

Shoreline Erosion Advisory Service

A Resource for Shoreline Landowners and Communities

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Virginia Department of Conservation and Recreation

Virginia Institute of Marine Science
Tidal Shoreline Management Workshop

June 14, 2018
Gloucester Point, VA

Overview

- What is the Shoreline Erosion Advisory Service?
- Chesapeake Bay TMDL WIP
Shoreline Management BMP Verification
and Reporting Pollutant Load Reduction Credits

Shoreline Erosion Advisory Service

What is a Homeowner To Do?



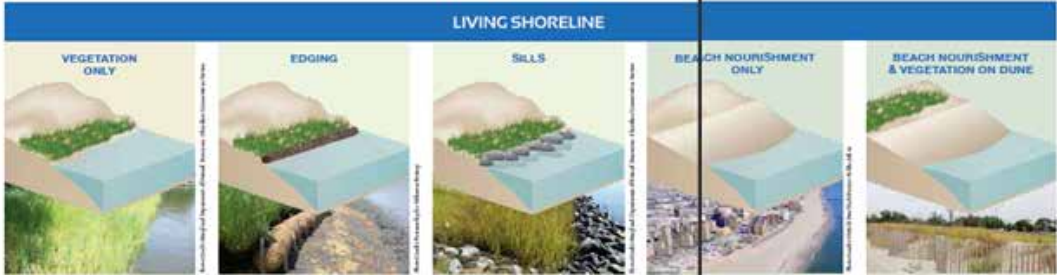
Erosion Rates

- Erosion is a natural process
- In coastal regions, waves, currents, tides, rises in sea level and wind all contribute to erosion
- Erosion of banks supplies sand to beaches and marshes
- Excess suspended sediment and associated nutrients can negatively impact SAV and water quality

- Generally, lower sections of rivers and the Bay experience highest rates of erosion
- Some Virginia shorelines have historic erosion rate of -30 feet per year
- Some areas are accreting +10 feet per year

HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

GREEN - SOFTER TECHNIQUES Small Waves | Small Fetch | Gentle Slope | Sheltered Coast



GRAY - HARDER TECHNIQUES Large Waves | Large Fetch | Steep Slope | Open Coast

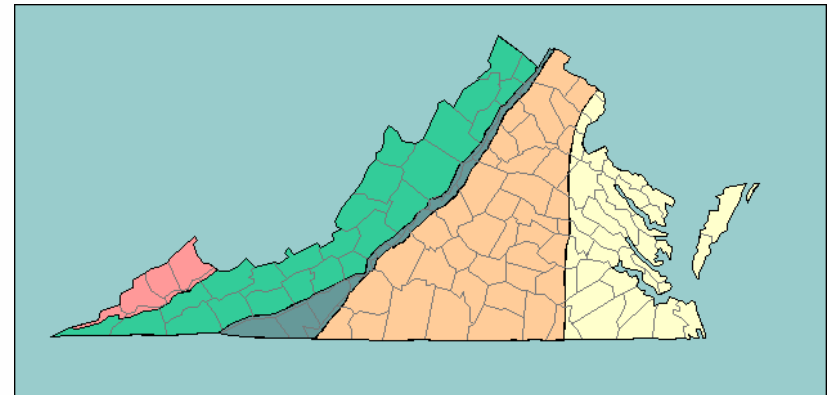


SEAS Created

- Created by Virginia General Assembly in 1980
- Provides technical assistance to property owners, localities, and state and federal agencies experiencing shoreline or streambank erosion in Virginia

SEAS Geography

- Service area historically
 - from fall line to Eastern Shore
 - from Fairfax County to North Carolina
- Chesapeake Bay in Virginia has over 5,000 miles of tidal shoreline
- Service area now expanded across entire Commonwealth



SEAS Services

- Site investigations
- Written reports
- Design/plan reviews
- Construction inspections
- Information
- VCAP Living Shorelines
- All SEAS services are **FREE!**



Chesapeake Bay TMDL WIP

Shoreline Management BMPs

Verification and Reporting of Pollutant Load Reduction Credits

Expert Panel report

- Convened by USEPA Chesapeake Bay Program
- Report approved 2015, revised 2017
- review the science and published literature
- develop protocols to estimate pollutant load reductions associated with different shoreline erosion BMPs

