 hard bottom sites for the September 2007 mission.

| Location | Relief | Number of Surveys | % Corals | | % Algae | | % Sponges | |
|-----------|----------------|-------------------|--------------|-------------|--------------|-------------|-------------|-------------|
| | | | Mean | (\pm SE) | Mean | (\pm SE) | Mean | (\pm SE) |
| East Bank | High | 24 | 65.25 | 3.47 | 22.45 | 2.91 | 0.35 | 0.17 |
| | Low | 8 | 28.83 | 6.89 | 48.18 | 7.23 | 2.92 | 1.85 |
| | Overall | 32 | 35.25 | 4.78 | 43.64 | 5.00 | 2.46 | 1.26 |



Marine Debris

- ◆ The marine debris observed within transects are summarized in Table 3. Detailed methodology can be found at http://ccma.nos.noaa.gov/ecosystems/coralreef/reef_fish/protocols_fgb.html. **Due to Hurricane Humberto the data presented below do not represent a random sampling of the bank. These data should not be used for monitoring.**

Table 3. The type and area of debris, area affected by the debris, and what colonized the debris during the September 2007 mission.

| Debris Type | Debris Area (cm ²) | Colonized By | Area Affected (cm ²) |
|--------------|--------------------------------|-------------------|----------------------------------|
| Fishing line | 25 | Encrusting sponge | 25 |

Events of Note:

- ◆ One of the dive groups observed four large tiger grouper (*Mycteroperca tigris*) and a smiling goldentail moray eel (*Gymnothorax miliaris*) during one dive.
- ◆ A black grouper (*Mycteroperca bonaci*) over 3 feet was recorded in a transect during one of the dives.

**Logistics of Note:**

- ◆ Six days of diving were planned, however due to Hurricane Humberto, the cruise had to return to dock and only two days were spent diving.
- ◆ High resolution multibeam bathymetry data were collected during this cruise in areas within and around the Sanctuary not previously mapped.

Project Diving Team:

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Chris Caldwell (NCCOS/CCMA BB)
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