DFH15 – Fish and Benthic Surveys
May 15-18, 2011

The Flower Garden Banks research team and partners from the National Center for Coastal Ocean Science (NCCOS). Harbor Branch Oceanographic Institute (HBOI), the University of North Carolina-Wilmington (UNCW), and students from Texas A&M University at Galveston (TAMUG), participated in this expedition to assess the fish populations and benthic assemblages in areas of the sanctuary below Scuba diving depths. In addition, quarterly water samples to analyze various water quality parameters were taken and monitoring equipment downloaded and maintained.

Participants

R/V Manta Crew:

Captain Darrell Walker
Mate Mike Shetler
Mate Ramie Reed
Cook Kayleigh Stancil

Scientific Crew:

Marissa Nuttall, FGBNMS
John Embesi, FGBNMS
Ryan Eckert, FGBNMS
Lance Horn, NURC/UNCW, ROV Technician
Glenn Taylor, NURC/UNCW, ROV Pilot
Josh Voss, HBOI
Randy Clark, NCCOS
Erik Ebert, NCCOS
Sam Henry, TAMUG
Mark Ruiz, TAMUG

Overview

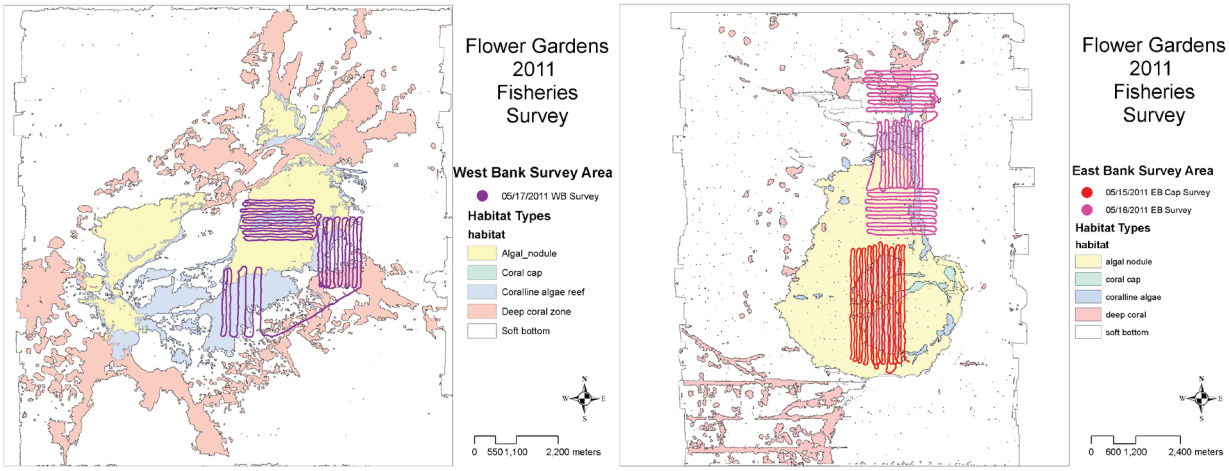
The research team departed aboard the R/V *Manta* mid-afternoon Sunday, May 15th, headed for East Flower Garden Bank. The vessel arrived at East Bank early in the evening, allowing some evening Scuba diving operations and nighttime acoustic surveys to be performed.

The following morning (5/16), ROV operations began at East Flower Garden Bank and continued through mid afternoon the following day (5/17), when the vessel moved to West Flower Garden Bank. ROV operations continued at West Bank until Wednesday (5/18), when rough seas forced an early return to the dock.

Every evening following ROV operations, Scuba operations were conducted at both banks to change out water quality monitoring instruments and collect water samples. Every night, acoustic fish surveys were conducted at each bank.

Lance Horn, UNCW/NURC, load their ROV onto the R/V Manta at the TAMUG dock. Image credit: Embesi/FGBNMS.

