Essential Skills for Living Shorelines

Living Shorelines and DCR

BMPs to Meet Water Quality Goals
Shoreline Erosion Advisory Services (SEAS)
Coastal Resilience Master Plan

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1

DCR SEAS ROLES: Technical Advisors and BMP Verification

Shoreline Erosion Advisory Service (SEAS)

- established 1980
- science-based technical assistance on environmentally sound shoreline mgmt alternatives
- private property owners & public land mgmt agencies experiencing erosion
- tidal shorelines or non-tidal streambanks & impoundments

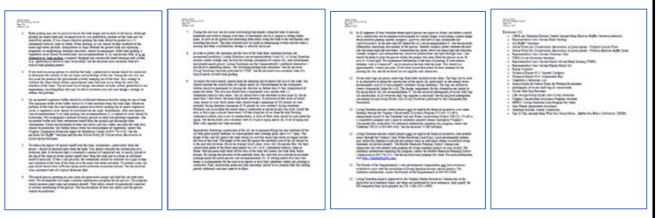
2

SEAS SERVICES

- **on-site** field investigation of erosion issues
- **written advisory reports** with recommended **solutions**
- **review designs and plans**
- **construction inspections**
- **guidance on financial incentive** programs
- all SEAS services are **NO COST** to property owners

3

SEAS Written Advisory Report



4

Best Available Science vs Technical Advisors/Resource

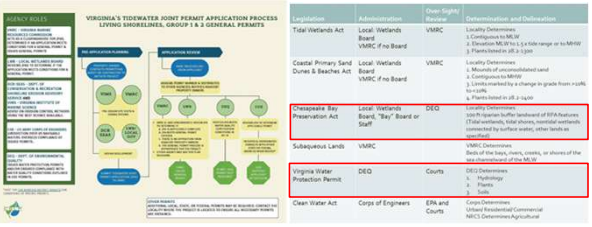
Best Available Science

DCR-SEAS ≠ VIMS Office of Research & Advisory Services

"designed to survive the impacts of **sea level rise**, using…the **2017 National Oceanographic and Atmospheric Administration's (NOAA) Intermediate-High scenario** projection curve or updated projection based on the **best available science** and selected through the **Coastal Master Plan** process".

5

Understanding & Navigating the Permitting Process

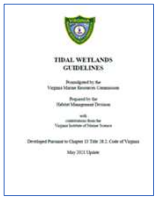


Legislation	Administration	Over-Sight/ Review	Determination and Delineation
Tidal Wetlands Act	Local: Wetlands Board VMRC if no Board	VMRC	Locality Determines 1. Contiguous to MLW 2. Elevation MLW to 1.5 x tide range or to MHW 3. Plants listed in 28.2-1300
Coastal Primary Sand Dunes & Beaches Act	Local: Wetlands Board VMRC if no Board	VMRC	Locality Determines 1. Mounds of unconsolidated sand 2. Contiguous to MHW 3. Limits marked by a change in grade from >10% to <10% 4. Plants listed in 28.2-1400
Chesapeake Bay Preservation Act	Local: Wetlands Board, "Bay" Board or Staff	DEQ	Locality Determines 100 ft riparian buffer landward of RPA features (Tidal wetlands, tidal shores, nontidal wetlands connected by surface water, other lands as specified)
Subaqueous Lands	VMRC		VMRC Determines Beds of the bays, rivers, creeks, or shores of the sea channelward of the MLW
Virginia Water Protection Permit	DEQ	Courts	DEQ Determines 1. Hydrology 2. Plants 3. Soils
Clean Water Act	Corps of Engineers	EPA and Courts	Corps Determines Upland Residential/ Commercial NRCS Determines Agricultural

6

Utilize and Follow Guidance Documents

VIMS | JPA | VMRC | VCAP



7

Design for Sea Level Rise and Coastal Hazards - Resilience

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

8

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, sediment in Ches Bay
- WIP released mid-2019 guides actions through 2025
- BMPs - Best Management Practices proposed by state to achieve TMDLs
- Shoreline Management including living shorelines is a BMPs

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

9

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/ >= 10ft 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

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10

TMDL pollutant load redux protocols

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 = 0.01362 VA = 0.00861	MD = 164 VA = 42

Example

annual erosion rate = 1 foot

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

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11

SEAS BMP Verification for TMDL WIP Reporting to DEQ

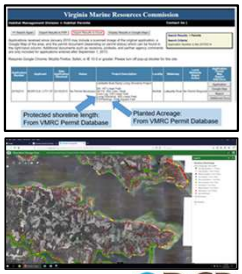
Data and Sources SEAS uses to Verify BMP

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



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12

WIP TMDL pollutant load redux

Shoreline Mgmt BMP Verification – WIP3 Goals vs. Reported Credits

	WIP 3 Goals		
Major Basin	goal (ft)	rprtd (ft)	% of goal
Potomac	70,051	55,041	78.6%
Rappahannock	132,484	95,580	72.1%
York	141,042	97,291	69.0%
James	79,446	81,624	102.7%
Eastern Shore	76,977	27,151	35.3%
TOTAL	500,000	356,687	71.3%

13

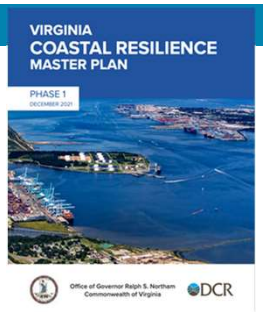
DCR - Coastal Resilience MP

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.



14

Do You Need Technical Advice? Contact Us

Insert Names and Contact Information for SEAS Technical Advisors

15