

Remote Sensing of Western-Caribbean Coral Communities

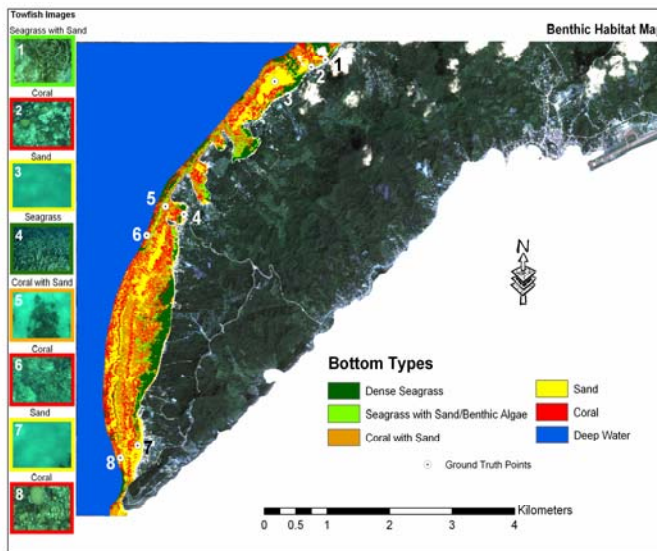
Introduction: Despite the fact that coral reefs have recognized biological, aesthetic, and economic value, they are being destroyed at an alarming rate. There is a need to not only develop baseline maps depicting the spatial patterns of coral reefs on a global scale but also to document the changing conditions associated with the world's reefs over time. Remote sensing has been suggested as a potential tool for monitoring the spatial extent, health, and changes in coral-reef ecosystems. Our work in marine environments began in 1996 with close-range, sub-surface sensing of coral features in the Northern Gulf of Aqaba. Since that time, our effort has been focused on the coral reefs of Roatan Island, Honduras, located in the Western Caribbean (shown at right).

Methods: The project operates at two levels; 1) in-situ collection and analysis of reflectance spectra; and 2) digital analysis of aircraft and satellite images.

Image Analysis: Work is underway on the digital classification of benthic features in the Roatan coastal zone using collected field data and IKONOS images



Roatan Island, Honduras. IKONOS image, 4 March 2000



Preliminary classification of benthic features of Roatan Island, Honduras.



In-situ data collection

Selected Publications:

Lawson, M., Leavitt, B., Rundquist, D., Emanuel, N., Perk, R., Keck, J., and Hauschild, M. In Review. Compensating for Irradiance Fluxes When Measuring the Spectral Reflectance of Corals *In-Situ*. *GIScience and Remote Sensing*.

Maeder, J., Narumalani, S., Rundquist, D., Perk, R., Schalles, J., Hutchins, K., and Keck, J., 2002. Classifying and Mapping General Coral-Reef Structure Using IKONOS Data. *Photogrammetric Engineering & Remote Sensing*, 68(12):1297-1305.

Mishra, D. R., Narumalani, S., Rundquist, D., and Lawson, M., In Press. Characterizing the 'vertical diffuse attenuation coefficient' for downwelling irradiance in coastal waters of Roatan Island, Honduras. *Journal of Photogrammetry and Remote Sensing*.

Mishra, D. R., Narumalani, S., Rundquist, D., and Lawson, M., 2005. High resolution ocean color remote sensing of benthic habitats: a case study at Roatan Island, Honduras. *IEEE Transactions in Geosciences and Remote Sensing*, 43(7):1592-1604.

Mishra, D. R., Narumilani, S., Rundquist, D. and Lawson, M., 2005. Benthic habitat mapping in tropical marine environments using QuickBird imagery. *Photogrammetric Engineering and Remote Sensing* (in press).

Mishra, D., Narumalani, S., Lawson, M. and Rundquist, D., 2004. Bathymetric mapping using IKONOS multispectral data. *GIScience and Remote Sensing*, 41(4): 301-321.

Schalles, J. F., Rundquist, D. C., Gitelson, A., and Keck, J., 2000. Close Range Hyperspectral Reflectance Measurements of Healthy Indo-Pacific and Caribbean Corals. *Proceedings of the Sixth International Conference on Remote Sensing for Marine and Coastal Environments*, Charleston, S. C., 1-3 May 2000. University of Michigan Press, Ann Arbor, pp. I 431-I 440.