

Sediment Sampling Program

The LIS Seafloor Mapping Program was created for the purpose of mapping the benthic environment of Long Island Sound. The type and distribution of seafloor substrates (i.e. boulders, gravel, sand, or mud) is a key factor for benthic habitat determination. In addition, sediment samples provide a scientific documentation of long- and short-term environmental changes that will facilitate decision making for conservation and remediation. The main sediment sampling program was conducted in June 2013 from Stony Brook University's *RV Seawolf* and *RV Pritchard*, and was a collaborative effort between LDEO and Queens College (QC), City University of New York.

Sediment Grabs

Sediment grabs are an efficient way to obtain a surface sediment sample. Analysis of these samples will provide a detailed baseline and better understanding of the spatial variability of the sediment type (gravel, sand, mud). Analysis will focus on describing the texture of the sediment, characterizing it as erosional or not, and determining the distribution of metals and organic material. Guided by the acoustic data, we collected 200 grab samples using the *RV Seawolf* and *RV Pritchard*. An additional 100 grab samples were collected by USGS with their SEABOSS system using the *RV Connecticut* from UConn. Detailed analyses are ongoing, but preliminary results indicate a high variability of the sediment distribution in the study area.

Education

THE SEDIMENT SAMPLING INVOLVED the participation of seven undergraduate and graduate students from Barnard College, Queens College, Hunter College, and a summer internship program at LDEO. The students participated in all the different acquisition methods: sediment coring, grabs, and navigation that required understanding of the latitude, longitude, and water depths. We formed teams and rotated them so that the students would learn about the different instruments. In this way, the students learn not only about science but also about collaboration and pledged to each other that they will continue to collaborate beyond the scope of this program. This was an invaluable experience for the students.



McHUGH, LEFT, AND STUDENTS are ready for the next sediment sample.

Sediment Coring

To better understand the long-term history of sedimentation in LIS, sediment coring is essential. Analysis of sediment cores will provide information on various geologic processes through time. The results will significantly improve our understanding of the present sedimentation pattern and will help make future decisions for the health of ecosystems. For collecting the sediment cores, we used two systems. One is a gravity corer, consisting of a core head and a two-meter long PVC pipe. The core



STUDENTS SAMPLING a sediment grab.

head is equipped with a check valve that maintains a vacuum above the collected sediment. As the name implies, the system descends through the water column and penetrates the sediment by the force of its weight. The other system was a hydraulic damped gravity corer, provided by the USGS in Woods Hole, MA, which allows for the recovery of sandy sediments that are difficult to retain in a normal gravity coring system. Again, using acoustic data as guidance for site selection, we collected 46 sediment cores of varying length. The sediment cores are currently being analyzed and we expect that some will provide details of recent environmental changes including erosion and deposition while others will contain records of long-term changes since the last glaciation.

—Cecilia McHugh, PhD, is a professor at Queens College, City University of New York; Frank O. Nitsche, PhD, is a research scientist at Lamont-Doherty Earth Observatory of Columbia University; and Timothy Kenna, PhD, is a Lamont Associate Research Professor at Lamont-Doherty Earth Observatory of Columbia University