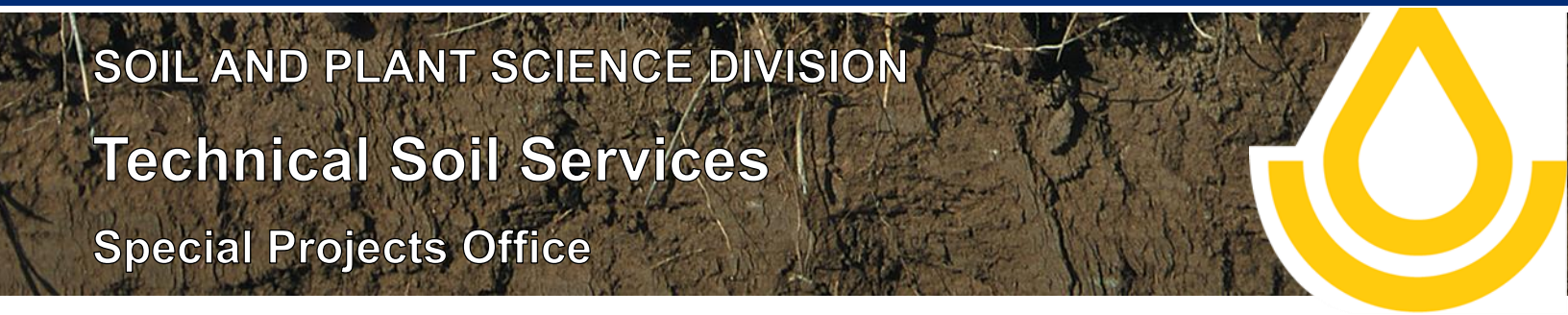

Hammonton, New Jersey, Major Land Resource Area (MLRA) Soil Survey Office (SSO)

SPSD Staff Evaluate Potential Coastal Bay Island Restoration Sites

Purpose

On April 14 and 26, members of the New Jersey Bay Islands Initiative performed preliminary site visits to evaluate two islands within Barnegat Bay for potential restoration projects. The Hammonton MLRA SSO Staff (members of the Initiative) provided the project team with soils information, explained how to use web soil survey, extracted multiple soil cores on the islands and subaqueous environments, and described the geomorphology and development of the islands. This gave the project team of coastal engineers, U.S. Fish and Wildlife Services (USFWS) ecologists biologists, local government officials, and university partners a better understanding of the underlying soils and geomorphology of the islands and surrounding area to better design the projects.

Background

The New Jersey Bay Islands Initiative is a group of coastal and estuarine experts from local, state, and federal government agencies established to protect and promote critical functions of the small but significant estuary islands throughout the Barnegat, Little Egg, and Great Bay estuaries. The marsh islands provide significant habitat for migratory birds, reduce wave and storm impacts on developed barrier islands communities, and serve as areas of enhanced blue carbon sequestration. According to the New Jersey Department of Environmental Protection, this region of the state has lost approximately 10 percent of tidal wetlands between 1975 and 2015. With this astonishing amount of tidal wetland loss, the group identified five degrading tidal marsh islands that serve as natural protection to the Long Beach Township community to protect and restore.

Figure 1. SSO Leader, David Steinmann (right), describes and explains the soil profile from a Macauley auger to the project team. The soil is a Pawcatuck series, a Terric Sulfihemists. (Photo courtesy of Bill Shadel, The Nature Conservancy.)

The project team first conducted a preliminary evaluation at West Marshelder Island in Spray Beach to formulate project ideas. This island developed on a flood tidal delta flat landform; a subaqueous landform associated with an inlet that deposits marine sands during each incoming tide. As sand continues to deposit and elevation builds, this subaqueous landform becomes a subaerial tidal marsh island landform that is associated with the Pawcatuck, Purnell, or Boxiron soil series. The island exhibited large areas of high marsh vegetation, and the soils, described by SSO staff as the Pawcatuck and Boxiron soil series during the site visit, showed stratified layers of organic soil material and sand, new deposition. The project team agreed the accretion of new soil material on the surface and elevation of the island were acceptable and above sea level rise attributes for the area. The island, however, receives a significant amount of wave erosion on the northern and western sides, due to northwestern winds and long fetch across the Barnegat Bay. The project team agreed the significant erosion in this area was an issue to combat at this specific island.

Figure 2. The eroded northern bank of West Marshelder Island. The marsh island edge is actively being undermined by water action, leaving the organic surface to fall into the bay. Eventually this organic surface will break off and wash into the bay. (Photo courtesy of Danielle McCulloch, USFWS.)

High Bar A, B, and C Islands in the Barnegat Light section of the bay were the next stop. These islands developed on top of a flood tidal delta subaqueous landform but are located much closer to the active Barnegat Inlet. Multiple soil descriptions indicated the soils on this island were dominantly Purnell soils. Initial vegetation observations attributed to low marsh and large areas of marsh are drowning with pools and ponds scattered across the island. The project team attributed the cutoff of sediment source, new deposition, and higher tidal fluxes to the modifications to the inlet and bay in the 1950s, resulting in this drowning marsh. Due to these factors, the project team discussed the beneficial use of dredge material for thin layer deposition to raise the surface elevation of the marsh as one of the few actions to take on this island.

When glancing across these coastal estuarine landscapes and seeing the small islands from afar, they may all look like the same spartina tidal marshes, but a closer examination of the soils, vegetation, flooding frequency, and edge erosion reveals how different they truly are from one another. Having multiple scientific disciplines conduct

preliminary site visits showed that restoration plans and designs are site specific and that coastal environments is very dynamic, making an in-depth investigation into each restoration project necessary for project success.

Figure 3. A photo of a drowning marsh on High University Coastal Research Center Bar Islands A, B, and C. (Photo courtesy of Kim McKenna, Stockton University Coastal Research Center.)

Key Outcomes

The New Jersey Bay Islands Initiative group identified and visited islands deemed most critical to community protection and in need of restoration. The project team learned about the importance and significance of the physical and chemical makeup of the soils below the marsh vegetation and how the geomorphology of different islands affects the soils at each site. The team also agreed that soils and soil scientists should be involved with pre-project evaluation of coastal projects in the future.

Based on the preliminary site visits, the project team concluded that each island would undergo a different type of restoration project. Two potential restoration practices discussed include beneficial use of dredge materials and erosion or shoreline protection with living shorelines using oyster reefs to stabilize the eroded edges.

The project team decided that an intensive ecosystem study, including more in-depth soil and vegetation transects on the islands and subaqueous soils, collection of weather data, and deployment of tide and wave gauges, should be conducted in the summer. As Initiative team members, the SSO staff are likely to be requested again to collect the intensive study data which will assist the design team in developing a comprehensive restoration design for each island.

Figure 4. Drone shot of West Marshelder Island looking west across Barnegat Bay. The top and right side of the island is the most erosive with long wind fetch across the open bay. (Photo courtesy of Bill Shadel, The Nature Conservancy.)