



MAPPING BENTHIC COMMUNITIES IN SOUTHWESTERN PUERTO RICO USING IKONOS

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Abstract

The Center for Subsurface Sensing and Imaging Systems (CenSSIS) is a National Science Foundation Engineering Research Center since 2000. Its mission is to revolutionize the existing technology for detecting and imaging biomedical and environmental-civil objects or conditions that are underground, underwater, or embedded in the human body. The University of Puerto Rico at Mayagüez (UPRM) is an important partner of CenSSIS with a multidisciplinary group of scientists, professors and students. Our main objective is to assemble accurate benthic maps of coral reefs communities using satellite imagery. The study area, Enrique Reef, is located in southwestern Puerto Rico and consists of sand, corals, seagrasses, and mangroves. IKONOS satellite data at 1m resolution was combined with *in situ* measurements (for accuracy assessment) to assemble a benthic map using ArcGIS 8.3.

Methods

Study Site:

- The study area is Enrique Reef, La Parguera, in the southwestern Puerto Rico.
- Enrique Reef consists of various habitats such as sand, corals, seagrasses and mangroves.

Satellite Data:

- An IKONOS image of La Parguera, Puerto Rico, from February 19, 2006 was used (Figure 1).
- The Datum of the image is UTM and the projection is NAD 83.



Figure 1: IKONOS image of Enrique Reef, La Parguera.

Validation Measurements:

- We obtained *in situ* data on habitat type (Figure 2) and depth.
- A Garmin 72 GPS was used to register an accurate position.
- A buoy was used to locate the position and the surrounding area was examined by snorkeling.
- The maximum depth of the surveyed areas was 5m.



Figure 2. Representative benthic types in Cayo Enrique include corals (a), seagrasses (b), and sand/rubble (c).

Results

- A preliminary benthic ecosystem map was created with ArcGIS 8.3 using a supervised classification (Figure 3).

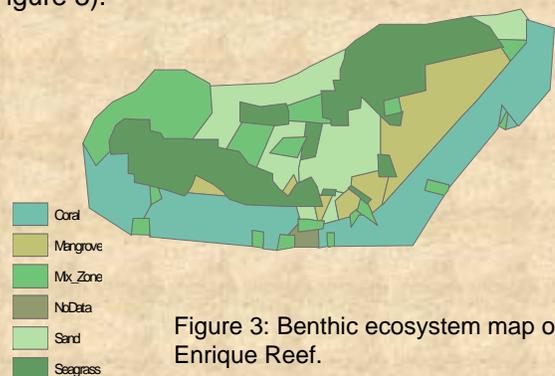


Figure 3: Benthic ecosystem map of Enrique Reef.

Next Steps

- Generate a more accurate map of the area.
- Improve the location information using a Trimble (PRO XR) GPS capable of sub-meter accuracies.
- Perform atmospheric and water column corrections and supervised classification using ENVI 4.3.

Acknowledgments

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