

## DEEP-WATER DATA COLLECTION &amp; BENTHIC HABITAT MAP PRODUCTION

In Cooperation with NOAA's Coral Reef Conservation Program (CRCP)

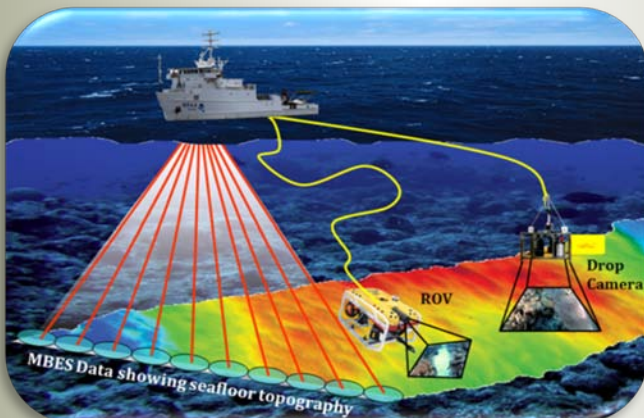
**Background**

Benthic habitat maps of deep-water coral reef ecosystems support multiple resource management objectives, including: (1) understanding and predicting the spatial distribution of resources; (2) detecting change associated with anthropogenic and environmental impacts; (3) supporting spatially-explicit management decisions (e.g., anchoring locations, vessel hazards, marine zoning, MPA delineation); as well as (4) designing robust sampling strategies for evaluating the efficacy of resource management actions. Working in partnership with CRCP, NOAA's Biogeography Branch is providing the scientific and technological expertise needed to collect and characterize remotely sensed data describing essential fish habitat and the distribution and abundance of deep-water corals. The resulting products and maps support effective resource monitoring and marine conservation efforts.

**Approach to Seafloor Mapping**

The Biogeography Branch has implemented a collaborative approach to seafloor mapping that addresses the needs of multiple organizations and partners concurrently. Products developed from this effort have supported a diverse set of geospatial data requirements for nautical charting, ecological research and resource management.

**Figure 1.** Diagram illustrating multibeam echosounder (MBES) data collection and ground validation. MBES sensors collect depth & intensity information. Remotely operated vehicles (ROVs) and drop cameras capture georeferenced photos of the seafloor.

**Data Collection**

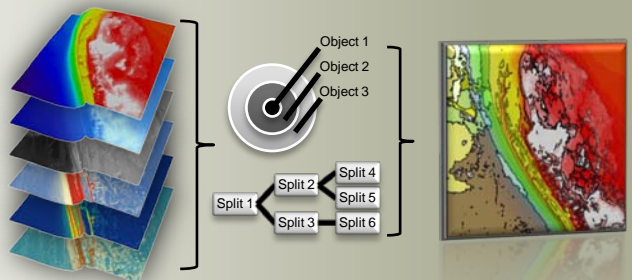
Information describing the physical and biological composition of deep-water coral reef ecosystems have been successfully collected using multibeam echosounders & remotely operated camera systems. Bioacoustic sensors have also been deployed to concurrently collect data describing fish distributions.

**Figure 2.** ROV or drop camera photos. (Left) spiny lobster at 66 m depth off the western coast of Puerto Rico. (Right) hard and soft corals at 18 m depth off the southwestern coast of Puerto Rico.

**Habitat Map Production**

Deep-water coral reef habitats are typically characterized by manually digitizing and interpreting acoustic imagery. The resulting maps, however, are time-intensive to produce, limited by the size of the minimum mapping unit, and ultimately subjective and irreproducible because they depend on the accuracy and interpretation of the person that is digitizing.

**Figure 3.** (Left) suite of benthic metrics derived from the MBES bathymetry and intensity surfaces. (Right) benthic habitat map developed using a new, hybrid classification technique.



To address these difficulties, the Biogeography Branch has implemented a new, semi-automated classification technique, combining object and pixel-based approaches. This improved methodology allows resource managers to more frequently assess the changing distribution of the coral reef systems that they manage, and to better quantify the impact of management actions on the benthos.

For more information, please contact:

Mark Monaco, PhD  
Biogeography Branch Chief  
Ph: (301) 713-3028 x160  
[mark.monaco@noaa.gov](mailto:mark.monaco@noaa.gov)

Tim Battista  
Oceanographer  
Ph: (301) 713-3028 x171  
[tim.battista@noaa.gov](mailto:tim.battista@noaa.gov)