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

Submitted by:

Nathan Fozard, Kevin DuBois, Jeff Halka, Scott Hardway, George Janek, Lee Karrh, Eva Koch, Lewis Linker, Pam Mason, Ed Moegereth, Daniel Proctor, Kevin Smith, Bill Stack, Steve Stewart, and Bill Wolanski

Accepted by Urban Stormwater Work Group: April 15, 2014

Approved by Watershed Technical Work Group: February 13, 2015

Approved by Water Quality Goal Implementation Team: July 13, 2015

Amended by WTWG and WQGIT: June, 2017

NOTE: THIS VERSION SUPERCEDES ALL PRIOR VERSIONS

Prepared by:

Sadie Drescher and Bill Stack (Chair), Center for Watershed Protection, Inc. and EPA Chesapeake Bay Program Office (CBPO) Sediment Stream Restoration Coordinator



Expert Panel report

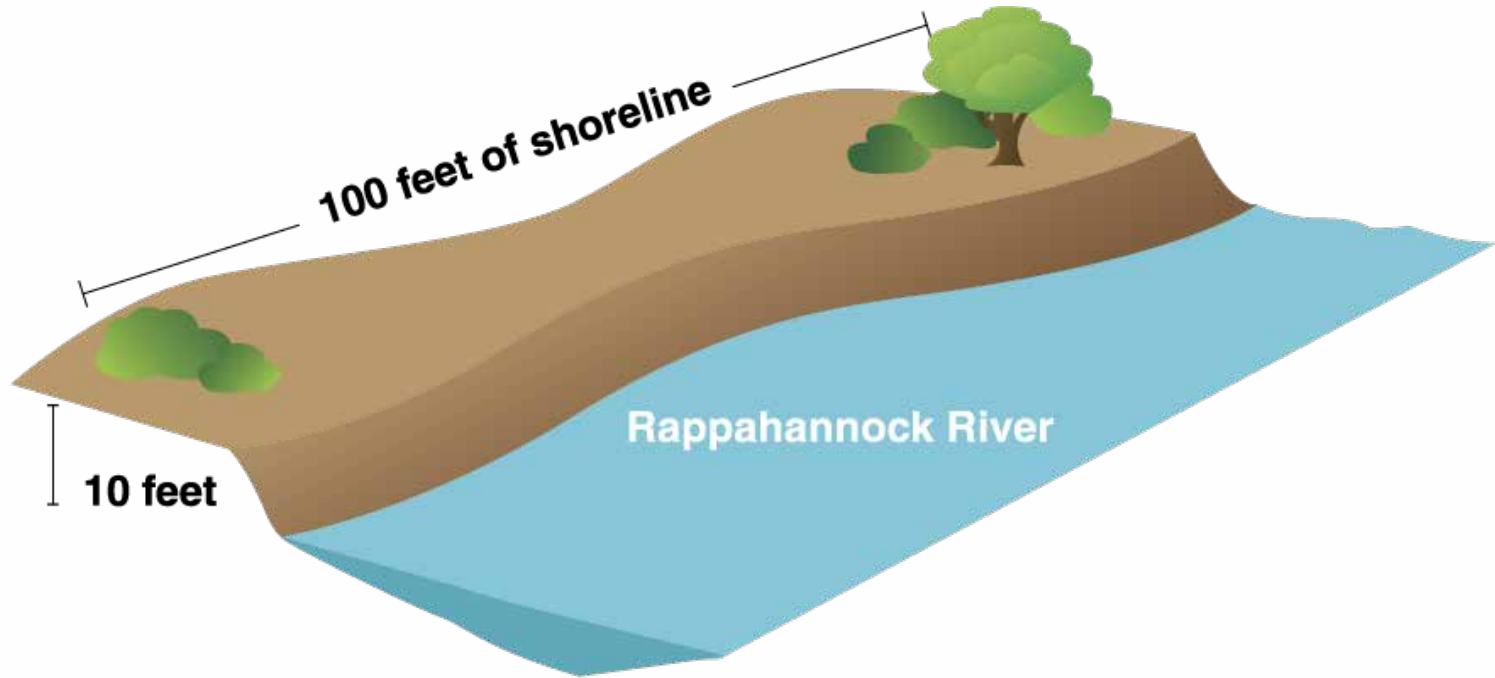
Table 1. Summary of shoreline management pollutant load reduction for individual projects.

