



NOAA Conducts Seafloor Habitat Mapping Mission in the U.S. Virgin Islands



In partnership with the Caribbean Fisheries Management Council, the University of the Virgin Islands, the U.S. Virgin Islands Department of Fish and Wildlife, and the National Park Service, NOAA collects SoNAR and video data in high priority conservation areas south of St. Thomas and St. John.

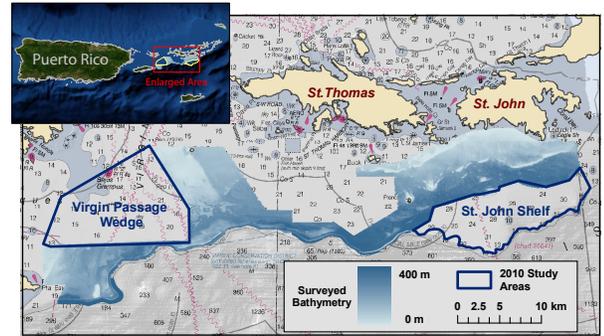


NOAA Project NF-10-03

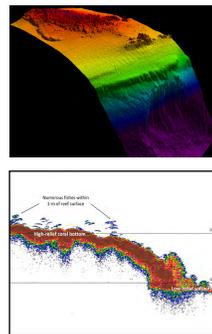
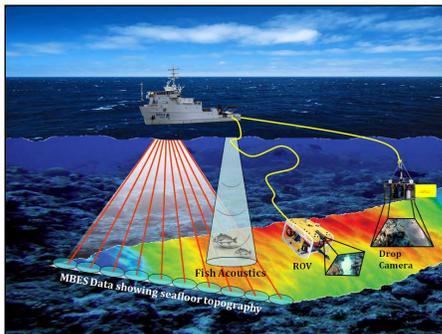
For more information:
Tim Battista • CCMA Biogeography Branch
(301) 713-3028 x171 • tim.battista@noaa.gov
<http://ccma.nos.noaa.gov/about/biogeography/>

Planning

During the seventh annual scientific mission in the U.S. Caribbean, NOAA's Center for Coastal Monitoring and Assessment (CCMA) will map and explore seafloor habitats 10 to 30 km off the southern coasts of St. Thomas and St. John. These high-priority areas were chosen by CCMA, in collaboration with the University of the Virgin Islands, the Caribbean Fisheries Management Council (CFMC) and NOAA's Office of Coast Survey because of their ecological significance to commercially important fisheries and the need for updated nautical charts.



CCMA selected the 2010 study areas in an effort to fill in gaps of seafloor data along the southern Puerto Rican shelf, where scientists have discovered expansive moderate-depth coral populations and important fish spawning habitats.



Acoustic Data Collection

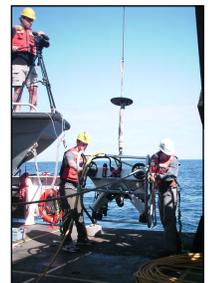
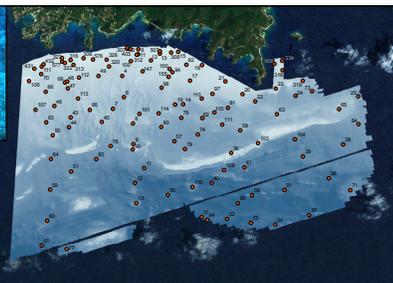
While onboard the NOAA ship Nancy Foster, CCMA scientists will collect and process data from multibeam echosounders (MBES). These sensors use sound to collect information about the depth (i.e., bathymetry) and physical properties (i.e., backscatter) of the seafloor. These two surfaces are then analyzed by scientists at the end of each day, and used to inform which geographic locations and seafloor habitats they would like to explore the following morning. Using other acoustic imaging technologies, researchers will also study fish populations. Based on the return strength of the sound waves, scientists can quantify fish density, size distributions, and day-night abundance and distribution differences at known spawning aggregation locations.

