

What do the recommendations cost?

An important part of the strategy recommendation is the accompanying typical cross-section. These cross-sections provide a starting point for consultants and/or designers and an approximate estimated cost per linear foot for the property owner. The table lists the strategies recommended for each reach and their approximate cost. Marsh management cost is often tree trimming and planting on existing bottom. An approximate cost is provided for breakwaters and beach fill; however, these types of projects can be built in phases and so costs are difficult to accurately determine per linear foot. All shoreline structures and plants require maintenance from time to time. Marsh grasses and even sand may need to be replaced after storms.

The strategies recommended for each reach in the **MCSMP** and their approximate cost.

Reach	Strategy	Cost per Linear Foot of Shoreline*
1	marsh management	<\$50
<i>Piankatank River, Hills Bay and Queens Creek</i>	small low sill	\$125-\$175
	low sill	\$150-\$195
	medium sill	\$190-\$240
2 - Lower energy areas	marsh management	<\$50
<i>Milford Haven and associated creeks</i>	small low sill	\$125-\$175
	low sill, narrow-crest	\$200-\$275
2 - Higher energy Bay Shoreline	breakwaters and beach fill	\$500-\$1,000
3	marsh management	<\$50
<i>Mobjack Bay, East River and North River</i>	small low sill	\$125-\$175
	low sill, narrow-crest	\$200-\$275
	low sill, wide-crest	\$250-\$350

*Costs are approximate and were determined in Spring 2010. They typically include the materials and installation of rocks, sand, and plants. Other work, such as permitting, gaining access, and other site work can vary considerably by site and is not included in the estimated cost.

Summary

Managing shorelines to slow down erosion as well as maintain marsh and aquatic habitats requires an understanding of the conditions of the site and how the various options perform under specific conditions. If waterfront landowners have good information, they will consider using Living Shoreline techniques if their property needs protection. Most people who live on the water do so because they enjoy the beauty and recreational opportunities of their location. Those natural assets depend on the inclusion of establishing appropriate vegetation which Living Shorelines aims to create.

The full **Mathews County Shoreline Management Plan** can be found online at

www.vims.edu/physical/research/shoreline/Publications-ShoreMgt.htm

It can be viewed in print at the Mathews Memorial Library • 251 Main Street • Mathews, Virginia 23109

For additional information on the **MCSMP**, contact the Mathews County Department of Planning, Zoning and Wetlands.

For more information on Shoreline Management, go to:

www.vims.edu/physical/research/shoreline

For more information on Living Shorelines, go to:

http://ccrm.vims.edu/coastal_zone/living_shorelines/index.html

Written by:

Donna Milligan and C. Scott Hardaway, Jr.

Shoreline Studies Program, Virginia Institute of Marine Science

March 2010

This project was funded by the National Fish and Wildlife Foundation through Grant Number 2007-0081-014



Introduction

Mathews County is bordered mostly by water with the Chesapeake Bay on the east, Mobjack Bay on the south, the North River on the west, and the Piankatank River on the north. In the past, shoreline erosion control options were usually limited to groins, revetments, or bulkheads. While groins typically are only effective in sandy areas, revetments and bulkheads can stop upland erosion, but often reduce the habitat along the shoreline by creating a barrier between the upland and the water. With much of the shoreline privately-owned, a need exists to inform landowners of management options that may improve the health of the Bay through more environmentally-friendly shore stabilization strategies which create a vegetated coastal profile.

Over the last 20 years, shore stabilization strategies that create habitats have been used effectively. These “Living Shorelines” are a suite of shoreline management strategies that use sand, plants and sometimes rock structures to stabilize the shore. Living Shorelines benefit the Chesapeake Bay by enhancing or creating shoreline habitats, reducing the erosive force of waves, trapping sediment thereby increasing water quality, and providing cover and food for fish, shellfish and birds.