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

- Basic qualifying conditions for BMPs/sites
- 4 general protocols to define load reductions associated with specific BMPs
- 5-year BMP life, renewable upon field verification

BMP Verification Project

- Virginia Dept. of Conservation and Recreation
 - Shoreline Erosion Advisory Service
 - Virginia Institute of Marine Science
 - Sea Grant's Commonwealth Coastal & Marine Policy Fellowship
 - Shoreline Studies Program
 - Center for Coastal Resources Management
 - Virginia Marine Resources Commission
 - Habitat Management Division
 - Virginia Dept. of Environmental Quality
-
- utilize Expert Panel report and protocols to quantify, verify, and report Chesapeake Bay TMDL WIP pollutant load reduction credits associated with specific shoreline stabilization practices implemented in Virginia tidal waters since 2008



Annual erosion rate = 1 foot

**46.8 tons of sediment
34 pounds of nitrogen
22.5 pounds of phosphorus**

Methodology – Permits

- VMRC Habitat Permit Database
 - January 1985-June 2016 (>11,000 records)
 - Records also at VIMS-CCRM database
- Selected permit applications received since 01/01/2008
- Selected permit applications where Structures included
 - Riprap, Revetment, Sill, Breakwater, Living Shoreline, Bioengineered Structure, Coir Log, Marsh Toe Sill
 - >2,500 records

Methodology - Parameters

- Project Construction Date
 - VMRC permit database
- Protected Shoreline Length (feet)
 - VMRC permit database
- Marsh Planted (acres)
 - VMRC permit database
- Erosion Rate (feet per year)
 - VIMS Shoreline Studies Program shapefiles – actual historic shoreline erosion from aerial images (1937-2009)
- Bank Height (feet)
 - VGIN LiDAR digital elevation model files (2009-2013)
- Upland Land Use (Agricultural, Forest, or Urban)
 - National Land Cover Dataset (2011), VBMP Land Cover (2013-2015), VBMP 2013 aerial photography, NAIP 2016 aerial photography

Virginia Marine Resources Commission

Habitat Management Division > Habitat Permits

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Export Results to PDF

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Display Results in Google Maps

Search Results: 1 Permits

Search Criteria:

Application Number is like 20110174

Applications received since January 2010 may include a scanned image of the original application, a Google Map of the area, and the permit document (depending on permit status) which can be found in the right-hand column. Additional documents such as revisions, protests, and partner agency comments are only included for applications entered after September 1, 2013.

Requires Google Chrome, Mozilla Firefox, Safari, or IE 10.0 or greater. Please turn off pop-up blocker for this site.

Application Number	Applicant	Date Application Received	Status	Project Description	Locality	Waterway	Local Wetlands Board Action	Application Permit Map Report Add Docs
20110174	BALDWIN, ERIC	02/11/2011	Issued	Rock Sill/Beach Nourishment/Living Shoreline BeachNourishment: 750 Cubic Yards Sill: 225 Linear Feet	Gloucester	Cedarbush Creek	Approved as Proposed	Application Google Map Report



Protected shoreline length:
From VMRC Permit Database

Virginia Marine Resources Commission

Habitat Management Division > Habitat Permits

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Search Results: 1 Permits

Search Criteria:

Application Number is like 20150214

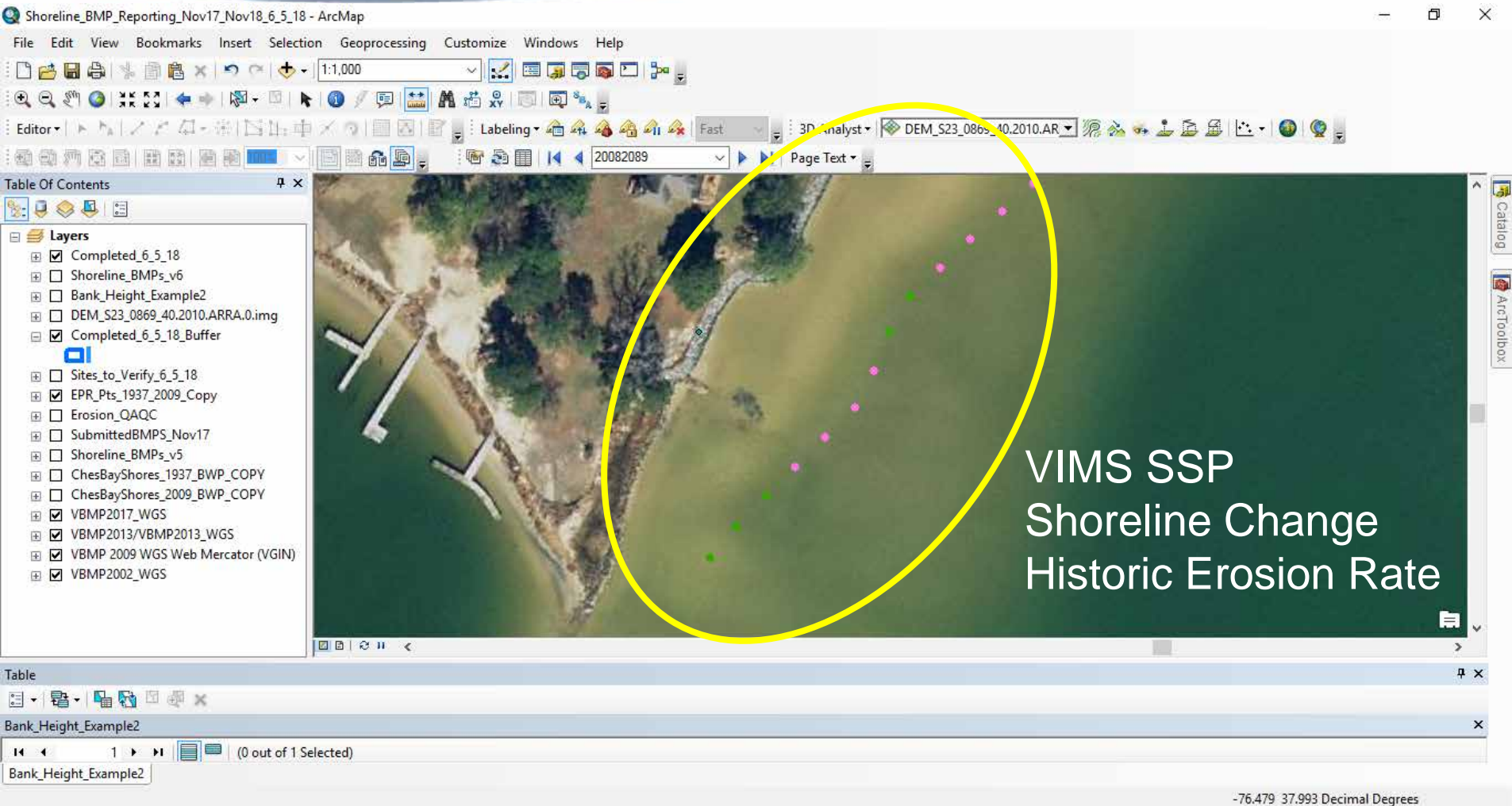
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Application Number	Applicant	Date Application Received	Status	Project Description	Locality	Waterway	Local Wetlands Board Action	Application Permit Map Report Add Docs
20150214	NORFOLK, CITY OF	02/18/2015	No Permit Necessary	LaValette Boat Ramp Living Shoreline Project Sill: 167 Linear Feet Sill 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 Google Map Report Additional Docs



Planted Acreage:
From VMRC Permit Database





Shoreline_BMP_Reporting_Nov17_Nov18_6_5_18 - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:2,000

Editor 3D Analyst DEM_S23_0869_40.2010.AR 20082089 Page Text

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LiDAR digital elevation model

