

Preserving The Bay's Living Shorelines

A Growing Grass-roots Effort

By Tom Barnard

The shores of the Chesapeake Bay, and in particular the myriad of smaller creeks and guts that run inland off its four major rivers, have for thousands of years been buffered and protected from the forces of erosion by communities of salt tolerant grasses, sedges and shrubs, collectively called tidal marshes. At the same time, these natural communities have served important ecological functions, as nurseries, habitat and primary food source for valuable bay fauna such as fishes and blue crabs. They also serve to filter sediments and other pollutants running off the adjacent uplands.

With the development of the bay watershed over time, land use has changed and forested upland buffers have been replaced by farms, housing developments, industries, marinas and other forms of economic growth. Growth has changed the bay landscape and led to significant loss of living resources over time, including non-tidal wetlands and tidal fringing marshes. Unfortunately, these anthropogenic losses have occurred concurrently with sea level rise which has served not only to increase natural shoreline erosion rates and marsh loss but also lead to accelerated attempts by homeowners to protect their upland and thus further exacerbate shoreline marsh losses.

Only relatively recently have scientists demonstrated many of the ecological functions performed by these natural shoreline communities and, in

particular, the complex interrelated nature of the upland and aquatic systems. However, the “armoring” of the shoreline against erosion, with the accompanying loss of most of the living aspects of the shoreline, continues at an ex-



Erosion control using low profile rock riprap with planted marsh.

tremely high rate. In 2002 and 2003, the Commonwealth of Virginia permitted construction of shoreline erosion control structures along 14.4 and 17.7 miles of bay shoreline, respectively. These numbers alone are alarming but VIMS' data further indicate that over the last ten years, Virginia has permitted the “hardening” of an average 18.5 miles of shoreline per year (VIMS Shoreline Permit Data Base).

Much of this shoreline loss is unnecessary or structurally over-designed for the level of erosion involved. Purely structural approaches tend to cut off the connections and natural interac-

tions between the upland riparian environments (e.g. the forested buffer) and the marshes, tidal flats and shallow water habitat. This, in turn, can lead to the drowning of fringe wetlands as sea level rises and the marsh can not move landward (up slope) or trap sediments running off the land, to compensate for the rising water levels. The eventual result is that the marsh is drowned and lost from the system. There are alternative approaches available which utilize “softer” more natural shoreline treatments or incorporate aspects of the living landscape while minimizing engineered, structural erosion control.

Many shorefront landowners are unaware of these techniques and would prefer a natural shoreline to hardened shorelines such as stone revetments or bulkheads.

Private waterfront property owners collectively control the majority of Maryland and Virginia's shoreline and thus, represent a significant opportunity to improve the water quality and habitat of the Chesapeake and Coastal Bays. For this reason, a **Living Shorelines Stewardship Initiative (LSSI)** has been set in motion.

Originally begun in Maryland with funding from The Keith Campbell Foundation for the Environment, the initiative has grown into a bi-state, multi-agency collaborative effort involving the states of Maryland and Virginia. Funding now is also being provided by the Maryland Department

of Natural Resources and the Chesapeake Bay Trust. Supporting the initiative presently are Anne Arundel County, several federal agencies, independent contractors, university research groups and non-governmental environmental organizations. The overall goal of the Living Shorelines Stewardship Initiative is to improve water quality and enhance habitat for living resources in the Chesapeake Bay through the shoreline management efforts of individual waterfront property owners. Key strategies to reaching the

The Virginia Wetlands Report is a quarterly publication of the Wetlands Program at the Virginia Institute of Marine Science of the College of William and Mary. Subscriptions are available without charge upon written request to: Wetlands Program, Virginia Institute of Marine Science, P.O. Box 1346, Gloucester Pt, VA 23062 USA. Address corrections requested.

Program Director:

Dr. Carl Hershner

Head, Wetlands Advisory Program:

Thomas A. Barnard, Jr.

