

Essential Skills for Living Shorelines

Living Shorelines BMPs to Meet Water Quality Goals Coastal Resilience Master Plan

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Utilize and Follow Guidance Documents

VIMS

Living Shoreline Design Guidelines for Shore Protection in Virginia's Estuarine Environment



Virginia Institute of Marine Science
William & Mary
Gloucester Point, Virginia

September 2021

JPA

Part 4 - Project Drawings

Plan view and cross-sectional view drawings are required for all projects. Application drawings do not need to be prepared by a professional draftsman, but they must be clear, accurate, and should be to an appropriate scale. If a scale is not used, all dimensions must be clearly depicted in the drawings. If available, a plat of the property should be included, with the existing and proposed structures clearly indicated. Distances from the proposed structure(s) to fixed points of reference (benchmarks) and to the adjacent property lines must be shown. A vicinity map (County road map, USGS Topographic map, etc.) must also be provided to show the location of the property. NOTE: The sample drawings have been included at the end of this section to provide guidance on the information required for different types of projects. Clear and accurate drawings are essential for project review and compliance determination. Incomplete or unclear drawings may cause delays in the processing of your application.

The following items must be included on ALL project drawings: (plan and cross-sectional, as appropriate)

- name of project
- north arrow
- scale
- waterway name
- existing and proposed structures, labeled as such
- dimensions of proposed structures
- mean high water and mean low water lines
- all delineated wetlands and all surface waters on the site, including the Cowardin classification (i.e., emergent, scrub-shrub, or forested) for those surface waters (if applicable)
- limits of proposed impacts to surface waters, such as fill areas, riprap scour protection placement, and dredged areas, and the amount of such impacts in square feet and acres
- ebb/flood direction
- adjacent property lines and owner's name
- distances from proposed structures to fixed points of reference (benchmarks) and adjacent property lines

Application Revised, October 2019

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VMRC



TIDAL WETLANDS GUIDELINES

Promulgated by the
Virginia Marine Resources Commission

Prepared by the
Habitat Management Division

with
contributions from the
Virginia Institute of Marine Science

Developed Pursuant to Chapter 13 Title 28.2, Code of Virginia

May 2021 Update

VCAP

VIRGINIA CONSERVATION ASSISTANCE PROGRAM

NINTH EDITION
PV 2025-2026

IMPLEMENTATION AND DESIGN MANUAL



A stormwater management cost-share program that provides financial incentives to property owners installing eligible Best Management Practices in Virginia's participating Soil & Water Conservation Districts.



Design for Sea Level Rise and Coastal Hazards - Resilience



DRAFT FOR PUBLIC COMMENT
May 2026



Dynamic Living Shoreline Design



Minimize Wave Energy

Wide tidal marshes

Wave attenuation structures that allow tidal inundation & sedimentation



Maximize Sediment Accretion

Dense plants in clusters + ribbed mussels



Provide Retreat Pathway

Grade bank for suitable slopes wherever possible

Reserve adjacent upland spaces with compatible land uses



Maintenance Interventions

Reserve access for future thin-layer fill additions & raise sill height

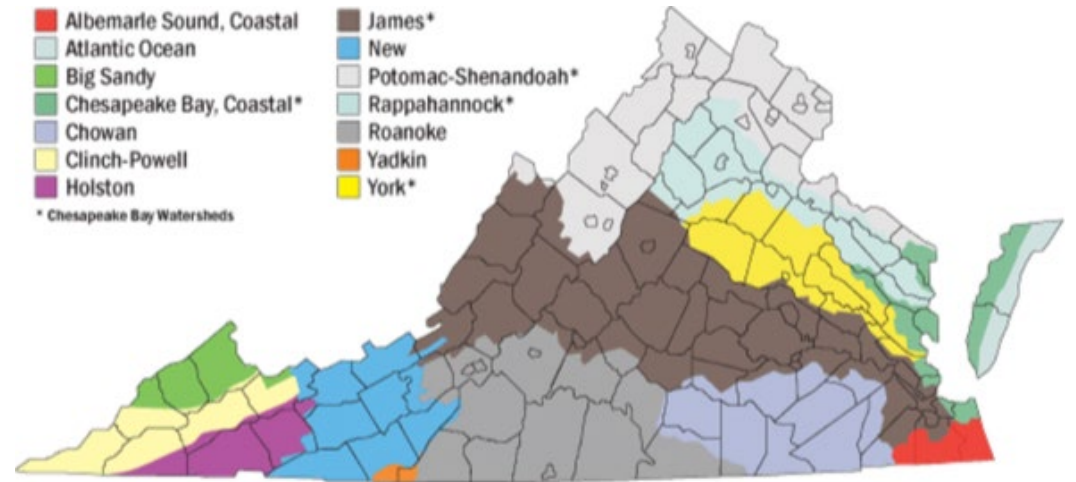
M. Mitchell & D. Bilkovic 2019 Embracing dynamic design for climate-resilient living shorelines.

