Green Infrastructure Fact Sheet

Living Shorelines

ILLUSTRATION: Jeffery Mathison

A living shoreline provides shoreline stabilization and erosion control while also preserving or enhancing habitat and water quality. Living shorelines are designed with living plants (emergent and submerged aquatic vegetation) and structures made with natural materials (oyster shells, earthen materials, or plant fiber logs) to help protect the shoreline from storms and waves. Living shorelines may also incorporate oysters, mussels, or other shellfish that form stable reefs and help filter water as they feed.

For more information:

Green Infrastructure Primer

www.de.gov/greeninfrastructure

Delaware Division of ENERGY & CLIMATE

Delaware Department of Natural Resources and Environmental Control

Benefits:

- Reduce erosion and allow sediment accumulation to support habitat
- Restore habitat that has been degraded by erosion
- Filter surface runoff from adjacent uplands, improving water quality
- Promote a higher abundance and diversity of plants and animal species
- Help shorelines keep pace with sea level rise by reducing wave energy and flooding

LEWES CANAL LIVING SHORELINE The goal of the Lewes Canal living shoreline is to protect the property from further erosion due to boat wake and wave energy and prevent the eroding sediment from building up in the canal. The project structures, including coconut fiber coir logs, coconut mats, and oyster shell bags, were installed in April 2014 and planted in April 2015.

PHOTO CREDIT: Wetland Monitoring and Assessment Program, DNREC

Site and Design Considerations:

- Physical environment
    - Soil type, bank elevation and slope, erosion rates
    - Water depth, salinity, prevailing wind direction, tide cycle
- Existing structures
    - Hard shoreline stabilization structures such as bulkheads or breakwaters
    - Docks or boat ramps
- Vegetation
    - Presence of existing vegetation (type and structure) will influence project design and plant selection
    - Living shoreline projects should include native species that are suited to salinity and water depth
- Shoreline wave action
    - No wake/Low wake– "Low energy" shorelines where the wave action is minimal, such as streams and tidal creeks, can be good locations for living shorelines using plants, fiber logs, and shellfish
    - Medium wake–In tributaries and rivers with higher wave energy, a living shoreline may require a "hybrid" design using "oyster castles", log breakwaters, or other structures parallel to the shoreline to help reduce wave action
    - High wake–Shorelines with high wave energy, such as near deep water and greater boat traffic, may require additional structures to diminish wave energy, or may not be suitable for a living shoreline

Maintenance:

- Perform installation and maintenance at low tide, when the plants and structures are exposed and accessible
- May need to backfill "cells" (area between coir logs) with sand and topsoil to enhance natural filling of sediment
- May need to adjust the cell height with additional coir logs if they sink or settle to keep elevation in the optimal plant growth range
- Weedy or invasive species should be controlled before and after installation
- If dry days occur after planting, water plants on the upland edge to keep them from wilting and dying
- Immediately remove and replace plants that die or are diseased so they don't affect the other vegetation
- Monitor the fiber logs and matting; because they are biodegradable, fiber logs and support posts may need to be replaced if they rot or break down before the shoreline is stabilized
- Install temporary fencing if needed to control waterfowl, because they are known to feed on freshly planted vegetation

Resources:

Partnership for Delaware Estuary
http://delawareestuary.org/living-shorelines

Delaware Natural Resources and Environmental Control Education and Outreach web page
http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Pages/Library_Education_Outreach.aspx

National Oceanic and Atmospheric Administration (NOAA) Living Shoreline Planning and Implementation
http://www.habitat.noaa.gov/restoration/techniques/lsimplementation.html