Acoustics
Erik Ebert/Chris Taylor, NCCOS-SCCFHR



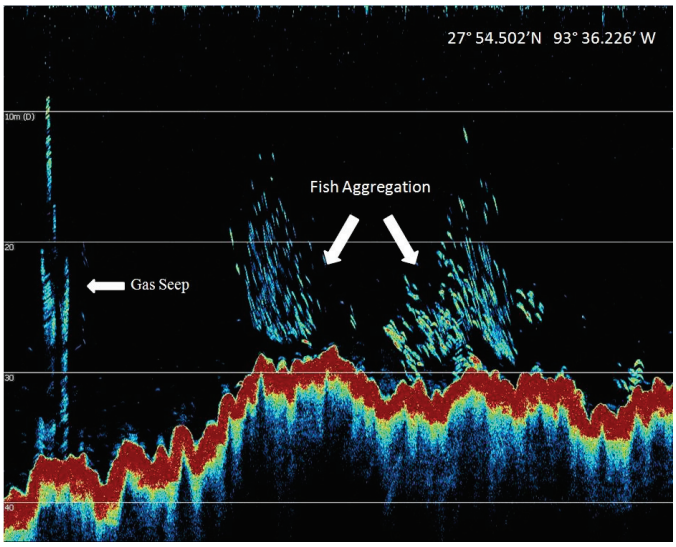
Maps of the East and West Flower Garden Banks showing where acoustic surveys were conducted. Image credit: Erik Ebert.

The second year of the fisheries acoustic survey at the Flower Garden Banks was a big success. We covered approximately 190 km of survey lines in three nights using a pole-mounted 120 kHz scientific echosounder. The survey covered the coral caps of East and West Banks in addition to a variety of habitats over the full range of depths.

The fisheries acoustic data is being used to map fish abundance and distribution in relation to habitats in the survey areas. Pairing the acoustic data with the ROV transects will allow for direct comparison of fish community assemblage and abundance and habitat use.

The post-processing of the acoustic data is being conducted at the Center for Coastal Fisheries and Habitat Research in Beaufort, NC. During a preliminary review and processing of the data during the mission, several interesting patterns of fish distribution over the East Bank coral cap were observed in addition to locating several large gas seeps (see below).

Comparing the data from previous year's surveys is showing interpretable and consistent patterns of fish abundance over the different habitats and depth strata in the Flower Garden Banks Sanctuary.



Acoustic representation of fish and a gas seep at the East Flower Garden Bank. The thick red line in the bottom portion of the image represents the contour of the substrate. The clusters of light blue dots above the red show the locations of fish and the light blue vertical streaks show a gas seep. Image credit: Erik Ebert.

ROV Transects

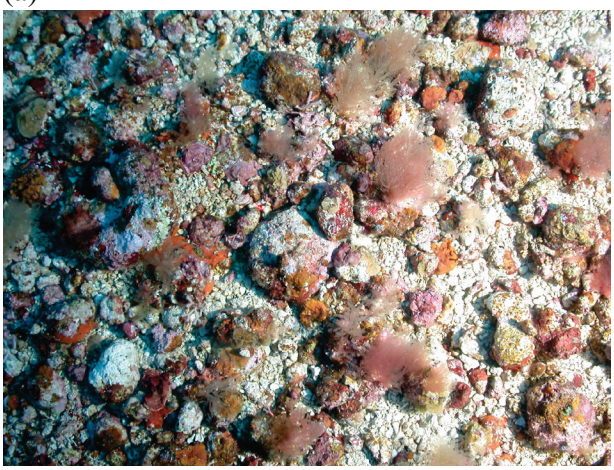
Fifteen 100m transects were randomly generated in each habitat zone for both East and West Flower Garden Banks. Habitat zones explored in this study included the Algal Nodule and Coralline Algal Reefs of the Coralline Algae zone, the Deep Coral zone, and Soft Bottom Communities.

Lance Horn, UNCW-NURC, pilots the ROV from the R/V Manta's dry lab. Image credit: Schmahl/FGBNMS.

In the day and a half spent at East Flower Garden Bank, thirty-two (32) transects were conducted. Ten (10) of these transects were in the Algal Nodule habitat, six (6) in the Coralline Algal Reefs, six (6) in the Deep Coral Zone, and ten (10) in the Soft Bottom Community. At West Flower Garden Bank twenty-three (23) transects were completed, with three (3) in the Algal Nodule habitat, eight (8) in the Coralline Algal Reefs, seven (7) in the Deep Coral zone, and five (5) in the Soft Bottom Community.

During each transect, forward facing video was collected, and downward facing still images. The number of images per transect varied, but averaged at 11 images per transect, with a minimum of 5 and a maximum of 17.

