North Carolina
National Estuarine Research Reserve

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Living Shorelines

Estuarine shorelines are at risk of erosion from several sources, including wave action, wind scouring and boat wake. Many property owners look to shoreline stabilization structures to decrease or stop erosion of their land. Stabilization structures can also provide protection during storm surges and hurricanes. But did you know that some stabilization structures can have conservation benefits as well? Such structures are called 'living shorelines' because they also are designed to provide natural habitat and preserve the ecological functions of the estuarine marsh.

In North Carolina estuaries, creating a living shoreline may be as simple as planting native marsh vegetation like smooth cordgrass (*Spartina alterniflora*) along a compromised bank. In low energy environments, the cordgrass roots and stems are enough to trap and hold sediment. In areas with more wave energy, additional construction may be required. Hard materials like rock, oyster shells or marl may be incorporated into the living shoreline design. A gently sloping, reinforced shoreline provides a large surface area for wave energy to dissipate, as well as additional habitat for plants and animals. This design also allows terrestrial wildlife access to the water.

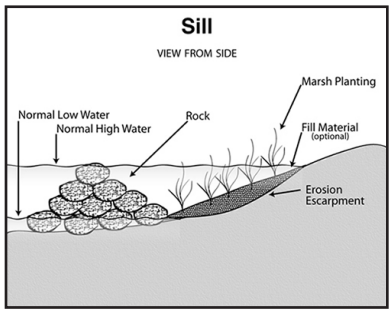
Some living shorelines called sills include offshore mounds also built of rock, oyster shells or marl. Sills are designed to break up waves before they hit the shoreline and they may have the added benefit of creating habitat for aquatic organisms. One animal that often benefits from this type of a living shoreline is the oyster. New oyster reefs build up on sills because the larvae settle on hard substrate. Fish use sills for shelter and foraging.

Living shorelines serve as effective buffers to protect shoreline property from erosion, while simultaneously maintaining functional habitats in the estuary.

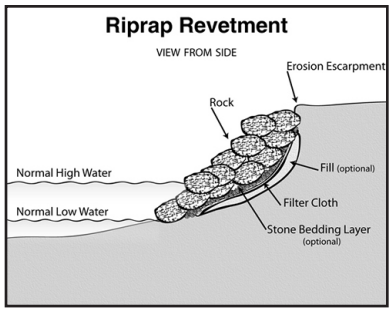
The North Carolina National Estuarine Research Reserve is a cooperative program between the North Carolina Department of Environment and Natural Resources, Division of Coastal Management and the National Oceanic and Atmospheric Administration.

LIVING ALTERNATIVES

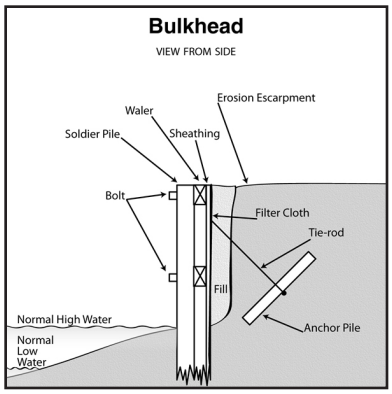
Below are three types of estuarine shoreline stabilization structures. Included are drawings of how each structure is built and a photograph of an existing structure. The first two alternatives are living shorelines. You can see that natural vegetation and marsh habitat are included in the designs. In contrast, bulkheads generally do a poorer job of supporting natural marsh functions.



SILLS made of rock or oyster shells are placed just off the shoreline to break up wave energy. This allows vegetation to take root. The sill may provide habitat for aquatic organisms like algae, shellfish, crustaceans and fish. Sediment can be added behind the sill and planted with cordgrass, a native marsh plant. The top of the sill usually extends just above the high water mark.



REVETMENTS are sloped structures built against the shoreline to absorb wave energy and prevent erosion. Building materials include rock, concrete and oyster shells. These structures are long lasting and can be combined with marsh grass plantings. The riprap provides habitat for some aquatic species. Revetments should be placed as far landward as possible to conserve the intertidal zone.



BULKHEADS or **SEAWALLS** are hard, vertical structures and are a common shoreline stabilization structure. Because they reflect, rather than absorb, much incoming wave energy, scouring of adjacent sediment can occur. Reflected wave energy may not allow marsh vegetation and aquatic organisms to thrive in front of bulkheads. Bulkheads may reduce the amount of sediment and nutrients flowing into the marsh.

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