Table

Bank_Height_Example2

1 (0 out of 1 Selected)

Bank_Height_Example2

-76.481 37.993 Decimal Degrees

Verification

1. VMRC-inspected and deemed 'in compliance'
 - Inspection Date = BMP 'Installation Date'
2. Not inspected, but visible via aerial imagery (desktop verification)
 - Date of Imagery = BMP 'Installation Date'
3. Not inspected and not visible (field verification required)
 - Date of field visit = BMP 'Installation Date'

Calculated Load Reductions

	# of Sites	Sites with Plants	Miles of Shoreline	N (lbs/yr)	P (lbs/yr)	S (lbs/yr)
Reported	481	9	17.7	3,750	2,630	6,410
Verified	514	12	20.0	4,975	3,395	8,259
Assessed	248	29	10.0	2,361	1,549	3,758
Total	1,243	50	47.7	11,086	7,574	18,427

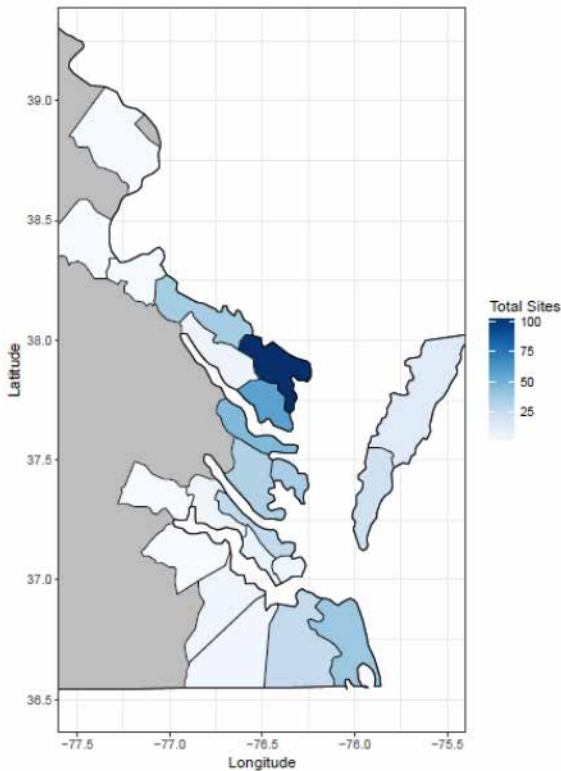
- Reported to DEQ (and subsequently USEPA) in Nov. 2017
- Verified and Ready to Report to DEQ by Nov. 2018
- Assessed and Needs to be Verified either by Desktop or Field

Outcomes

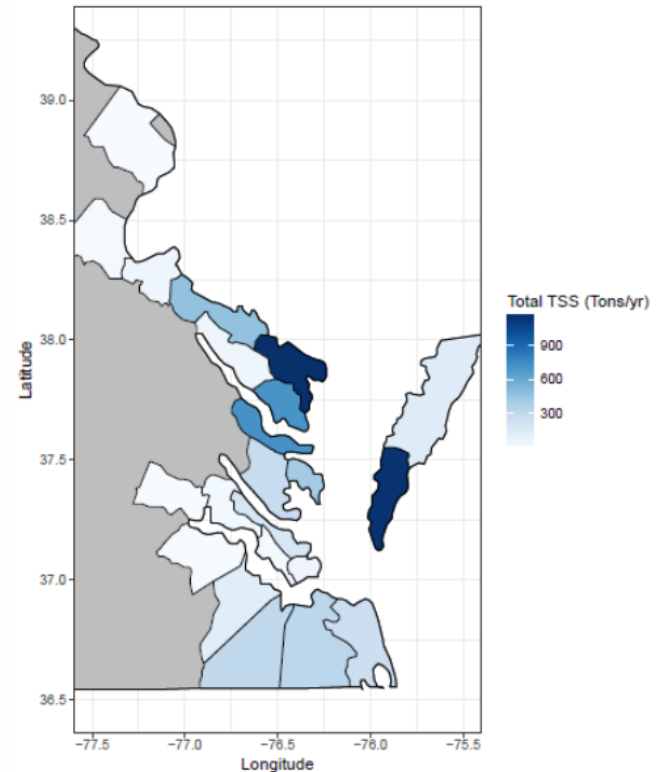
Parameter	Value
Total Number of Sites	481
Protected Length (ft)	93,599
Protected Length (mi)	17.73
Number Planted Sites (subset of total)	9
Total Planted Area (sq.ft)	15,424
Planted Area (ac)	0.35

