

Chesapeake Bay Program Quick Reference Guide for BMPs

N-2. Shoreline Management (Urban and Non-Urban)

General Information

There are a range of practices that can limit tidal shoreline erosion and protect property. Many states encourage practices that use natural habitats such as vegetation, sometimes with the addition of hard structures, to create living shorelines.

CBP Definition(s)

Shoreline management is any tidal shoreline practice that prevents and/or reduces tidal sediments to the Bay. Shoreline management practices can include living shorelines, revetments and/or breakwater systems, bulkheads and seawalls.

The particular definition varies by state, but for CBP purposes a *living shoreline* refers to a shoreline management practice or suite of stabilization and erosion control measures that preserve natural shoreline, minimize shoreline erosion, maintains coastal processes and provides aquatic habitat. Living shoreline can be non-structural with only vegetated and natural elements, or hybrid with vegetation plus some hard structures such as stone sills or breakwaters.

(Urban or Non-Urban) Shoreline Erosion Control Non-Vegetated are shoreline management practices without a vegetated area along an urban- or agriculturally-dominated tidal shoreline that prevent and/or reduces tidal sediments to the Bay.

(Urban or Non-Urban) Shoreline Erosion Control Vegetated are shoreline management practices with a vegetated area along an urban- or agriculturally-dominated tidal shoreline that prevent and/or reduces tidal sediments to the Bay.

Specifications or Key Qualifying Conditions

These BMPs are only applicable along tidal shorelines. They should be implemented in areas with a demonstrated need to control erosion based on the jurisdiction's respective thresholds and qualifying conditions for shoreline management projects. Only projects with vegetated areas can receive credit for Protocols 2-4 of this BMP. Any shoreline practices implemented prior to 2008 are automatically credited in the model and should not be reported.

Nitrogen, Phosphorus and Sediment Reductions

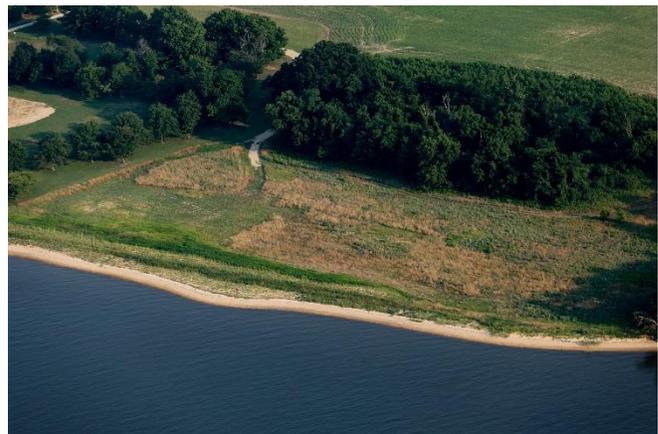
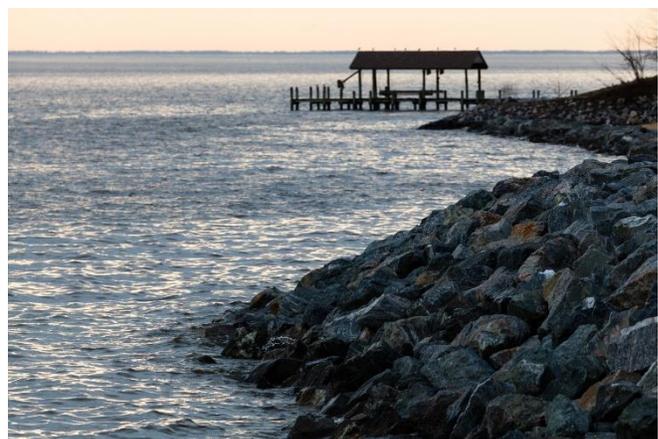


Figure N-2-1. Erosion is a natural process, but sometimes it is necessary to protect property from excessive erosion, like occurred (top) with Hurricane Isabel in 2003. Often the shoreline in or near developed areas is hardened – or “armored” – against erosion using bulkheads, revetments or riprap (middle). The use of softer approaches – such as the living shoreline (bottom) seen from the air – are becoming more common. Living shorelines protect against excessive erosion while providing ecological functions like habitat. Photos: Chesapeake Bay Program

There are four general protocols to define the pollutant load reductions from shoreline management practices. There is also a default rate for historic projects and new projects that cannot conform to the recommended reporting requirements.

