

CHAPTER 7: SHORE EROSION CONTROL

The Critical Area Criteria and local Critical Area programs encourage the protection of rapidly eroding shorelines by private and public property owners. Sediments, a major pollutant in the Chesapeake and Coastal Bays, are generated when land falls off into the water or is battered by wind or waves. Oftentimes, nutrients and other pollutants that are bound to soil particles are also released into waterways when erosion occurs. While erosion is a natural process, it can be intensified by runoff from upland development, boating activity, loss of marsh or other riparian vegetation, and even sea level rise. In addition to the adverse impacts to water quality and habitat created by erosion, it can lead to decreased property values and can threaten the integrity of existing structures, roads, and utilities.

While shore erosion control is encouraged in the Critical Area, the type of control measure that best conserves fish, wildlife, and plant habitat should be used. Maryland's Critical Area Program requires that nonstructural shoreline stabilization measures be used, except in areas designated and mapped by the Maryland Department of the Environment (MDE) as appropriate for structural measures. Nonstructural stabilization measures include: beach nourishment, the installation of marsh vegetation, and various sill and sand fill designs that include planting of low and high marsh vegetation. Nonstructural measures may not be feasible on all sites because of excessive erosion, heavy tides, or the size and configuration of a particular waterway. In these cases, an applicant can apply for a waiver as part of the permit application process.

Types of Erosion Control Measures

Nonstructural erosion control measures are preferred because of the following benefits: maintenance of intertidal habitat and transitional habitat between

- *Even areas that provide public access to the shoreline and are intensely used can be designed to maintain natural vegetation and avoid alteration of the shoreline in order to minimize erosion.*



Intertidal habitat is important to the overall health and ecology of Maryland's tidal tributaries and the Bays...



■ *Nonstructural erosion control measures are practical and effective on many sites and allow for the maintenance of transitional habitat between aquatic and upland communities.*

aquatic and upland communities; enhancement of water quality; utilization of natural and renewable resources; and maintenance of natural wave, tide, and hydrologic patterns and flows. Intertidal habitat is important to the overall health and ecology of Maryland's tidal tributaries and the Bays because it is used by a wide variety of estuarine organisms, many of which provide food for both terrestrial and aquatic species. This area also provides a natural transition between aquatic and upland communities. This transitional area can function to provide protection for young fish and crabs; habitat for burrowing species; water access for amphibious species; and food and nesting areas for a wide variety of aquatic and upland species. The intertidal zone provides significantly better habitat when nonstructural erosion control measures, like a created marsh, are used, as opposed to a hardened structural measures. Vertical wall-type structures eliminate any kind of transition zone by cutting

off the upland community, deflecting wave energy downward, and scouring the near shore environment. Revetments, while dispersing some wave energy, provide only limited habitat for a few species and tend to function as a barrier between upland and aquatic habitats. Many species, such as Diamondback Terrapins and Horseshoe Crabs that may use a vegetatively stabilized shoreline for nesting, cannot use shorelines protected by rock revetments.

Nonstructural erosion control measures that use vegetation also provide significant water quality benefits. Vegetated systems filter and trap sediments and debris, promoting water clarity that is conducive to the growth of Submerged Aquatic Vegetation (SAV). SAV beds are an important nursery area for many economically and ecologically valuable species. Vegetated systems also take up and "fix" nutrients, particularly nitrogen and phosphorus. Excess nitrogen and phosphorus contribute to algae blooms, which cloud the water and lead to low dissolved oxygen levels when the algae decomposes. SAV beds are negatively affected by bulkheads and revetments due to deflected wave energy and the resuspension of sediments.

In addition to the water quality and habitat benefits provided by vegetated shorelines, they also utilize natural and renewable resources and mimic natural stable shoreline conditions typically found on Maryland's waterways. In general, shoreline protection measures that "blend" with the natural shoreline through the use of construction methods and materials typical of the area provide more ecosystem functions and control erosion more effectively than other methods.

