Living Shorelines for Erosion Control on Long Island, New York and the Living Shorelines Database

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Agencies and NGOs are promoting living shorelines as the preferred method for coastal erosion protection in low- to moderate-wave energy estuarine environments on Long Island, New York. This technique combines small-scale structural components (preferably stone or organic materials), fill and native plants to stabilize the shoreline while creating habitat that mimics natural features. Proponents believe living shorelines can provide environmental benefits and avoid some of the adverse impacts associated with more traditional shore armoring techniques, such as bulkheads and revetments that fix the shoreline in place and can lead to the loss of vegetated marshes and beaches. A report on sea level rise for the state legislature encouraged the use of living shorelines stating; …*feasible soft-engineering techniques (living shorelines) should be evaluated in comparison with other structural and adaptation options to identify the combination of measures that will provide adequate safety for human uses and optimal environmental quality.* (New York Sea Level Rise Task Force 2010). In addition to immediate environmental benefits, the Task Force thought living shorelines would be more "adaptable" to increased rates of sea level rise by stabilizing and enhancing marshes and potentially minimizing disruptions of long term shoreline migration. A panel assembled by Governor Cuomo to provide recommendations for making New York more resilient to disasters in the wake of superstorm Sandy, called on the state to *Develop a comprehensive package of soft infrastructure investments to protect New York Harbor communities, including building living shorelines, new wetlands, oyster reefs, …* (NYS 2100 Commission 2013) to mitigate present and future coastal erosion and flooding problems.

Despite the growing call for living shorelines and the extensive application of this technique in the estuaries of the East and Gulf coasts of the U.S., this technique is not widely used in New York for erosion control. There are no true living shoreline coastal protection projects along the State's marine coast. This is largely due to a lack of awareness and reliable engineering standards for these structures along with present permitting requirements that discourage filling, disturbance, alteration and/or construction on bay bottoms (below the mean low waterline (MLW)) which make it extremely difficult to build effective projects.

Present regulations do permit the construction of low sill bulkhead marsh projects (Figure 1.) which typically consist of a low bulkhead located at the approximate MLW with a top elevation approximately one foot below mean high water backed by a planted intertidal marsh typically less than 10 to 15 feet wide and an upland retaining wall or rip rap structure to prevent erosion during storms. These structures do provide some marsh habitat but differ from what are

typically thought of as living shorelines in a few key ways. The vegetated marsh width is limited by the requirement to place the sill at or landward of MLW and seldom reaches the 20+ foot width preferred for erosion control. Rather than relying on wave dissipation by vegetation for shore protection, the landward structure provides protection by armoring the upland. This system has been effective in minimizing erosion, in some cases even during an extreme event like Sandy, but the upper structure may limit the "adaptability" of this approach in the face of increased rates of sea level rise by preventing migration of the shoreline. In addition, potential ecosystems services provided by the relatively narrow marsh area have not been quantitatively documented.

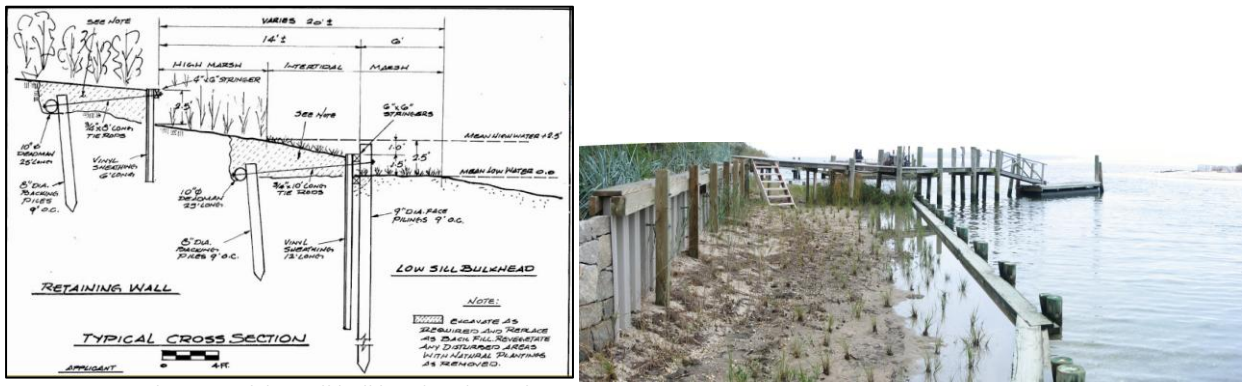

Figure 1. Typical New York low sill bulkhead and marsh project.

If living shorelines are to be used successfully to address coastal erosion in New York, coastal decision makers and stakeholders must be more aware of this approach and be better able to evaluate, plan and implement projects. As part of a larger effort to provide these audiences with the information they need, New York Sea Grant has been working as a member of the Living Shorelines Subcommittee of the Coastal Zone Management Committee of the Coasts, Oceans, Ports and Rivers Institute of the American Society of Civil Engineers on an on-line data base of existing living shorelines projects around the country. Presently, this interactive database <http://livingshorelines.mycopri.org> lists and maps the locations of over 50 individual projects and includes detailed technical information on key project criteria including:

- Location (Google Maps)
- Pre-Project Site Conditions
- Physical and Environmental Considerations
- Design Considerations
- Structural Elements
- Non-Structural Vegetation and Fill Elements
- Project Performance
- Reference, Photographs and Permitting Materials

Users will be able to search the site based on these criteria to identify existing projects similar to ones they might be considering. Plans are underway to allow input of additional case studies

from around the country and updated information such as post-project monitoring reports so that they are available for users in a central location. This site will be an important tool in increasing awareness of living shorelines among New York's coastal stakeholders and providing them with the information and resources needed to help them decisions regarding their appropriate use.

References:

New York State Sea Level Rise Task Force. 2010. *Report to the Legislature.* New York State Department of Environmental Conservation, Albany, NY. 103 pp.

NYS 2100 Commission. 2013. *Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure.* New York State 2100 Commission. 204 pp.