- Protocol 1. Credit for prevented sediment
- Protocol 2. Denitrification in vegetated areas
- Protocol 3. Sedimentation in vegetated areas
- Protocol 4. Marsh redfield ratio for vegetated areas

Table N-2-1. Summary of protocols for nitrogen, phosphorus and sediment reductions of shoreline management BMPs

Protocol		TN (lbs. per unit)	TP (lbs. per unit)	TSS (lbs. per unit)
Protocol 1. Prevented sediment	Linear feet	Project-specific	Project-specific	Project-specific
Protocol 2. Denitrification	Acres of re-vegetation	85	N/A	N/A
Protocol 3. Sedimentation	Acres of re-vegetation	N/A	5.289	6,959
Protocol 4. Marsh Redfield Ratio	Acres of re-vegetation	6.83	0.3	N/A
Non-conforming/existing practices	Linear feet	0.04756 / 0.01218*	0.03362 / 0.00861*	164 / 42 **

* Analysis by Modeling Workgroup indicated that an average of 0.00029 lbs. TN per lb. of TSS and 0.000205 lbs. TP per lb. of TSS. These values can be used directly by jurisdictions for their calculations in Protocol 1, and were adapted for non-conforming/existing practices by multiplying by the default TSS reduction for non-conforming projects by the average nutrient concentrations in sediment. The first number applies to MD, DE and DC (i.e., 0.04756 for TN and 0.03362 for TP) and the second number applies to VA.

** The default rate is based on fine sediment erosion estimates from the expert panel report (Table 3) and a 50% reduction factor applied. The first number applies to Maryland, Delaware and Washington, D.C., and the second number applies to Virginia.

Specific Reporting and Modeling Information

Applicable Land Use Types (or other load sources) Treated by the BMP:

- Shoreline

The practice can only be applied to the “Shoreline” load source, but the BMP can be distinguished based on sector using the appropriate secondary BMP designation of either “Urban Shoreline Management” or “Non-Urban Shoreline Management.”

Brief Description of BMP Simulation in the Model

All shoreline management practices are *Load Reduction BMPs*, which means they are modeled as a simple removal of pounds of nitrogen, phosphorus and/or sediment. However, the shoreline load source is only at the edge-of-tide in the model. Therefore, the load reduction from shoreline management practices are removed at the edge-of-tide and not the edge-of-stream as is done for stream restoration.

Annual or Cumulative? Cumulative (10-year credit duration)

Can this practice be combined with other BMPs? Yes.

Key Elements for State BMP Reporting through NEIEN

- **BMP Name:** Shoreline Management
 - Urban Shoreline Management*
 - Urban Shoreline Erosion Control Non-Vegetated**
 - Urban Shoreline Erosion Control Non-Vegetated
 - Non-Urban Shoreline Management*
 - Non-Urban Shoreline Erosion Control Non-Vegetated**
 - Non-Urban Shoreline Erosion Control Non-Vegetated
- **Measurement unit(s):** Length restored (feet); Acres planted**; Protocol 1 TN (lbs); Protocol 1 TP (lbs); Protocol 1 TSS (lbs)
- **Load Source:** Shoreline
- **Geographic location:** Approved NEIEN geographies: County; County (CBW only); Hydrologic Unit Code (HUC12, HUC10, HUC8, HUC6, HUC4); State (CBW only)
- **Date of implementation:** Year the project was completed.

* These BMPs provide default load reductions based on length restored (feet) of shoreline, which can be used for non-conforming projects or planning purposes.

** These BMPs are for practices with some vegetated area, i.e. non-structural or hybrid living shoreline. Acres planted or the vegetated area is needed for load reductions based on Protocols 2-4. Eligible hybrid practices can also report reductions for Protocol 1.

