

Chesapeake Bay Shoreline ~~Management~~ ~~Erosion Control~~ Expert Panel: Water Quality, Models, and Panelists – oh my!

2013 Mid-Atlantic Living Shorelines Summit

Cambridge, Maryland

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Shoreline Management Expert Panel Facilitator

Center for Watershed Protection, Inc.,
Watershed Researcher & Planner

About Us



- 💧 National non-profit 501(c)3 organization
- 💧 22 full-time professional staff
- 💧 Offices in MD, VA, NY, PA

What we do

- Distill research into practical tools
- Provide local watershed services
- Train others to manage watersheds



Outline

- EPA Chesapeake Bay Program (CBP)
 - TMDL & WIPs
- Shoreline Management expert panel
 - Charge
 - Water Quality Data
 - Products



Source: Tony Watkinson

“Shoreline management” is defined as any tidal shoreline practice that prevents and/or reduces tidal sediments to the Bay.

Living Shorelines

Structural practices

low structure

high structure

Non-structural living shorelines:

Projects that include natural habitat elements only, such as vegetation, oyster reef, coarse woody debris, and sand.



Non-structural living shoreline

Hybrid living shorelines:

Projects that include natural habitat elements such as vegetation, oyster reef, and sand, as well as some hard structures such as stone sills or breakwaters



Low-structure hybrid living shoreline



Medium-structure hybrid living shoreline

Projects that include the following practices without a natural habitat component:

