BIOGEOGRAPHY BRANCH

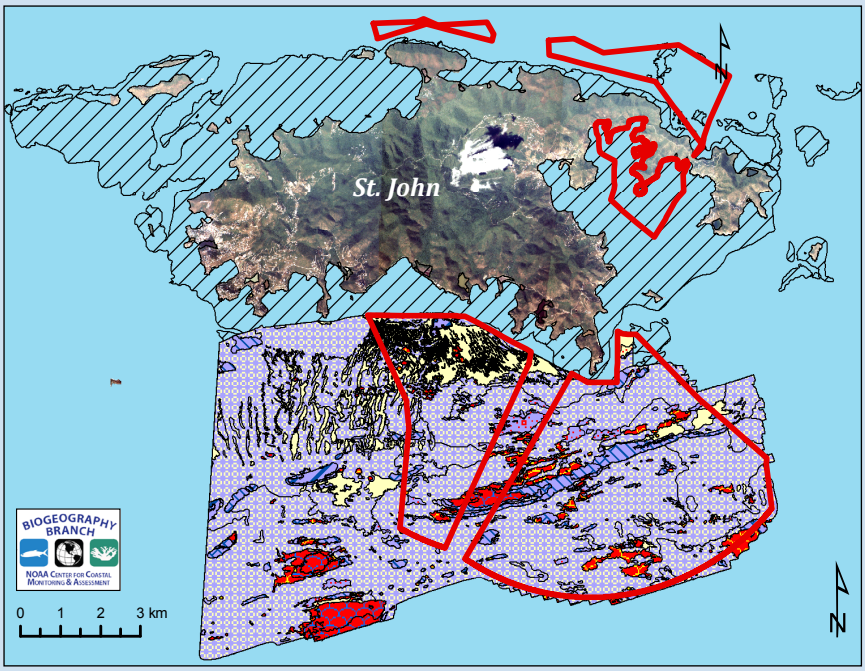
CENTER FOR COASTAL MONITORING & ASSESSMENT

NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

NEW TECHNIQUE TO IMPROVE THE EFFICIENCY OF SEAFLOOR HABITAT MAPPING

BACKGROUND

A report released by NOAA's Biogeography Branch in partnership with the U.S. National Park Service details a new, semi-automated method for creating seafloor habitat maps that is seven times faster and just as accurate. *Moderate-Depth Benthic Habitats of St. John, U.S. Virgin Islands* illustrates over two dozen different underwater habitat types in the moderate waters (30-60 m) of the Virgin Islands Coral Reef National Monument south of St. John. This is the first effort to map the area at this depth, providing managers and the community with a snapshot of the environment.



Moderate-Depth Benthic Habitats of St. John, USVI *debuts seafloor habitat maps generated using a new, semi-automated approach. This technique has the potential to drastically reduce map production time, yet maintain accuracy.*

The Virgin Islands Coral Reef National Monument was created in 2001 to protect the coral reefs and other marine resources within its 12,708 acres.

The map products described in the report are designed to help managers understand where key resources are located in the area. This information is a crucial part of an ecosystem-based management approach to protect and conserve the monument's marine resources from increasing natural and human-related threats.

A second report, *Shallow-Water Benthic Habitat Maps of St. John, U.S. Virgin Islands*, provides complimentary information about the distribution of the area's shallow-water (0-30 m) resources.

NEW APPROACH TO SEAFLOOR MAP PRODUCTION

The Biogeography Branch, with support from the National Park Service, developed an alternative to manually produced seafloor habitat maps. The moderate-depth maps for St. John, U.S. Virgin Islands were created using a semi-automated process that is roughly seven times faster, maintains accuracy and minimizes the subjectivity involved with manually classifying seafloor habitats. While these initial results point to promising improvements in the creation of seafloor habitat maps, formal comparisons of the manual and semi-automated techniques are still ongoing.

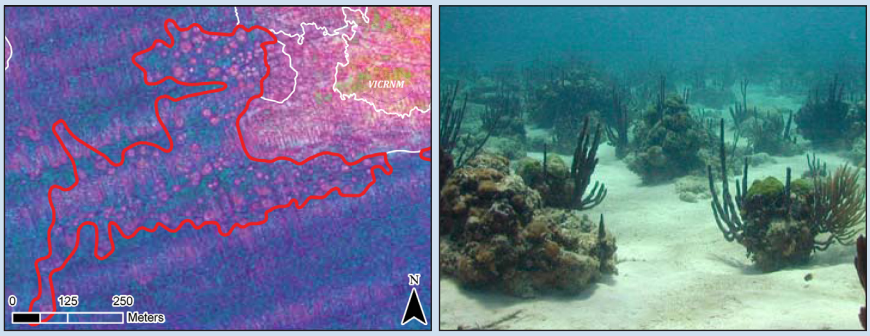
Mapping Method	Area Mapped (km^2)	Man Hours	Area Mapped (km^2) per Hour	Accuracy (Detailed Structure)	Accuracy (Major Cover)	Accuracy (Coral Cover)
Manual	53.4	571	0.09	88.8%	93.0%	85.7%
Semi-automated	90.2	120	0.75	88.7%	95.0%	88.3%
Total Difference	**▲36.8 km^2**	**▼451 hrs**	**▲0.66 km^2**	**▼0.1%**	**▲2.0%**	**▲2.6%**

Initial comparisons of the manual and semi-automated techniques. Please note that formal testing of the two methods is underway.