Vegetated shorelines also minimize disturbance to the existing riparian area and alteration of the shoreline, making it possible to maintain natural wave, tide, and hydrologic patterns and flows while minimizing erosion. In most cases, shoreline erosion control measures that allow for the maintenance of normal coastal processes, such as seasonally high tides, the growth and decomposition of organic matter, the exposure of intertidal mudflats, and the accretion and transfer of sand, not only minimize disruption of the ecosystem, but can actually enhance and expand ecosystem functions

Permit and Approval Process

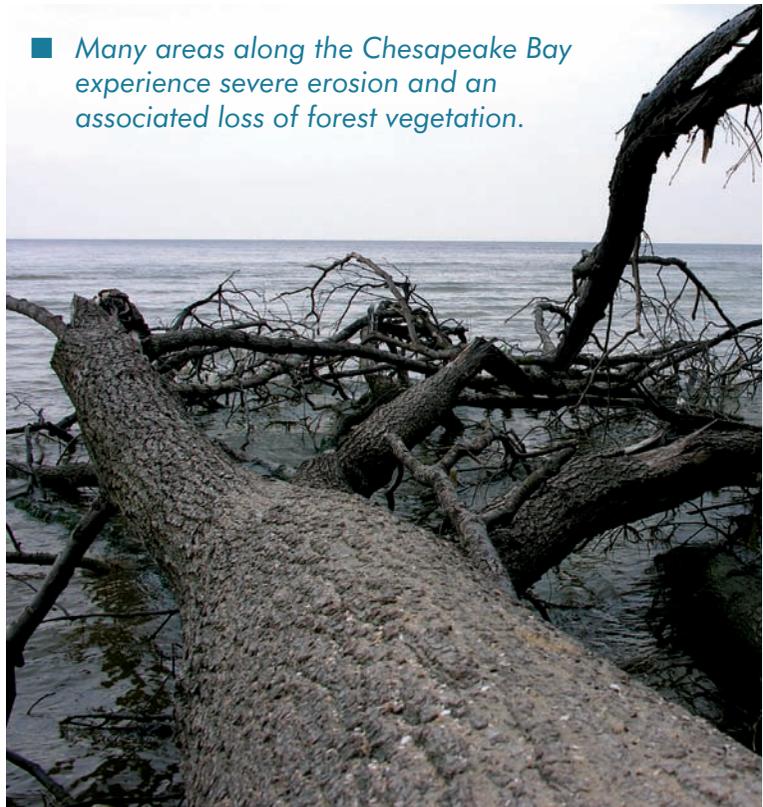
In order to install most shore erosion control measures, appropriate permits or licenses must be issued by MDE, the Maryland Board of Public Works, and the United States Army Corps of Engineers. State regulations pertaining to the issuance of permits can be found in the Code of Maryland Regulations, Regulation 26.24.04.01, and the State and federal government utilize a joint permit application for these projects. In addition to State and federal authorizations, a local permit is usually required because the installation of erosion control measures can significantly impact Critical Area resources, especially the Buffer. In general, permit applications that alter the Buffer or disturb Buffer vegetation must include a Buffer Management Plan. Approval of a Buffer Management Plan ensures that the Buffer functions are maintained or enhanced following installation of a shoreline protection measure.

Disturbance to, and alteration of, the Buffer to install

a shore erosion control measure can be permitted, but the project design and construction methods must minimize the disturbance. For example, a single point of access to the shoreline to conduct the work should be used, and, if possible, the shoreline should be accessed from the water. Grading, tree clearing, and the removal of natural vegetation should be minimized so that the Buffer functions are not compromised. After the erosion control measure is installed, all areas disturbed should be fully restored to provide further stabilization and to mitigate for habitat impacts. While some shore erosion control projects include grading and removal of vegetation, shore erosion control cannot be used as a justification for clearing the Buffer or for otherwise circumventing Critical Area requirements.

While erosion is one of the many complex natural processes that comprise the ecosystems of Maryland's Bays, erosion can have detrimental effects on property values; water quality; and fish, wildlife, and plant habitats. The installation of appropriate shore erosion control measures where necessary can minimize these impacts, but careful consideration must be given to design measures that are suitable for a specific site, maximize water quality benefits, and conserve aquatic and upland habitat.

■ *Many areas along the Chesapeake Bay experience severe erosion and an associated loss of forest vegetation.*



Agriculture is a protected land use that provides immeasurable economic, aesthetic, and open space benefits in the Critical Area; however, farming practices must be designed and implemented to protect water quality and natural habitats.