slide borrowed from Karen Durhing, VIMS-CCRM, webinar 08/11/2021

Living Shorelines: BMPs to Meet TMDL Goals

Chesapeake Bay Phase III Watershed Implementation Plan (WIP)

- TMDL – total maximum daily load is pollution diet to reduce nitrogen, phosphorus, and sediment in Chesapeake Bay
- WIP released mid-2019 guides actions through 2025 (Beyond 2025?, CESR report)
- BMPs - Best Management Practices proposed by the Commonwealth to achieve TMDLs
- Shoreline Management goals including living shorelines as a BMP



Basin	WIP3 (ft)	WIP3 (mi)
Potomac	70,051	13.27
Rappahannock	132,484	25.09
York	141,042	26.71
James	79,446	15.05
Eastern Shore	76,977	14.58
SUM	500,000	94.70

Shoreline Management BMP - Chesapeake Bay Program

Expert Panel established pollutant reductions and qualifying criteria

❖ Living Shorelines

- Nonstructural
- Hybrid System Including Sill
- Hybrid System Including Breakwater

❖ Revetment and/or Breakwater - no Living Shoreline

- ONLY if site experiencing erosion + LS not technically feasible + NO impact to SAV, shellfish beds or wetlands

❖ Bulkhead/Seawalls

- ONLY if erosion + marine commercial/ industrial/ ports w/ ≥ 10 ft deep water 35 ft from shore

Recommendations of the Expert Panel to Define Removal Rates for Shoreline Management Projects

Good Recipes for the Bay Pollution Diet

U-14 SHORELINE MANAGEMENT PRACTICES

PRACTICE AT A GLANCE

Shoreline management practices improve water quality and ecological conditions within the Bay and the surrounding tidal tributaries.

Shoreline management practices protect property, prevent erosion, improve nearshore aquatic habitat, and mitigate unintended consequences of storm events.

Shoreline management practices exist on a spectrum based on the amount of hardened armor used. They range from living shorelines to bulkheads, seawalls and revetments.

Nutrient and sediment reductions are calculated using four protocols. Specific qualifying criteria and verification standards must be satisfied to receive credits.

DESCRIPTION

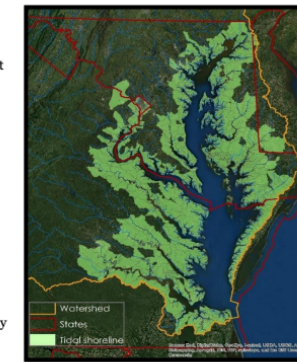
Shoreline management is any tidal shoreline practice that prevents and/or reduces delivery of tidal sediments to the Bay from both bank and nearshore erosion. There is no clear geographic boundary that defines where shoreline management can be implemented, though practices are typically placed in tidal areas where erosion is most prevalent. This fact sheet focuses on the shorelines of Maryland and Virginia, but the protocols can be applied to the District of Columbia and Delaware depending on the local regulatory conditions.

Shoreline management practices exist on a spectrum based on the amount of hardened armor used. The type of shoreline management practice selected will vary based on local policies, site characteristics, owner preference, available funding, and multiple other factors.