(a)



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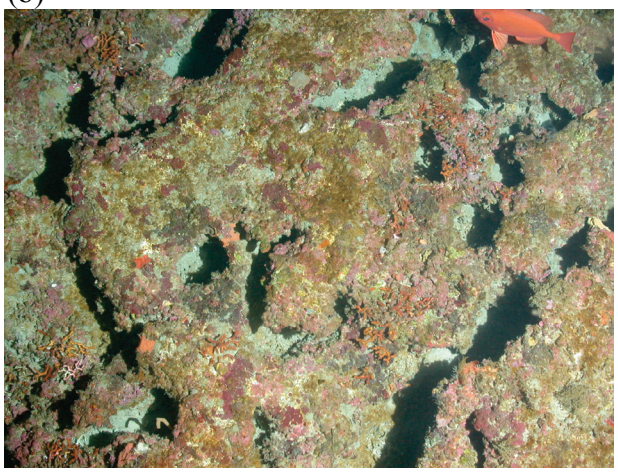

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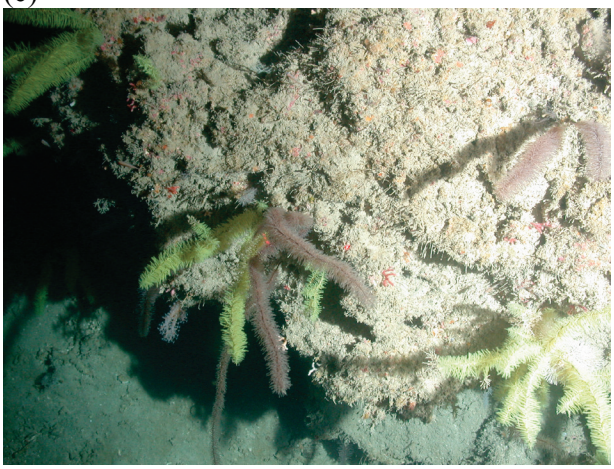
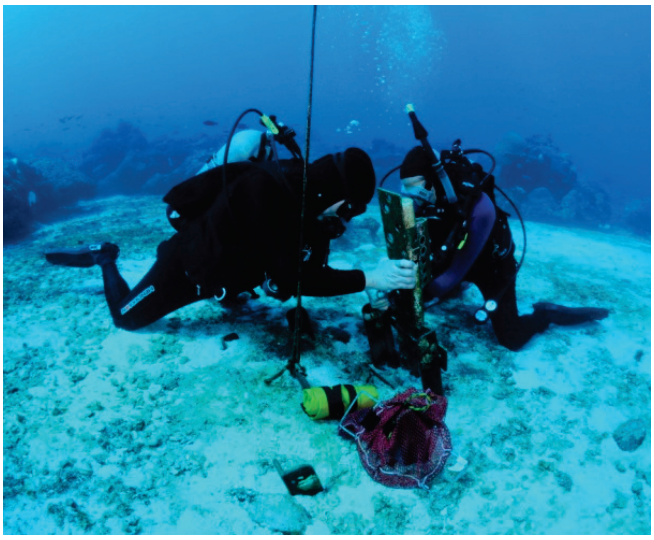


Images from the downward facing still camera mounted on the ROV. Habitats shown include (a) the Algal Nodule habitat, (b) Coralline Algal Reefs, and (c) Deep Coral Zone. These images will be used to assess benthic cover for each habitat. Images credit: UNCW-NURC/FGBNMS.

SCUBA Operations

Following ROV operations, the Flower Garden Banks research team conducted Scuba dives to the reef cap of East, West and Stetson Banks. At all the banks, water quality instruments on the reef cap were collected, replaced and downloaded. In addition, divers placed water temperature monitors at 130 ft at the deep Long-Term Monitoring stations.

While diving, researchers observed several large Black Grouper at both West Flower Garden and Stetson Banks, a Marbled Grouper at Stetson Bank, Creolefish spawning and Sharpnose Puffer courting at East Bank (5/17), and Spotted Morays courting at Stetson Bank (5/19).



Researchers collect an instrument that measures temperature and salinity from the reef cap. Image Credit: Schmahl/FGBNMS.

Water Samples

At East, West and Stetson Banks, quarterly water samples were collected. These water samples are then stored and shipped to an EPA-certified laboratory for analysis of water quality parameters, including ammonia, nitrate, nitrite, phosphorus, and chlorophyll.

Researchers collect temperature and salinity measurements using a hand-held YSI. Image credit: Schmahl/FGBNMS.