Are Marshes Losing Ground?

Imagine going back to a favorite childhood spot and it wasn't there. If you choose to visit a coastal salt marsh, it could happen.

Sea Grant Scholar Alex Kolker observes a salt marsh.

"The natural laboratories of Long Island's many estuaries support numerous salt marsh and coastal wetland habitats which are under threat from both natural and human-induced changes," says **Steven Goodbred,** a marine geologist at Marine Sciences Research Center at Stony Brook University. Ongoing work funded by New York Sea Grant is looking at several different salt-marsh sites around Long Island. One major goal of this study is to reconstruct the history of a marsh's response to environmental change—change caused by sea-level rise, shifting land use, and the natural forces that continually reshape the coast. Every wetland has its own distinctive tides, wave energy, and rates at which sediment accumulates or is washed away. And each wetland has its own sensitivity to the possible threats of future environmental change.

Alex Kolker holds a large sediment corer taken from a salt marsh.

arshes that dot New York City's Jamaica Bay, a complex ecological system that also happens to be a gateway to one of the world's most densely populated cities. Recent observations reveal that some of these marshes seem to be disappearing. On some of these marshes, grasses waving in the wind and abundant wildlife looking for food have been replaced by barren, eroded landscape. The marshes are in the middle of an active bay where waves constantly wash away sediment and re-deposit it. Does marsh loss over the last 30 years have anything to do with changes in sedimentation rates?

Investigating this possible linkage, Sea Grant Scholar **Alex Kolker,** working under Steve Goodbred and MSRC's **Kirk Cochran,** recently presented his findings at a March symposium, *Jamaica Bay's Disappearing Marshes,* which was sponsored by the National Park Service and Gateway National Recreational area with help from NYSG and the NY Aquarium. Kolker and his fellow graduate students took core samples from three different salt marshes in Jamaica Bay and compared them to sediment cores from salt marshes elsewhere on Long Island. By using radioactive lead tracers, they determined the rates at which sediment accumulates.

What the team found was that sedimentation rates over the past century averaged 0.52 cm/yr for a core from Big Egg Marsh, 0.44cm/yr from East High Marsh and 0.28 cm/yr from JoCo Marsh. These sedimentation rates are comparable to fairly stable wetland systems elsewhere on Long Island. Analysis suggests that sedimentation rates in Big Egg Marsh have increased over the past three decades. Yet, Big Egg appears to be losing ground and has been the site of experimental techniques to restore the marsh.

The results suggest that marsh loss in Jamaica Bay, and across Long Island, is controlled by complex dynamics which may not be directly linked to the accumulation of sediment at all. Other factors that the researchers are looking at are changes in storm frequency, sea level change and anthropogenic disturbance to the adjacent estuaries and uplands. Examining these other factors further may help to characterize each wetland and its potential response to future environmental change. Determining marsh sensitivities to multiple stressors is expected to aid Jamaica Bay restoration efforts and mitigate marsh losses in other Long Island wetlands.

— Barbara A. Branca

Graduate student Chris Clapp examines material from a core sample.
Photos courtesy of Alex Kolker and Steven Goodbred.