The shoreline management plan is useful for evaluating and planning shoreline management strategies appropriate for the Bay, creeks and rivers of Mathews County. These shoreline management strategies are balanced against shore protection, environmental concerns, and zoning and permitting regulations to provide the recommendation for shore reaches along the tidal shorelines of the County. In addition to these concerns, cost also is a consideration for regulatory agencies and property owners. The Mathews County Shoreline Management Plan (**MCSMP**) analyzes unique shoreline situations on various scales and presents stabilization alternatives that optimize the balance of habitat value and effective erosion control. These strategies, along with the cost estimates provided, can be used during the project development stage to promote the most reasonable and beneficial approach to shoreline stabilization.

The **MCSMP** is an educational and management reference for the County and its landholders. Much of Mathews County's shoreline is suitable for a "Living Shoreline" approach to shoreline management. The MCSMP identifies shoreline types at multiple scales, from individual lots to large reaches, and determines whether or not they are actively eroding and provides an analysis of the physical and hydrodynamic characteristics of each site. This accurate and detailed information at the appropriate scale is the basis for shore protection recommendations. Recommendations were made along eroding properties both residential and those susceptible to development such as wooded or agricultural land. These are the areas where shore structures likely will be constructed. Property types other than these may not receive a recommendation such as very wide marshes.

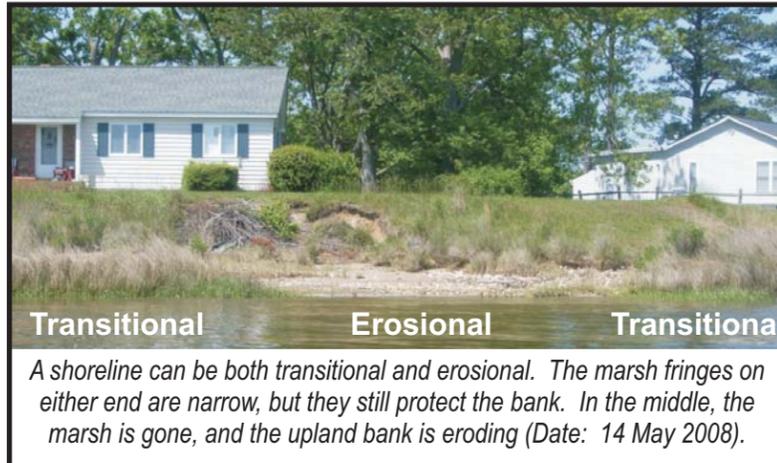
What are general existing shoreline conditions?

Along Mathews' shorelines, year-to-year erosion rates may vary widely for a property. Shoreline loss is most significant during storms when water levels and wind make the wave action very damaging. Severe northeasters and hurricanes, rather than gradual processes, are what cause dramatic changes in shorelines. Typically, waves undercut banks or the edge of a fringe marsh, or remove soil from a bank face, causing landward retreat of the bank or vegetation.

The base of bank and bank face conditions range from stable through transitional to erosive. An unstable base of bank is usually the first indicator of shore erosion. Instability of the bank face is the second indicator. If both the bank face and base are exposed, there is probably active erosion. If there is no undercutting at the base of the bank, and the bank face is fully vegetated, then both are likely stable. These two extremes are readily identified. Transitional shorelines may be harder to identify.



An example of a stable shoreline in Mathews County. The relatively wide marsh protects the upland bank which is stabilized with shrubs. (Date: 14 May 2008)



A shoreline can be both transitional and erosional. The marsh fringes on either end are narrow, but they still protect the bank. In the middle, the marsh is gone, and the upland bank is eroding (Date: 14 May 2008).

In areas with very low wave energy, banks may have been undercut for many years and are not measurably eroding. Trees that shade the shore zone can prevent the marsh grasses from growing, possibly accelerating erosion. Generally, the wider the marsh/beach fringe, the more stable the upland bank. Narrow (<5 ft) marshes or beaches have less ability to absorb wave energy than wide (>15 ft) marshes or beaches. Some action to manage the shoreline is recommended where the banks are actively eroding or the marsh or beach fringes are very narrow.

What are some shore zone management considerations?

Wherever it is possible to preserve a continuous connection between the upland, the shore, and the nearshore, a high quality ecosystem can be maintained which benefits the fish, crabs, and wildlife and make waterfront living desirable.