Living shorelines are erosion control measures that use natural materials to protect, restore or enhance natural shoreline habitat. They have few structural components and rely on elements like marsh vegetation, oyster reefs, coarse woody debris, and sand.

Hybrid living shorelines are projects that include natural habitat elements as well as some hard structures such as stone sills or breakwaters.

Structural shoreline practices include bulkheads, seawalls, revetments, breakwaters, groins, and jetties. These practices have no natural habitat components and should only be considered when living shorelines are not technically feasible. Qualifying criteria needed to receive nutrient and sediment reduction credit for each type of shoreline management practice is summarized in Table 1.



Shaded areas represent portions of the watershed adjacent to Chesapeake Bay tidal waters

George Janek, Lee Karrh, Eva
or, Kevin Smith, Bill Stack, Steve

April 15, 2014
February 13, 2015
Team: July 13, 2015
June, 2017

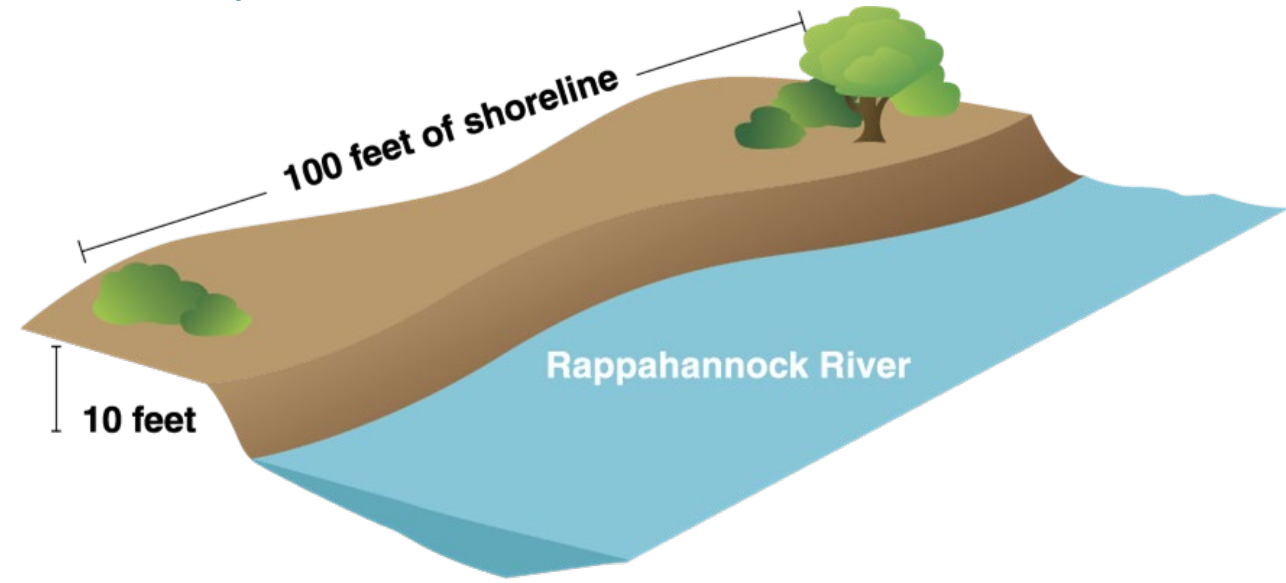
PRIOR VERSIONS

hed Protection, Inc. and EPA
m Restoration Coordinator



TMDL pollutant load redux protocols

Example



annual erosion rate = 1 foot

15.77 tons of sediment
27.14 pounds of nitrogen
19.19 pounds of phosphorus

Protocol	Submitted Unit	Total Nitrogen (lbs per unit)	Total Phosphorus (lbs per unit)	Total Suspended Sediment (lbs per unit)
Protocol 1 - Prevented Sediment	Linear Feet	Project-Specific*	Project-Specific*	Project-Specific
Protocol 2 – Denitrification	Acres of re-vegetation	85	NA	NA
Protocol 3 - Sedimentation	Acres of re-vegetation	NA	5.289	6,959
Protocol 4 – Marsh Redfield Ratio	Acres of re-vegetation	6.83	0.3	NA
Non-conforming/Existing Practices *	Linear Feet	MD = 0.04756 VA = 0.01218	MD = 0.03362 VA = 0.00861	MD = 164 VA = 42