SEMI-AUTOMATED MAPPING TECHNIQUE

The semi-automated technique uses ENVI software to process initial imagery and outline features and areas of interest on the seafloor. From there, researchers program the software to categorize these areas (as coral, pavement, patch reef, etc.) according to specific criteria outlined by the Branch's established seafloor habitat characterization guidelines. Although further research is needed, early indicators suggest this process is suitable for both optical and acoustic data.

This new technique has the potential to transform the process of habitat mapping from a time consuming, static effort to a dynamic, more easily produced monitoring tool.



The technique uses computer software to identify areas of interest on seafloor imagery, then outlines the features and categorizes them based on programed parameters. The left frame depicts an aggregated patch reef digitally identified and highlighted in red. The right frame shows a photo of the highlighted aggregated patch reef.

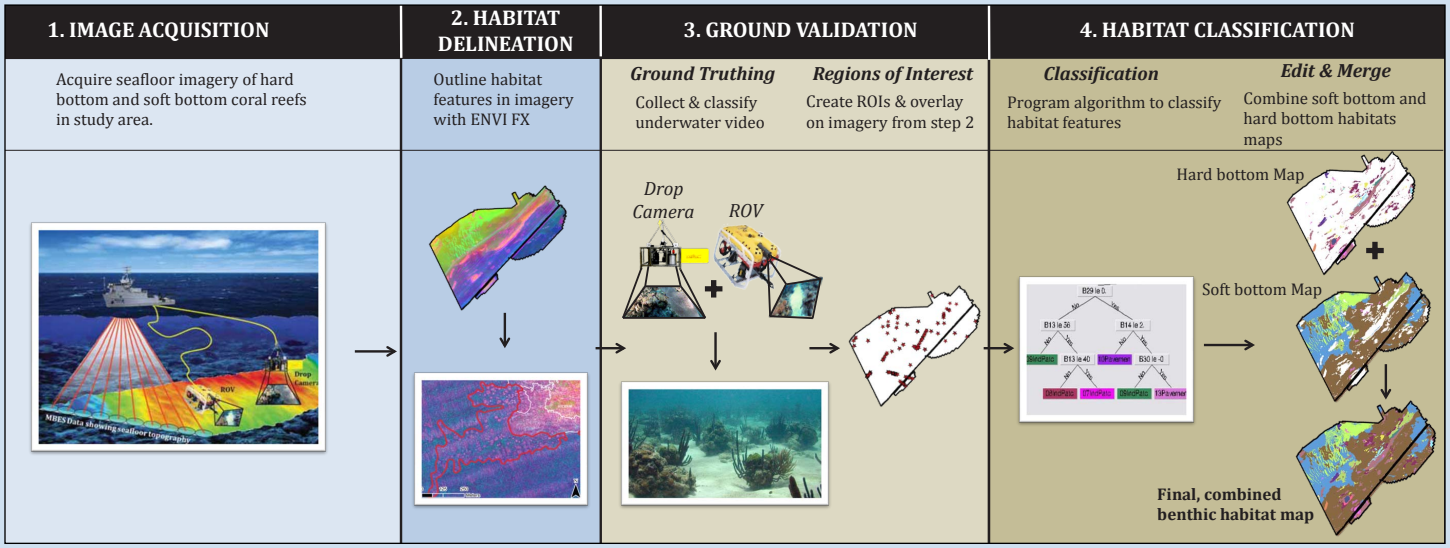


Diagram illustrating the semi-automated process used to created the moderate-depth seafloor habitat maps.

ONLINE RESOURCES & RELATED PRODUCTS

- **Download St. John Reports & Related Data:** http://ccma.nos.noaa.gov/ecosystems/coralreef/benthic_usvi.html
- **Biogeography Branch:** http://ccma.nos.noaa.gov/about/biogeography/welcome.html
- **U.S. National Park Service Virgin Islands Coral Reef Monument:** http://www.nps.gov/vicr/index.htm

CONTACT

The Biogeography Branch mission is to develop information and analytical capabilities through research, monitoring, and assessment on the distribution and ecology of living marine resources and their associated habitats for improved ecosystem-based management. For more information about the Biogeography Branch or the St. John mapping project, contact:

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