

BIOGEOGRAPHY BRANCH

CENTER FOR COASTAL MONITORING & ASSESSMENT
NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

Seafloor Characterization of the U.S. Caribbean 2010 Field Season March 18-April 6, 2010

Cruise Summary

The Biogeography Branch's 2010 Seafloor Characterization of the U.S. Caribbean mission to collect data off the southern coasts of St. Thomas and St. John in the U.S. Virgin Islands came to a successful completion today. Over the past 20 days, scientists collected fish distribution data, hundreds of hours of underwater footage, and mapped roughly 188 square kilometers covering previously unmapped areas of the Virgin Passage and completing maps of the shelf south of St. John. The team took a break from 24-hour data collection to invite local students, partners, political representatives and press aboard the NOAA Ship *Nancy Foster* to learn more about the group's work in the area. Short summaries of the data collected during the course of the mission, as well as an overview of the outreach events are below.

Leg 1: March 18-26, 2010

The focus of Leg 1 was to complete seafloor mapping of the insular shelf south west of St. Thomas using high resolution multibeam acoustic systems (Reson SeaBat 7125). Approximately 82 km² area of the Virgin Passage was mapped, connecting with areas mapped in previous years by NOAA and USGS. (See Figure 1). Water depth ranged from 30-70 meters. The principal seafloor habitats observed on the shelf were aggregate reef, spur and groove, aggregated patch reefs with live coral cover often exceeding 50%. Additionally NOAA scientist deployed a remotely operated vehicle (ROV) and drop cameras to visually record and verify the acoustic signatures. These data were collected at sites within the mapping area and beyond to support future map products. Thirty-four ROV transects and 105 drop camera sites were completed.

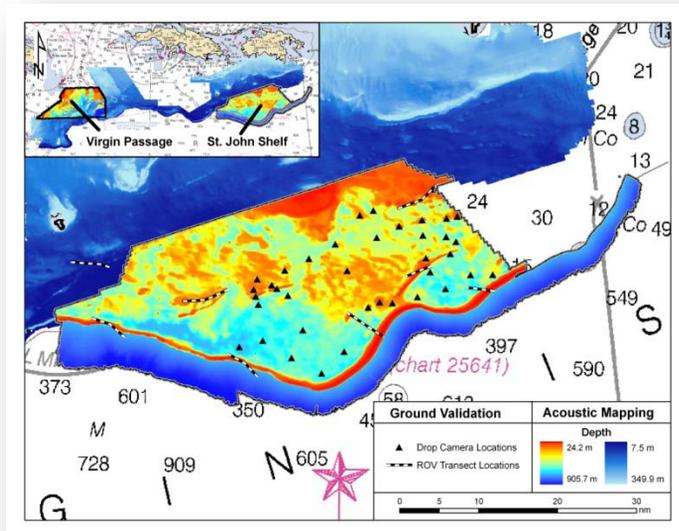


Figure 1: An area roughly 82 km² south west of St. Thomas was mapped during the first half of the mission.

While collecting multibeam data, a scientific splitbeam echosounder was used to map the distribution of fish. The continuous opportunistic collection of fish data over many habitats and at many times of the day will be used to assess abundance and spatio-temporal patterns in the shelf's fish community.

Leg 2: March 27-April 6, 2010

The focus of activities during Leg 2 was to complete seafloor mapping of the deep bank/shelf escarpment (350 – 900 m), the moderate depth (50 to 350 m) shelf edge and the relatively shallow (30 to 50 m) insular shelf south of St. John. Approximately 106 km² area of the St. John Shelf was mapped, connecting with areas mapped in previous years by NOAA. (See Figure 2). Two ship-based multibeam sonar systems, the Simrad EM 1002 and the Reson 7125, were used to conduct the high resolution mapping. The principal benthic habitats observed on the shelf were rhodolith fields, pavement and patch reefs with algae being the dominant biological cover type. Thirty-two ROV transects and 11 drop camera sites were completed during this leg.

High coral cover and a diverse fish community were found along a relatively shallow aggregate reef at the shelf edge. This aggregate reef was observed in several other places along the shelf edge south of St Thomas and Puerto Rico. Of note, two colonies of staghorn coral (*Acropora cervicornis*) were found along at the shelf edge at roughly 90 ft depths. (See Figure 3). A multitude of sharks were observed in ROV video this year (many more than previous years), perhaps associated with the nearby grouper and spawning aggregations.

As in Leg 1, a splitbeam echosounder was also used to opportunistically map the distribution of fish. The distribution of fish along several ROV transects was assessed using splitbeam sonar before the ROV was deployed. This technique allowed the team to groundtruth splitbeam data. Scientists noted a coarse spatial-scale correlation between the abundance of fish observed in the sonar and with the ROV.