Produced by:

VIMS Publication Center

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This report was funded, in part, by the Virginia Institute of Marine Science and by the Virginia Coastal Resources Management Program of the Department of Environmental Quality through Grant #NA03NOS4190104 - Task #11 of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resources Management, under the Coastal Zone Management Act, as amended.



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goal include: using science to drive appropriate types of, and locations for “living shorelines” treatments; and facilitating the institutionalization of living shoreline approaches through contractors and shoreline management policy makers. The ultimate desired outcome is to have: “Maryland and Virginia shorefront property owners routinely consider and frequently choose living shoreline alternatives as their preferred shoreline management treatment.”

These “softer” more natural shoreline treatments involve the use of marsh reestablishment, beach nourishment and low profile rock structures combined with biotic elements such as marsh toe protection and shallow water sills as well as the use of properly employed organic materials such as fiber logs. Besides attenuating shoreline erosion, these treatments facilitate natural coastal functions and processes such as nutrient recycling, sand and sediment deposition, the movement of detritus within the littoral zone and the protection of the natural shoreline habitat. These treatments may not be appropriate for all shorelines, high energy beaches for example, but where they can be utilized, the discerning property owner may benefit from reduced costs, creating or maintaining habitat and conditions that contribute to maintaining and restoring water quality along with important Chesapeake Bay habitats.

The University of Maryland Center for Environmental Studies (UMCES) Horn Pt. Lab has received funding from Maryland Department of Natural Resources and the Chesapeake Bay Trust to conduct a detailed field assessment and documentation of 8 shoreline erosion control projects in Maryland which incorporate marsh creation or protection as a key element of the design. The team, which will also include experts from Virginia and Maryland funded by the Campbell Foundation, will evaluate a variety of factors that may vary from site to site. Factors to be assessed may include:

Physical Effectiveness Assessment Factors:

- ◆ Shoreline wave exposure/fetch.

- ◆ Physical integrity of original design including configuration and placement of original materials.
- ◆ Changes in elevations and slope of fill containment area, displacement of structural features (stone groins, sills, breakwaters etc.).
- ◆ Changes in shoreline profile nearshore, shore zone, bank erosion or deposition on-site, updrift & downdrift areas.
- ◆ Design features in relationship to wave climate, reach characteristics, shore type and substrate composition.
- ◆ Variations in treatment type designs, maintenance & other factors affecting results.

Biological Effectiveness Factors:

- ◆ Emergent wetland plant community characteristics species composition (tide-range variable), width of marsh, percent cover, plant height.
- ◆ SAV historical presence, species, percent cover, canopy height, flowering, maximum depth of distribution.
- ◆ Associated fauna use of the site by birds, reptiles, invertebrates etc.
- ◆ Habitat suitability water quality (dissolved inorganic nitrogen and phosphorus), epiphytic loading.

The Virginia Institute of Marine Science (VIMS) has been funded by the Keith Campbell Foundation for the Environment to conduct field surveys in Virginia focusing on the effectiveness of existing low profile marsh toe protection structures identified through their Tidal Shoreline Permit Data Base. The assessment team will use many of the same criteria, listed above, to develop a site-specific profile of each marsh toe structure and photographic exhibits that will be used to produce presentation materials for a spring 2005 workshop. The workshop will be sponsored by the National Estuarine Research Reserve System and the Center for Coastal Resources Management at VIMS and should be of interest to marine contractors, waterfront property owners, environmental consultants,

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wetlands boards and shoreline regulators as well as non-governmental environmental organizations (NGO).

Depending on how successful the initial steps of the Living Shorelines Stewardship Initiative are in Virginia, organized shorefront property owners may be eligible to apply for grants such as has occurred with the South River Federation in Maryland. They have partnered with the Chesapeake Bay Foundation and others in applying for a

grant to enable the production of a “South River Living Shoreline and Estuarine Habitat Restoration Framework.” Once developed, this framework will be part of an overall strategy to educate landowners to the benefits of natural shoreline management options and to consider their use. The emphasis at present is to demonstrate the effectiveness of these “living” approaches to shoreline erosion control and then to get the word out to property owners.

David Burke, LSSI manager, contributed to this article.