Mapping the Seafloor

integrating habitats into a marine zoning design

Coast guard drops underwater video camera © Steve Schill

Goal:

To provide accurate seafloor habitat data that informs ecological approaches to marine management and the development of a marine zoning design for St. Kitts and Nevis.

Biodiversity Objective:

To create the first detailed maps of all near shore seafloor habitats of St. Kitts and Nevis for inclusion in marine management planning to protect coral reefs, seagrass beds, nursery grounds and other habitats for marine life and the socioeconomic benefits they provide.

Outcome:

Demonstration of a cost effective and community driven approach for developing a high resolution seafloor habitat map that provides critical input for decision making in marine spatial planning and management.

Partners:

The project was carried out with support and funding from the United States Agency for International Development in partnership with the St. Kitts and Nevis Coast Guard and the National Coral Reef Institute of Nova Southeastern University's Oceanographic Center.

Project Highlights

Previous data collected from seafloor habitat surveys on St. Kitts and Nevis were too coarse in resolution or too limited in geographic extent to be useful for marine management. This mapping effort produced the first high resolution seafloor habitat maps for the islands' coastal waters less than 30 meters (90 feet) deep. An underwater video system coupled with GPS and a depth sounding device was used over the course of ten days aboard the St. Kitts and Nevis Coast Guard vessel. With this system, field crews collected more than 425 underwater video samples of the narrow, 260 square kilometer ocean shelf that surrounds St. Kitts and Nevis. Data was collected on 12 habitat classes using high resolution satellite technology in combination with the field measurements. The clear waters of the Caribbean allow sunlight to reflect off the ocean floor at depths to 30 meters, enabling scientists to map underwater features and structures in areas as small as 2.5 meters (7.5 feet). The GPS referenced underwater video clips are then used to "train" image classification software to recognize patterns in the imagery that correspond to underwater habitat types. Detailed seafloor habitat maps were then produced showing the extent and distribution of each habitat class, filling an important data gap needed for a marine zoning plan.

Benefits for People and Nature

The underwater habitats of the small island states in the Eastern Caribbean contain a wealth of biodiversity. In the past two decades these habitats have been severely degraded by human activities, severe storms, increased ocean temperatures and invasive species. There is a lack of baseline data on these habitats to enable managers and decision makers to understand current conditions and plan adaptive management.

The benefits of this project are:

- A cost effective data gathering tool for seafloor habitat was developed, tested and used to collect better data than was previously available.
- Local stakeholders were included in gathering the data. In the process they learned about, and became more invested in, the marine environment surrounding their island.
- The habitat maps can be used to help identify areas potentially suitable for anchoring, environmental restoration, conservation, research, fishing, and tourism.
- The mapping products were used to develop the draft marine zoning design for St. Kitts and Nevis. The products are versatile and can be used for other marine and coastal planning purposes by a variety of agencies and organizations.
- The underwater videos provide an important record of the status and health of marine habitat conditions and will serve as an important baseline for monitoring future changes.
- All products from this project have been provided to the departments of planning, fisheries, and tourism on each island, as well as the St. Kitts National Trust and the Nevis Historical and Conservation Society.

Next Steps for Success

Ultimately, this project demonstrates how a satellite-based mapping method can be applied to effectively inform important management decisions. Guided by strong community support, this will ultimately lead to the long-term sustainable use of marine resources in St. Kitts and Nevis. This work, as part of a larger project aimed at drafting a national marine zoning plan, will provide a model for other island nations with similar needs.

Next steps for this project include:

- Map deeper marine habitats, which are not visible in satellite images, to produce comprehensive seafloor habitat maps for the entire exclusive economic zone of St. Kitts and Nevis.
- Use the project's decision support products for multiple-objective analysis, sustainable resource management and finalization of a marine zoning plan.

For more information on this project, or to inquire about the products that were produced, please contact The Nature Conservancy's Caribbean Program at caribgis@tnc.org.

Survey team member lowers camera © Steve Schill

USAID FROM THE AMERICAN PEOPLE

The Nature Conservancy
Protecting nature. Preserving life.™

contact information

Ruth Blyther
Caribbean Program
3052 Estate Little Princess
Christiansted, USVI 00820

tel (340) 718-5575 Ext. 207
fax (340) 718-1613
rblyther@tnc.org
nature.org/caribbean

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.