During the day several large schools of snappers in shallow water on the shelf were spotted. These snappers could have been associated with the spawning aggregations observed along the shelf edge at night. The timing of the mapping mission was coincident with spawning aggregation times for yellowfin grouper, and dog, cubera yellowtail and mutton snappers.

Two known spawning aggregation sites, Grammanik Bank and Tampo bank, were surveyed using ROVs to collect underwater video and splitbeam sonar to map fish distribution and characterize size spectra. Splitbeam transects were positioned and timed on potential spawning aggregation sites to gather information on precisely when and where the aggregations occurred. At Grammanik Bank, the team observed approximately 50 yellowfin grouper close to the bottom, as well as schools of snappers. This number of grouper in one location is uncommon and was likely a spawning aggregation. A lack of courtship displays may have meant the precise time of the survey was either too early or too late. At Tampo Bank we saw schools of dog snapper and numerous yellowtail snapper. Other snappers were observed in the distance but could not be identified.

During the second leg of the cruise, a significant amount of fishing gear was detected in the project area. Approximately 24 fish traps were observed during the course of the ROV dives with particularly intense fishing pressure detected at Tampo Bank. (See Figure 3). One highlight was observing video footage of a trap full of fish and another of four sharks trying to get into a full trap. Derelict fishing traps were also observed at Grammanik Bank, but active fishing was not detected.

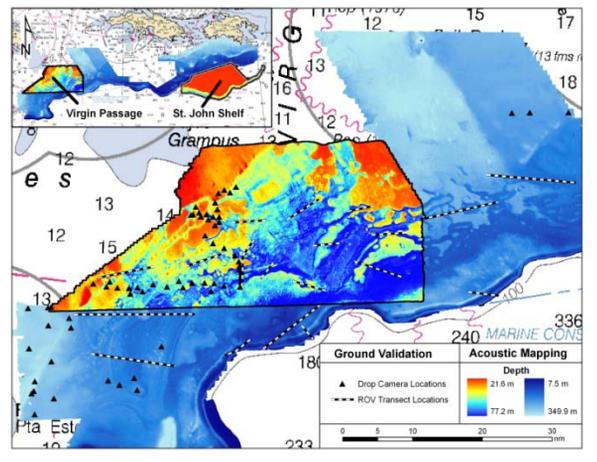


Figure 2: Acoustic data and ground truthing points collected during the second leg of the mission south of St. John.



Figure 3: A colony of Endangered Species Act-listed staghorn coral (left). Derelict traps on the seafloor (center and right).

Biogeography Branch Outreach: March 26, 27 and 29, 2010

Following the successful completion of the mission's first leg, the ship returned to Charlotte Amalie, St. Thomas for several scheduled outreach events. The weekend began with a small group of fishermen from the St. Tomas Fishermen's Association coming aboard to tour the ship, hear about the vessel's capabilities, interact with NOAA scientists and learn more about NOAA research in the area. This event was part of a continued effort to build new and enhance existing relationships with local fishing communities.

The following day a group of 26 students and several chaperones from the Gladys Abraham Elementary School's environmental club participated in an afternoon-long science education program focusing on corals, fish, habitats and careers in marine science. The group cycled through three, 40-minute stations where they experienced life on a ship, saw the tools and technologies used in underwater exploration, and built their own coral reef ecosystems. (See Figure 4).



Figure 4: Simon Pittman and Maile Sullivan help students as they build their own coral reef (left). Lance Horn shows a group how the ROV works (center). Ed Owens and Sam Tormey help some of the kids as they try on immersion suits, also known as "gumby suits" (right).

The final outreach event was a four-hour program during which invited guests, including local partners, political representatives, students and a reporter, sailed with the science team and crew. The afternoon at sea was designed to educate attendees on the mapping activities and other scientific investigations the Biogeography Branch and its partners are conducting in the area. The day was split into several presentations and live demonstrations to explain how the team uses various SONAR technologies, a remotely operated vehicle and other tools to better understand the physical characteristics of the seafloor, locate and explore important seafloor habitats, and study fish populations and distributions at suspected spawning aggregation sites. Local managers joined the scientists to explain how the data collected by these annual missions are the first steps toward helping local governments and management agencies build a strong, science-based management approach to protect and conserve marine resources.

Special thanks to the crew of the NOAA Ship Nancy Foster for their continued support and the expertise each member of the crew brings to the group.

For more information about NOAA's Center for Coastal Monitoring and Assessment Biogeography Branch visit, <http://ccma.nos.noaa.gov/about/biogeography/welcome.html>