BMP Verification for TMDL WIP Reporting to DEQ

Data and Sources to Verify BMP

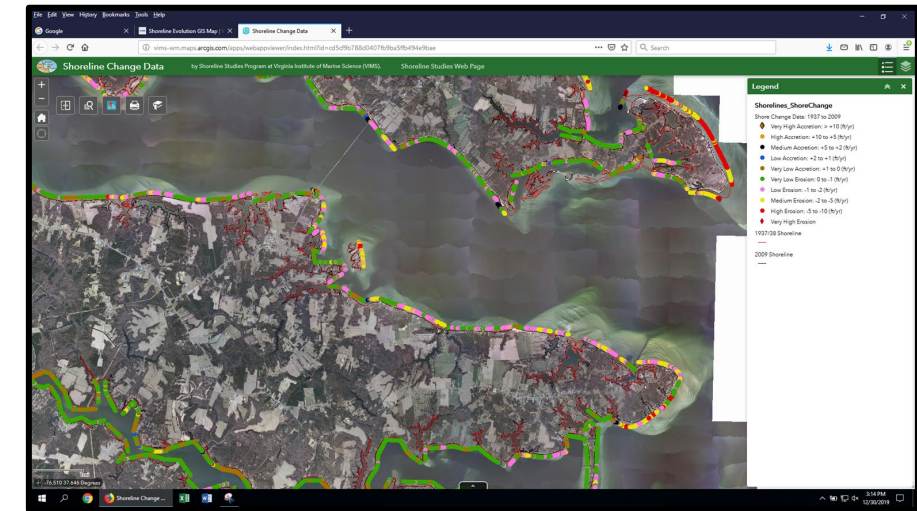
From VMRC *Permit* Database

- Project Construction Date
- Protected Shoreline Length (ft)
- Planted Marsh (ac)

From Other Sources

- Erosion Rate (ft/yr) – VIMS Shoreline Studies Program – actual historic shoreline erosion from aerial images (1937-2009)
- Bank Height (ft) – VGIN LiDAR digital elevation models
- Upland Land Use (Agricultural, Forest, or Urban) – National Land Cover Dataset, VBMP Land Cover, VBMP aerial photography, NAIP aerial photography, VIMS CCRM

Application Number	Applicant	Date Application Received	Status	Project Description	Locality	Waterway	Local Wetlands Board Action	Application Permit Map Report Add Docs
20150214	NORFOLK CITY OF	02/18/2015	No Permit Necessary	LaValette Boat Ramp Living Shoreline Project Silt: 167 Linear Feet Silt Fill: 454 Cubic Yards Core Log: 238 Linear Feet Living Shoreline: 405 Linear Feet Fill/Plantings: 9349 Square Feet	Norfolk	Lafayette River	No Permit Required	Application Map Report Add Docs



WIP TMDL pollutant load redux

Shoreline Mgmt BMP Verification – WIP3 Goals vs. Reported Credits

Major Basin	WIP 3 Goals		
	goal (ft)	rprtd (ft)	% of goal
Potomac	70,051	55,077	78.6%
Rappahannock	132,484	103,796	78.3%
York	141,042	107,255	76.0%
James	79,446	81,624	102.7%
Eastern Shore	76,977	27,924	36.3%
TOTAL	500,000	375,676	75.1%

DCR - Coastal Resilience MP

Public Perspectives: Community Benefits from Natural and Nature-Based Projects

Over 1,300 Virginians responded to a public online survey with questions relating to their lived flooding experiences and their views on what types of projects would increase resilience in their community. Of those respondents:

- 61%** believe their community would benefit from nature-based shoreline stabilization.
- 57%** said their community would benefit from habitat creation and restoration.

VIRGINIA COASTAL RESILIENCE MASTER PLAN

PHASE 1
DECEMBER 2021



Office of Governor Ralph S. Northam
Commonwealth of Virginia