Pollutant	Total Load Reduction (lbs/year)	Average Reduction (lbs/site)	Per-Unit Reduction (lbs/ft/year)
TP	2,629.51	5.47	0.02809
TN	3,749.51	7.8	0.04006
TSS	12,819,702	26,652.19	137

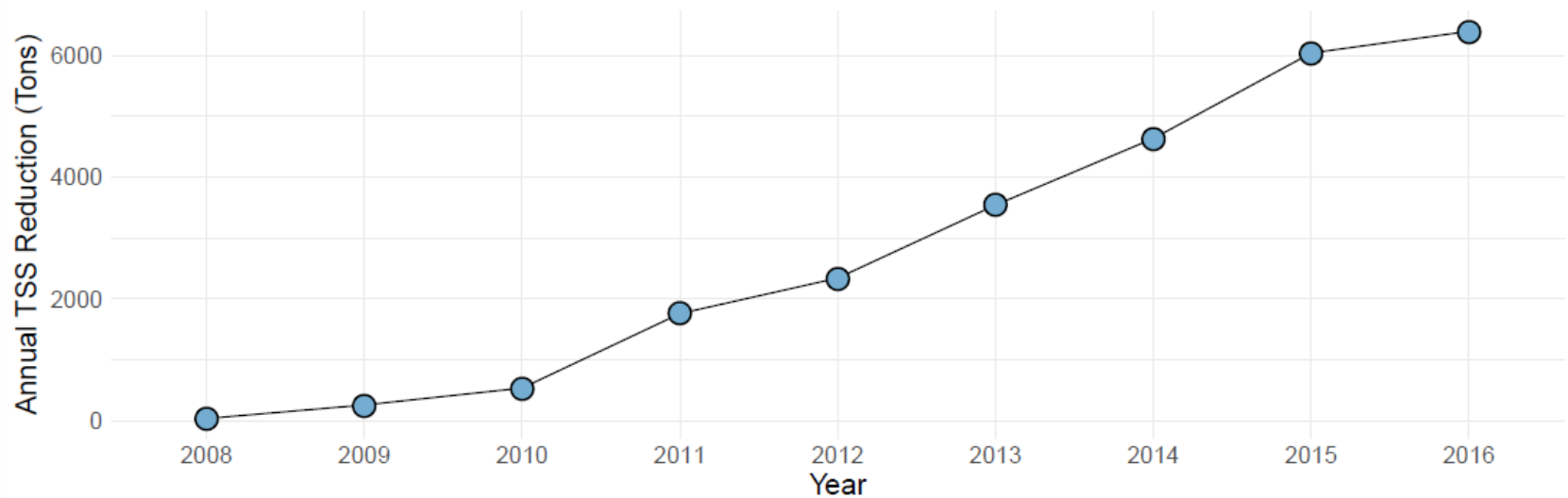
Number of Sites by Locality



Total Sediment Reductions by Locality

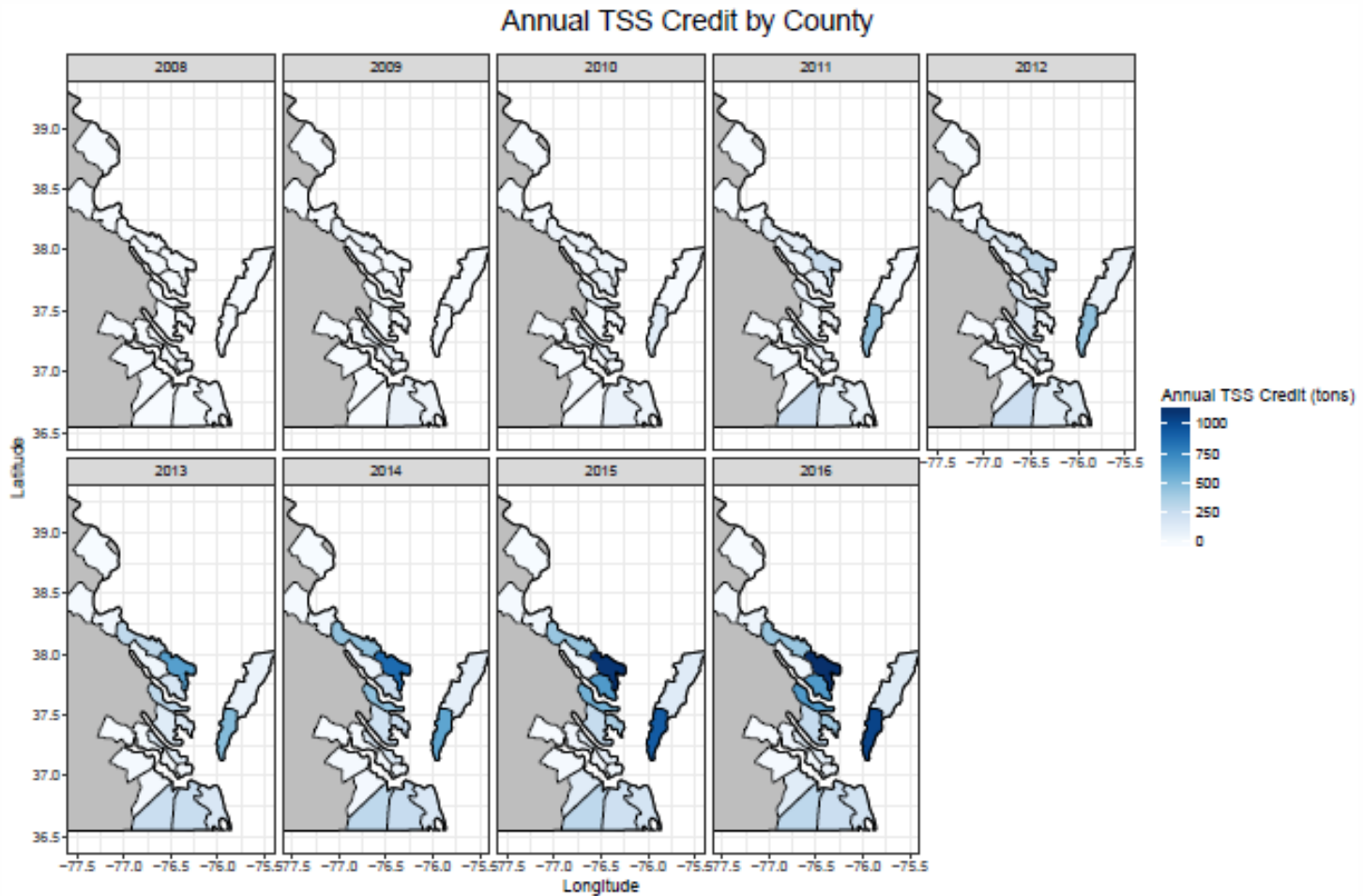


Cumulative Annual TSS Reduction



- 5 year BMP life

Annual TSS Credit by Locality



Next Steps

- Complete verification of historic sites
 - Determine credits for sites not inspected by VMRC
 - Use remote sensing, aerial photography, Google Earth (desktop verification)
 - Prioritize sites for field verification, by land or sea
 - Start with sites on Rappahannock and York Rivers
- Process for reporting and verifying new shoreline BMPs
 - Obtaining VMRC permit application data on new sites
 - July 2016 thru December 2017, and beyond
 - Keep up with on-going VMRC inspections
- Reporting “renewed” sites after 5-year life of BMP
- Transition (Bruce’s Fellowship is ending)

Feedback

- Any other entities reporting?
- BMP Warehouse; Protocols vs. Default Rates
- Inspections: Schedule, collecting information
- Living Shorelines and Plantings
- Possibility to collect more required data up front or during inspection?
- Verification as logistical challenge

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Shoreline Erosion Advisory Service

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