

## **Characterization of surface sediments in the Hudson River with the use of Multibeam sonar and sediment analysis**

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In order to assess the ecological resources and benthic habitat types of an estuarine ecosystem it is important to characterize the morphology of the basin and the sediment distribution. A study of the Hudson River Estuary is presently underway which will result in 35 miles of river being mapped by late 1999. This research project (joint between Marine Sciences Research Center and Lamont-Doherty Earth Observatory) is supported by the New York Department of Environmental Conservation in order to determine the distribution of benthic habitats in the Hudson River Estuary.

Surface sediment characterization has traditionally been done through grain size analysis of samples. However, recent advances in acoustic mapping systems have provided the opportunity to remotely classify sediments by considering the backscatter of the bottom. Coarse-grained sediments generally have higher acoustic backscatter than fine-grained sediments, and broad changes in grain size can therefore be differentiated through the analysis of backscatter as calibrated by grain size analysis. Both acoustic and traditional sediment analysis techniques are being employed in an initial effort to more accurately identify surface sediment distribution in the Hudson River from 41°26'N to 41°36'N.

During a cruise in the fall of 1998, a Simrad EM 3000 multibeam echo sounder (operating at 300 kHz with 127 beams) was used to simultaneously collect bathymetric data and bottom backscatter data. The mapping system was operated at a cruise speed of 9 knots and provided nearly 100% coverage of the survey area. The sonar survey and sediment sample acquisition was navigated with the use of Differential Global Positioning System (DGPS).

A variety of features were identified through the sonar survey including large rock outcrops, sunken vessels and deposits that appear to be ship derived debris (Ferrini, 1998). Sediment ridges that are the result of river and tidal currents are also easily identified in the bathymetric maps both upstream and downstream of bedrock outcrops and other large obstructions. Preliminary sediment analysis shows a complex distribution of sediments in this area consisting of predominantly fine grained sediments and anthropogenic particles including coal and slag. Further analysis will be used to correlate changes in backscatter with sediment distribution.

### Reference:

Ferrini, V. L. 1998. Side-scan sonar imagery and the sedimentary characteristics of ship-derived deposits in Western Lake Ontario. M.S. Thesis, State University of New York, Stony Brook.