- Bulkheads/Seawalls
- Revetments
- Breakwaters
- Groins/jetties

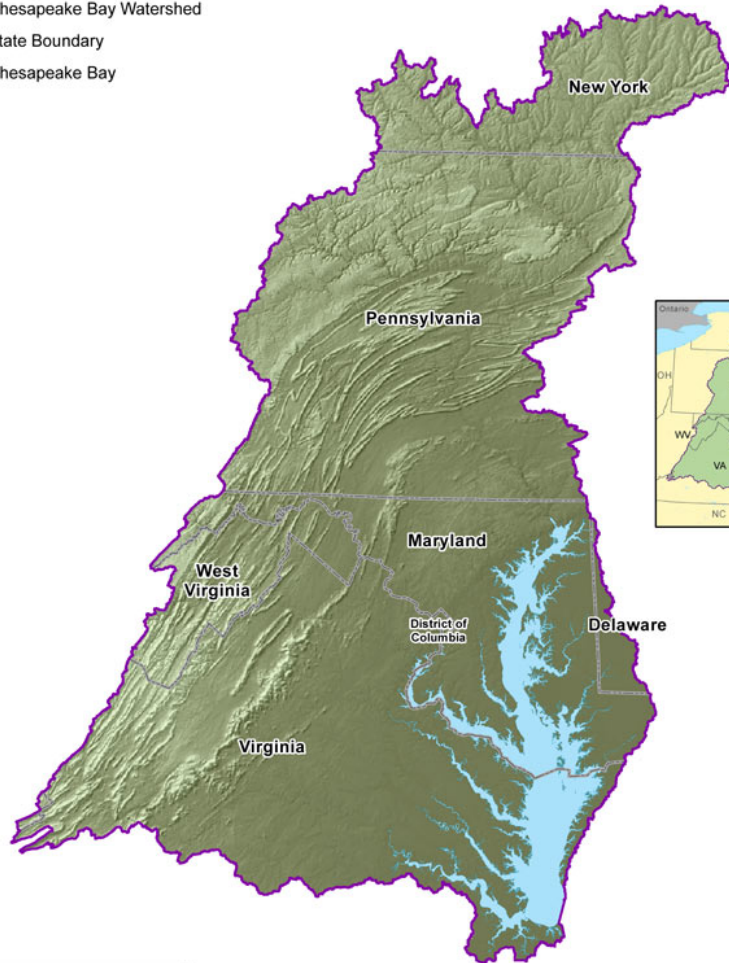


Structural erosion control practice

Chesapeake Bay Watershed



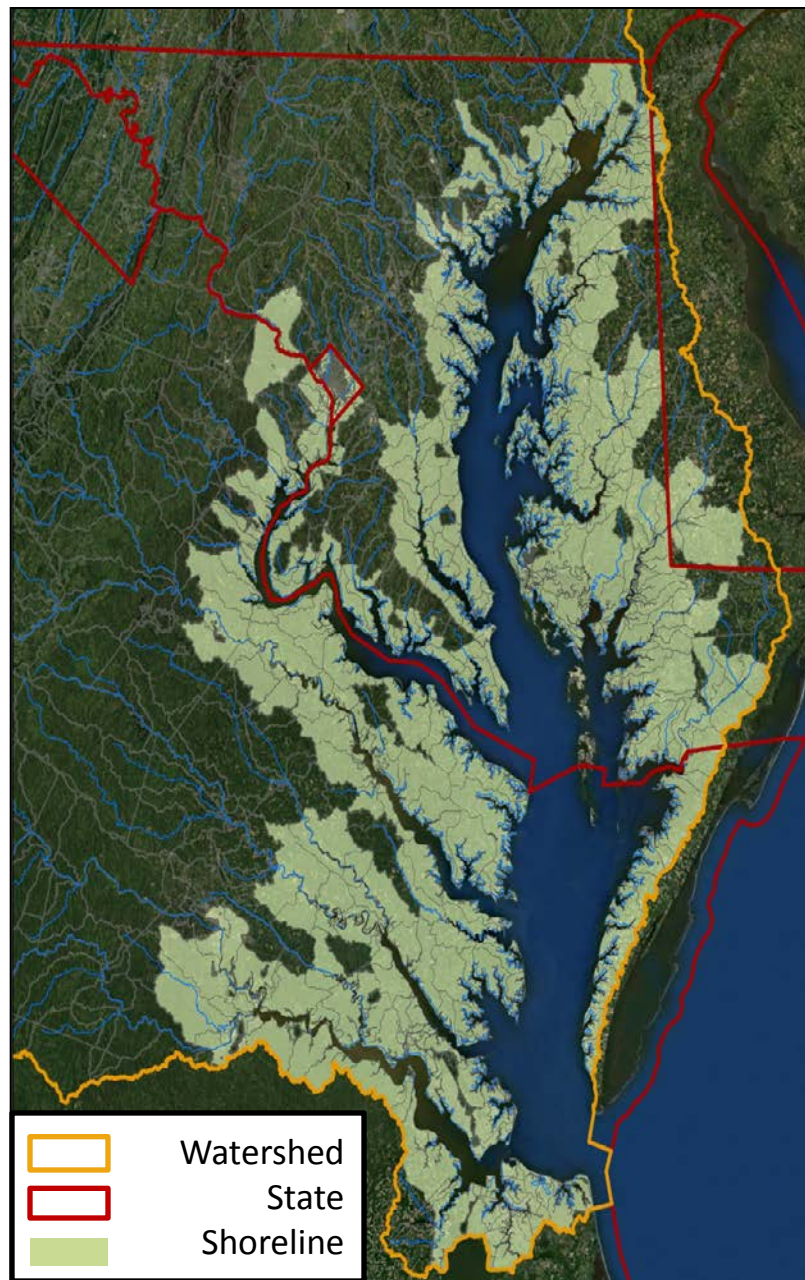
- Chesapeake Bay Watershed
- State Boundary
- Chesapeake Bay



Data Sources: Chesapeake Bay Program
 For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net/forms/sofuse.htm)
 Disclaimer: www.chesapeakebay.net/forms/sofuse.htm

Created by EA, 1/24/08

UTM Zone 18N, NAD 83





EPA CBP Overview

- Regional partnership that leads and directs Chesapeake Bay restoration and protection
- Bay Program partners include federal and state agencies, local governments, non-profit organizations and academic institutions
- CBP's central location is Annapolis, MD



Chesapeake Bay TMDL & WIPs

- 💧 The Bay TMDL, a historic and comprehensive "pollution diet," was established in December 2010 based largely on implementation plans prepared by Delaware, District of Columbia, Maryland, New York, Pennsylvania, Virginia, West Virginia.
- 💧 The Chesapeake Bay TMDL
 - 2017 60% implementation
 - 2025 100% implementation

Expert Panel Process

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WATER
QUALITY
GIT



Source: Albert McCullough

Panel process information is online at:

- http://stat.chesapeakebay.net/?q=node/130&quicktabs_10=3
- http://www.chesapeakebay.net/documents/Nutrient-Sediment_Control_Review_Protocol_07162013.pdf

