

Living Shoreline Project:

Alternative estuarine erosion control and implementation

Altamaha-Ogeechee Estuarine Complex, GA



Living Shoreline Restoration Project

Georgia's oyster reefs face many challenges today, ranging from the threats of historical over-harvesting to polluted waters, diseases, impacts from invasive species, and other forms of anthropogenic interference. Globally, nearly 85 percent of the world's oyster reefs have been lost or significantly reduced making oyster reefs one of the most severely impacted marine habitats on earth.

The goals of the Georgia Living Shoreline project were to both restore oyster reef while developing a natural alternative to conventional 'hardened' shoreline erosion control methods. Using natural oyster recruitment as the "cementing agent" the living shoreline project employed natural materials to produce an effective "green" upland erosion control management strategy. The use of natural processes and materials allowed for enhanced ecological function and the creation of high-quality oyster reef habitat. This habitat in-turn, provides benefits to countless living marine resources, estuarine water quality and overall enhanced biodiversity.

As opposed to conventional techniques, usually employing steel interlocking sheathing, recycled concrete infrastructure, or chemically treated wooden bulkheads, this Living Shoreline approach creates a natural embankment using natural oyster shells and zoned native plants to effectively stabilize shoreline erosion.

Living Shoreline Demonstration Sites:



Long Tabby:

Constructed with a combination of 'hard' and 'soft' methods (rock gabion, granite, oyster shells, and native vegetation).

Ashantilly:

Constructed from only 'soft' methods (oyster shell bags and native vegetation).

The 'living shoreline' alternative employs sustainable resources and natural vegetation to create a robust intertidal habitat, thereby increasing biodiversity and water quality, facilitating upland and marine habitat continuity, and providing a habitat friendly alternative to conventional erosion control shoreline hardening methods.

Objectives of the Living Shoreline Project

The Living Shoreline project, as implemented in the National Estuarine Research Reserve on Sapelo Island, GA, was developed to determine the ecological efficacy and engineering feasibility of using 'living shoreline' treatments, specifically oyster shells, as a natural solution to conventional erosion control while also restoring oyster reefs. The project was brought to fruition through support from local, state and federal agencies with a tremendous amount of help from countless volunteers. Collectively these volunteers contributed over 1500 working hours toward the construction of the two demonstration sites. This community involvement allowed for a unique opportunity to both educate and spread public awareness regarding not only the Living Shoreline project itself, but also of the associated benefits this type of engineering contains over conventional "hardening" practices including enhanced faunal transmigration, sustaining coastal biodiversity and current local trends in sea level rise.

This project was designed to compare the use of several alternative engineering methods at two demonstration sites on Sapelo Island (Long Tabby and Ashantilly). Using scientifically comparable combinations of polyvinyl netting shell-bags, loose oyster shell and granite rock in a gabion matrix, rock and shell bags in gabion, and rock only in gabion, the project sought to identify the "best" management practice among these treatments. The annual scientific analysis (over a 3 year period) allowed the team to define the optimal design (as determined by oyster size, biomass, density and even vegetation survival). The Ashantilly site, which employed only bagged oyster shells and native vegetation on a bank slope gradient of 1-to-2 (rise/run) was determined the best among the tested combinations.



Outcome

The Living Shoreline project has come to fruition through close partnerships among The Nature Conservancy, Sapelo Island National Estuarine Research Reserve, the Georgia Dept. Of Natural Resource, the University of Georgia, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and volunteers from Coastal Wildscapes and Friends of Sapelo, to create a proof-of-concept implementation, rooted in verifiable scientific evaluation, of a natural and sustainable alternative to conventional erosion control methods. The Living Shoreline's engineering provided a wide range of ecological benefits by restoring local oyster habitat, increasing water quality, allowing faunal migration and providing upland and estuarine habitat continuity which all contributed to increases in overall site biodiversity. These benefits are critically important considerations when choosing an erosion control design in an estuarine setting.

The National Partnership between the NOAA Community-based Restoration Program and The Nature Conservancy implements innovative conservation activities that benefit marine, estuarine and riparian habitats across the United States. The NOAA Restoration Center has worked with community organizations to support locally-driven projects that provide strong on-the-ground habitat restoration components that offer educational and social benefits for people and their communities, as well as long-term ecological benefits.



Volunteers working together to plant native vegetation in zones just above the oyster shell bags.

Working Together

The Nature Conservancy in cooperation with the National Oceanic and Atmospheric Administration's Restoration Center, the Sapelo Island National Estuarine Research Reserve, the Georgia Department of Natural Resources (Wildlife Resources Division & Coastal Resources Division), the Environmental Protection Agency and the Marine Extension Service have come together to restore oyster populations within Georgia as well as to promote and implement a living shoreline alternative to current erosion control mechanisms

What's Next?

The successful implementation of the Living Shoreline project resulted in a groundswell of positive community support and interest. It became clear that future of this project and others like it lies in the coordination of people and agencies on all levels (ie. local, state and federal), to facilitate and promote projects of this kind. In the future, novel engineering advancements such as the lessons learned from this project may eventually help to replace conventional methods due to considerations of costs, engineering longevity and enhanced ecological value to the systems in which they are sited. Moreover, The Nature Conservancy working within a partnership framework hopes to educate all levels of landowners of the ecological importance and economical advantages of employing a living shoreline on their property.

The mission of The Nature Conservancy is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

For more information

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