

Benthic Habitat Mapping in the Peconic Bays

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The Peconic Bays, situated between the north and south fork of eastern Long Island, represent an ensemble of sedimentary environments and benthic habitats distinct from the more urbanized estuaries of Long Island Sound and Great South Bay. We are partway through a project designed to characterize the underwater lands of the Peconic Bays in order to describe the natural processes and sedimentary history of the region, to understand the factors important in the distribution of the benthos, and to quantify the type and variability of the benthos in order to provide insights for management. This kind of information is needed to determine the variability of the sea bed (both natural and anthropogenic), to identify variables important in creating different benthic habitats, to evaluate the sensitivity of benthic habitats to loss and degradation, and to provide a baseline for quantifying future changes. Six regions of the Peconic Bays are being studied during Phase I of the project in order to characterize regional variability and to demonstrate the approach. Four cross-bay transects will be developed during Phase II.

Steps in characterizing and mapping benthic habitats include 1) using geophysical techniques (side-scan sonar and multibeam bathymetry and backscatter) to visualize the sea bed, 2) using the acoustic data to determine the nature and distribution of sedimentary features and the boundaries of regions of similar character, 3) sampling of the different regions to determine the sediment types and benthic fauna, and 4) analyzing the acoustic, sedimentary and faunal data to determine natural groupings and associations of sediments and biota. Side-scan sonar is being used to map primarily in water depths less than 8 m while an EM3000 multibeam echosounder is being used in water depths greater than 5 m. Sediment sampling is being done with a modified Van Veen grab sampler (0.04 m², for both sedimentary properties and benthic fauna) and with cores (for sediment layering and sedimentation rates). Grab samples are being taken at up to 60 locations in each study area in a stratified random pattern (5 samples per major bottom type with 2 replicates) to allow for statistical analysis of the results. Sediments are being analyzed for water content, organic carbon (LOI), redox boundary depth, and grain size distribution as well as for benthic fauna.

Initial results demonstrate a range of sedimentary features and sediment types in the Peconic Bays, including features most likely created during lower post-glacial sea-level stands. These features appear to be preserved because of low wave energy and limited sediment input to the Peconic Bays. Initial results from a site near Robins Island suggest that the benthic fauna is primarily surface and subsurface deposit feeders and that there are geographical differences in species composition and abundance. Suspension feeders are mostly restricted to the sandier sediments, samples from one area consistently had many juvenile hard clams, brittle stars are abundant in most muddy sediments, and barrel bubbles and chevron worms are the most common predators.