Panel Members

Panelist	Affiliation
Jana Davis, Ph.D.	CBT/HGIT
Kevin DuBois, PWS, PWD	City of Norfolk, VA
Jeff Halka	MD Geologic Survey
Scott Hardaway, P.G.	VIMS Shoreline Studies Program
George Janek	USACE, Norfolk District
Lee Karrh	MD DNR
Eva Koch, Ph.D.	UMCES
Lewis Linker	CBPO
Pam Mason	VIMS Center for Coastal Resource Management
Ed Morgereth, MS ISS	Biohabitats
Daniel Proctor, P.E.	Williamsburg Environmental Group
Kevin Smith	MD DNR
Bill Stack, P.E.	CWP, CBPO
Steve Stewart/Nathan Forand	Baltimore County Dept. of Environmental Protection and Sustainability
Bill Wolinski, P.E.	Talbot County Dept. of Public Works

Shoreline Management Expert Panel Charge

- Evaluate how shoreline practices are modeled
- Review literature
- Provide a definition, geographic boundary, and qualifying conditions
- Develop pollutant removal rate protocols
- Define reporting units
- Recommend reporting, tracking, and verification procedures



How many shoreline management practices are in the Bay?

- Phase 2 WIP = 0
- 2012 Progress Report = 0
- Based on CBP query on 5/16/13



Need for Panel

- TN, TP, TSS removal rates approved by CBP in 2003

Source	TN (lb per foot per year)	TP (lb per foot per year)	TSS (lb per foot per year)
CBP (2003)	0.02	0.0025	2

- Need to update TN, TP, and TSS removal rates based on best available information
 - i.e., expert panel



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CBP (2003)	0.02	0.0025	2
CBP (interim rate, 2011)	0.20	0.068	310

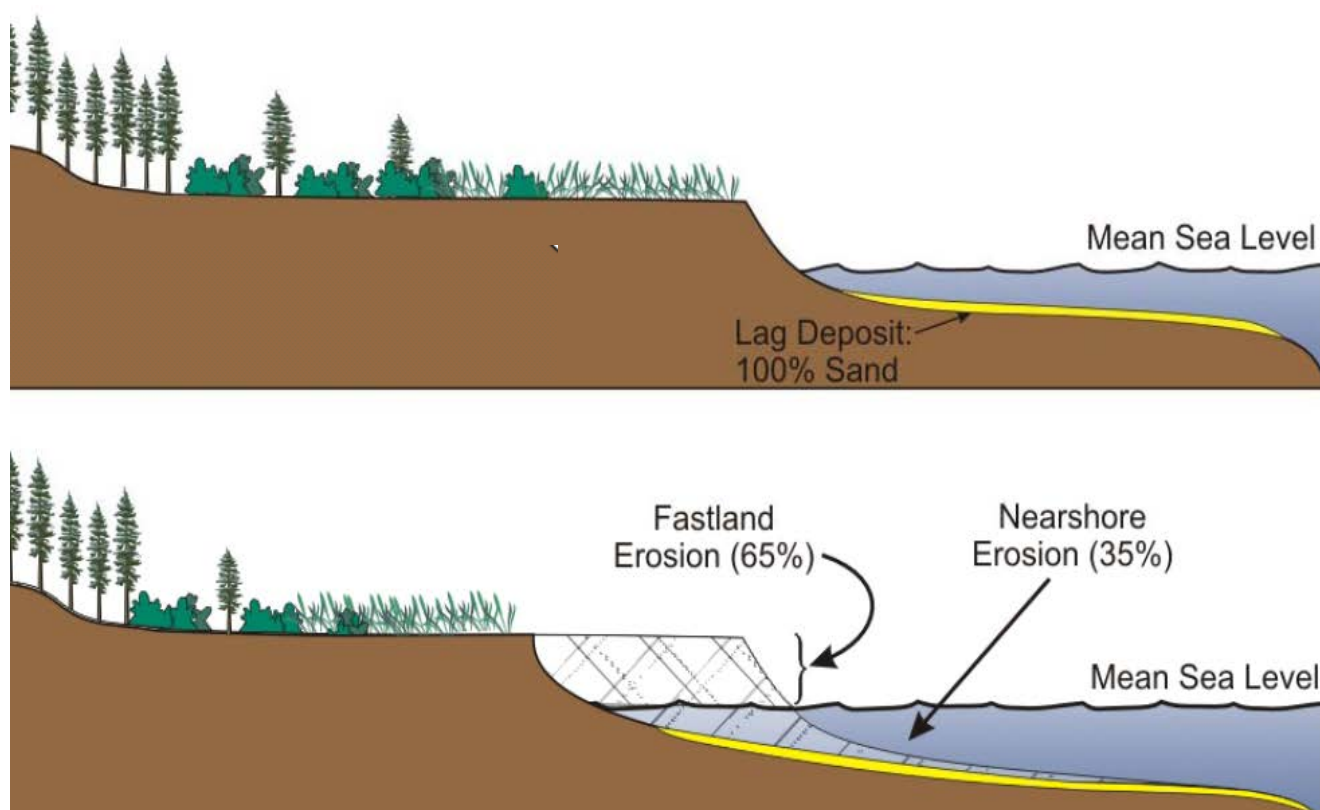
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Comparing the Numbers: Shoreline Erosion Loading Rates