Table N-2-2. Synonymous BMP names for Watershed Model, NEIEN and other sources

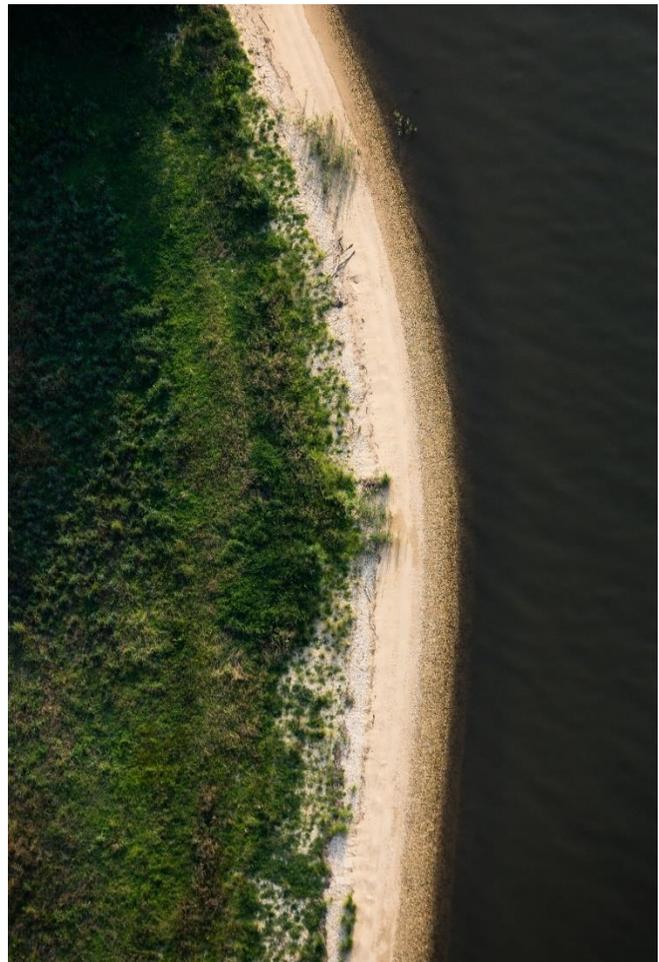


Figure N-2-2. Living shorelines can use a variety of natural design elements to create or restore vegetated areas to reduce shoreline erosion while protecting near-shore aquatic habitat important for young blue crabs and fish. Photo: Chesapeake Bay Program

CBP or Expert Panel term	NEIEN BMP name	Other common practice names
Urban Shoreline Management*	Urban Shoreline Management	
Urban Shoreline Erosion Control Non-Vegetated	Urban Shoreline Non-Vegetated	
Urban Shoreline Erosion Control Vegetated	Urban Shoreline Vegetated	Living shoreline
Non-Urban Shoreline Management*	Ag Shoreline Management	
Non-Urban Shoreline Erosion Control Non-Vegetated	Ag Shoreline Non-Vegetated	
Non-Urban Shoreline Erosion Control Vegetated	Ag Shoreline Vegetated	Living shoreline
* Default BMPs for planning purposes or for non-conforming existing practices.		

Additional Information

Expert panel report:

Forand, F., DuBois, K., Halka, J., Hardaway, S., Janek, G., Karrh, L., Koch, E., Linker, L., Mason, P., Morgereth, E., Proctor, D., Smith, K., Stack, B., Stewart, S. & B. Wolinski. 2015. Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects. Prepared by S. Drescher and B. Stack, Center for Watershed Protection. Approved by the WQGIT July 13, 2015, with revised credits approved June 26, 2017. https://www.chesapeakebay.net/documents/Shoreline-Management-Protocols_Final_Approved_07132015-WQGIT-approved_Revised_06012017_formatted.pdf

Version and History Statement

This info sheet was first published on August 10, 2018 and reflects the BMP definitions and reductions approved by the WQGIT in July 2015 with crediting revisions approved June 2017.

All BMP effectiveness estimates are subject to potential future reviews according to the availability of new scientific information and CBP partnership needs, as defined in the [BMP Review Protocol](#).