From the bathymetry information gathered by the Nancy Foster' multibeam, scientists can derive 3D representations of important seafloor features (Top right: Bajo de Cico, Puerto Rico). They can also track and record fish densities (bottom right) using other acoustic instruments.

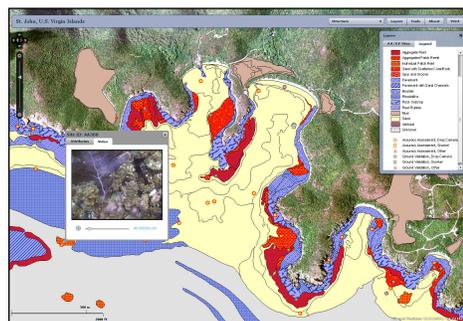
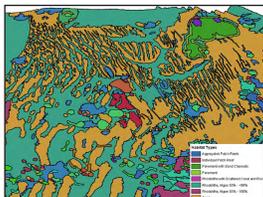
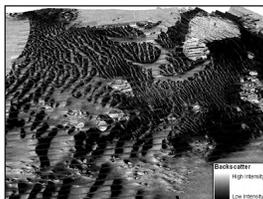
Ground Validation Missions

In order to explore the locations and habitats selected from the acoustic imagery analysis, scientists from CCMA and UNCW (University of North Carolina at Wilmington) use a remotely operated vehicle (ROV). This ROV is equipped with technology that allows scientists to determine the ROV's location, as well as with underwater video and high-resolution still cameras that are used to photograph habitats on the seafloor. By viewing both of these datasets at the same time, scientists gain an understanding of how the two datasets are related and can begin to develop a habitat map of the seafloor.

Researchers establish ground validation points (right) across the seafloor that's been mapped using acoustic imagery. At each location, a drop camera (above), ROV (far right), or dive team is employed to directly and systematically survey the benthic habitats.



Products

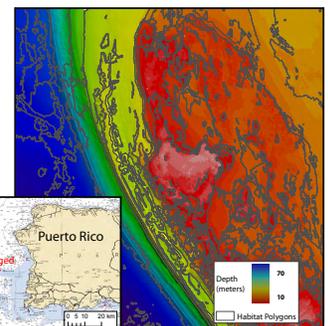


BIOMapper (above) is the highly-accessible web interface through which habitat characterization data and underwater video can be accessed. A backscatter surface (above left) and habitat map (below left) of the same area south of St. John, USVI are examples of other products that will be derived from data gathered on this mission.

Several products are generated from the research conducted onboard the Nancy Foster. In particular, these products include: (1) underwater video and photographs with associated geographic locations; (2) processed depth imagery; (3) processed backscatter imagery; and (4) a habitat map describing the geographic location, physical structure, biological cover and live coral cover on the seafloor. All of this data and information is disseminated online using CCMA's BIOMapper (Biogeography Integrated Online Mapper). This scalable web application allows users to interact with all of these datasets dynamically, so that they can tailor the information that they receive to suit their research and management needs.

Management Outcomes

Seafloor habitat mapping is one of the first steps toward building a science-based argument for the conservation of living marine resources. "The NOAA maps and seafloor imagery are what we use to get the first glimpses of an area," explains Graciela García-Moliner of the CFMC. This approach was valuable for Puerto Rico's Abir la Sierra Bank (see map, below right), where the spawning populations of Red Hind have been seasonally protected from commercial fishing since 1996. More recently, resource managers from the CFMC and local fishermen alike began to voice concern for the area's population of Queen Conch. To evaluate the threat of overfishing to this commercially valuable mollusk, the Biogeography Branch collected acoustic imagery, ROV video, and underwater still photos, and later conducted a characterization study of the queen conch population. In 2005, CFMC used these products and the subsequent characterization study to gather enough support to close the Queen Conch fishery in Puerto Rican waters. This year, the council hopes to use similar tools to evaluate the effectiveness of this closure.



In 2005 the Queen Conch (above) joined the Red Hind as a protected species in the Abir la Sierra bank. The Biogeography Branch's mapping products (bathymetry and habitat delineation data shown at right) played a significant role in this conservation decision.