



Delaware Estuary Living Shoreline Initiative

FACT SHEET
August, 2008



What is the Delaware Estuary Living Shoreline Initiative (DELSI)?

DELSI is pilot project initiated in cooperation between the Partnership for the Delaware Estuary and Rutgers University to stabilize the eroding shorelines of tidal marshes using natural intertidal reef communities comprised of shellfish such as mussels. The use of shellfish reefs to protect eroding edges of marshes is a relatively new concept, but it has been successfully applied in other parts of the United States to combat sea level rise, damage from boat wakes, and other problems that contribute to loss and degradation of marshes.

This project will utilize various all natural materials and technologies to attract natural recruitment of mussels and other shellfish. Once established, different types of intertidal shellfish reefs will be monitored to assess which approach performs best with regard to shoreline stabilization and other ecological benefits relative to costs. Results from DELSI will provide economically effective approaches to combat the erosion of tidal marshes in Delaware Estuary, particularly along areas such as the New Jersey Bayshore region which are experiencing widespread problems with marsh loss and degradation associated with erosion.

Why are restoring mussel reefs important in the Delaware Estuary?

New Jersey tidal marshes are experiencing erosion from a variety of factors, but rising sea level tops the list in most areas. In most areas, human development and other land use prevents any landward retreat of marshes; hence, losses of acreage are certain. Moreover, recent findings suggest that the health of our remaining wetlands is declining or is in jeopardy in most areas. Marsh health is vital to the overall condition of the Delaware Estuary, as marshes act as the Estuary's "kidney's" by filtering tidal waters, improving water quality. In addition, they provide critical habitat for fish and birds: serving as nurseries, spawning sites, foraging areas, and nesting grounds. Marshes act like sponges, retaining excess water and buffering against storm surge; thereby affording flood protection for humans. By providing a new tactic to stabilize eroding marsh edges using mussel-based shellfish reefs, DELSI has the potential to expand our tool kit for protecting against sea level rise, restoring critical habitats for keystone species, and maintaining the ecological integrity of tidal marshes in the Delaware Estuary.

How could mussel reefs stabilize and restore marsh shorelines?

A variety of all natural materials, such as coconut fiber bio-logs and mats, bagged clutch, and wooden stakes will be positioned in high and mid intertidal zones. DELSI will contrast which of these substrates attract greatest recruitment of bivalves, particularly ribbed mussels (*Geukensia demissa*). These mussels help to stabilize low marsh edges by binding tightly to each other and to vegetation in dense clusters, which encourages sedimentation and vegetation production. Bivalves such as mussels also remove nutrient-rich particles from the water, leading to the accrual of usable nutrients on the surfaces to which they are attached, further promoting plant productivity. By facilitating sediment accumulation, marsh grass production, and by themselves

providing added three-dimensional complexity, mussel beds and oyster reefs accentuate the habitat value for a diverse array of additional plants and animals, enriching the ecology as well as stabilizing erosion along the marsh shorelines.

Why target ribbed mussels?

Ribbed Mussels (*Guekensia demissa*) are one of the functional dominant species in salt and brackish marshes of the Delaware Estuary. Not only does *Guekensia* play an essential role in depositing sediment and rebuilding marshes, but the species also benefits water quality, ecological communities, and plant production. Beds of *Guekensia* are beneficial to fish, fiddler and blue crabs, snails, and horseshoe crabs. They are also possibly unique among bivalve mollusks in being able to digest plant cellulose and feed as “omnivores.” Importantly, they also have a high capability to graze on and digest single-cells of bacteria in the water, possibly helping to reduce bacterial contamination in tributaries along the New Jersey Bay shore area.



Where and How is DELSI being implemented?

Suitable pilot project sites have been identified in the Maurice River and Cohansey River watersheds as well as other areas along the New Jersey Bayshore and in Delaware. To date, living shoreline installations have been completed at study sites along the Maurice River and additional sites will be added contingent on permitting and funding. Treatments will be adaptively managed depending on funding, logistics, partnership involvement, weather, and other factors. Recruitment and shoreline erosion control success will be monitored and contrasted among treatments over the next year, and results will guide additional phases of DELSI. Additional phases are expected to include a seeding strategy to “jump start” living shorelines with hatchery-propagated shellfish. With the continued emergence of new materials and techniques, and the building interest of new partners, the Partnership and Rutgers will work to expand DELSI treatments and study locations in New Jersey and Delaware.

Who is involved?

The Partnership for the Delaware Estuary (Principle Investigator: Dr. Danielle Kreeger) is collaborating with the Rutgers University Haskin Shellfish Research Laboratory Center (PI: Dr. David Bushek). Additional involvement is expected from other Non-Governmental Organizations, academic institutions, and volunteers in the region. Support for this work has been generously provided by the National Fish and Wildlife Foundation, NJ Department of Environmental Protection and US EPA Region 2. If you are interested in becoming involved with this project, please contact the Partnership, OManager@DelawareEstuary.org, or by phone at (800) 445-4935.

The Partnership for the Delaware Estuary, a National Estuary Program based in Wilmington, leads collaborative and creative efforts to protect and enhance the Delaware Estuary, and its tributaries for current and future generations. We envision everyone working together to make the Delaware Estuary the most inviting, prosperous and healthy natural recourse of its kind in the nation