Determining the nature of the problem on your property is crucial to management. Are you on low-ground and are you concerned about flooding? Shoreline structures cannot stop flood waters, but a natural slope to the land can reduce the impacts of storm waves. Is your shoreline eroding or is it a landscaping issue? In other words, are you actively losing land or do you just wish it would look different? What if you did nothing and took a wait-and-see approach? How would that impact your property? These are all considerations in determining the best approach for managing your waterfront property.

Consideration also should be given to the types of vegetation along the shoreline. Trees and shrubs act as riparian buffers to trap and filter sediments, nutrients, and chemicals from surface runoff and shallow groundwater. Controlling overland flow and trees at the edge of unstable banks can help the shoreline stabilization process. Tree roots exposed by an eroding bank can accelerate land loss if the tree falls and takes part of the bank with it. Managing trees and shoreline vegetation to stabilize an exposed and eroding bank face may require trimming, removal, or other measures to obtain a grade slope that will be more stable. Tree work, bank grading, and planting with the appropriate vegetation are best done with assistance from experts who can plan, permit and/or perform the job. To find out what permits are required, check with the Mathews County Department of Planning, Zoning, and Wetlands (www.co.mathews.va.us).

How do I manage my shoreline?

The first course of action is to observe what is happening on your shoreline and your neighbor's shoreline. If possible, take measurements and photographs spanning the seasons, particularly when storms occur. Note the type, location and density of plants, its orientation to the sun, and the hours of sunlight reaching marsh grasses. Observations at low and high tides, from the shore or from a boat offshore, can be helpful. Look at the historic photographs of your property, available in the **MCSMP**. This information will be helpful in understanding the issues affecting your specific property, deciding if you have a problem that requires action and working with consultants or contractors if erosion must be addressed. If a shoreline needs stabilization, consider how to incorporate the principles of Living Shoreline design into the project.

The simplest approach for shorelines that have an existing marsh fringe, but do not have active bank erosion, is **marsh management**. This wait-and-see approach includes removing dead plant material or debris that might smother marsh plants. Trees may need to be limbed or thinned to make sure the marsh gets adequate sunlight. Results from these simple measures can be dramatic in the smaller tributaries where wave forces are limited (obtain permits if you intend to cut trees or disturb soil). After trimming overhanging trees that can kill marsh grasses, another option is to plant existing bottom with *Spartina alterniflora* (smooth cordgrass). In the lower energy small creeks, this may be all that is needed. As energy increases in the larger creeks and rivers of Mathews County, it may be necessary to add sand and stabilize it with rock sills or groins in order to establish a marsh. Permits are required if sand fill is placed onto state-owned bottom as well as the intertidal zone. Obtain permits if you intend to cut trees or disturb soil.

In addition to **marsh management**, **stone sills** and **breakwaters** are Living Shoreline strategies that have been used successfully in many other areas of the Bay.

Stone sills: In the **MCSMP**, typical cross-sections of recommended sills were developed for each subreach. The cross-sections show the sand for the wetlands substrate is on a 10:1 slope from the base of the bank to the back of the sill. The elevation of the intersection of the fill at the bank and the sill will determine, in part, the dimensions of the sill system. Sills and breakwaters must be designed for the site conditions and wave energy and constructed using techniques and materials specified by the engineer or designer. However, the cross-sections can be used to estimate the cost of the system for your specific property.

Breakwater System: Breakwaters are used on shores with higher wave energies such as along the Chesapeake Bay. Although single breakwaters can be used, two or more are recommended to address several hundred feet of high energy coast. Breakwaters can be designed to various levels of protection with larger system dimensions generally correspond to higher fetch exposures and where a beach and dune shoreline is desired.

What if my property does not have a recommendation?

Due to site and weather conditions, it is possible that some erosional sites were missed. If, after following the methods above, you feel your bank is actively eroding then use the data provided in the MCSMP to find a site near yours that has similar existing conditions. It is likely that the recommendation made at that site will fit your property. The typical cross-sections can provide a starting point for determining costs and can be discussed with a consultant. In addition, the Shoreline Studies Program at VIMS can answer questions.



The gapped sill with wide marsh protects the vegetated upland in Mathews County (Date: 12 Aug 2008).