Source	TN (lb per foot per year)	TP (lb per foot per year)	TSS (lb per foot per year)
Ibison, 1990	1.65	1.27	7,000
Ibison, 1992	0.81	0.66	2,800
Proctor, 2012 (WEG)	na	0.38 or 0.29	1,300
MDE, 2011*	0.16	0.11	451
BaCo (mean)	0.36	0.23	974
CBP (2003)	0.02	0.0025	2
CBP (interim rate, 2011)	0.20	0.068	310

*MDE data based on Baltimore Co. DEPS analysis of 23 individual shoreline restoration projects completed by Baltimore Co. DEPS Capital Projects and Operations. Median values were used. (Nathan Forand presentation to the SEC panel on 2/25/13)

Unprotected shore erosion is a major Chesapeake Bay sediment source



Erosion of fastland from unprotected shorelines represents 65% of the total load; nearshore erosion represents 35%.

In Summary - We Need an Update

- Removal rate based on outdated, limited stream restoration data
- Removal rate less than reported values
- Under and/or mis-reported



Source: Tony Watkinson



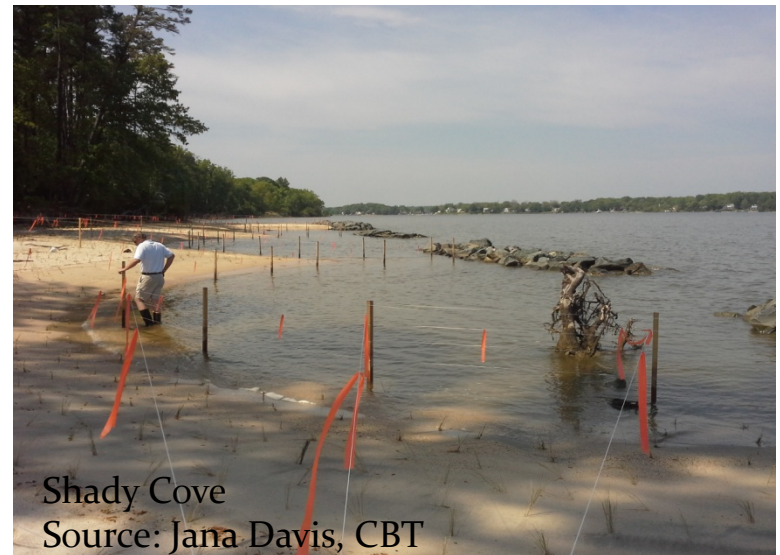
VIMS, Gloucester Point, VA

Panel Work

- Met ~1/month since Jan 2013
- Heard from experts, reviewed literature, discussed decision points and reached consensus
- Drafted report

Draft Protocols

- Prevented Sediment
- Denitrification
- Sedimentation
- Marsh Redfield Ratio



Study Area	Denitrification Rate	Pounds TN/Acre/Yr	Nearshore Water Characteristics	Sample Time	Sample Location	Site and Drainage Characteristics	Notes	Method ¹	Source
Dyke Marsh, Potomac River (VA)	$147 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	160.9	Tidal freshwater	November	Annual, mixed, and perennial plant community type	Dyke Marsh Preserve is a 80 ha marsh on the Potomac River and located south of Alexandria, VA	Mean DNR ² rates	MIMS	Hopfensperger et al., 2009
Dyke Marsh, Potomac River (VA)	$147 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	160.9	Tidal freshwater	October	High, mid, and low marsh	Dyke Marsh Preserve is a 80 ha marsh on the Potomac River and located south of Alexandria, VA	DNR listed in Table 4	MIMS	Hopfensperger et al., 2009
Jug Bay NERRS, Maryland	$60 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	65.7	Tidal freshwater	Spring	High, mid, and low marsh	Patuxent River catchment	NA	MIMS	Merrill and Cornwell, 2000
Jug Bay NERRS, Maryland	$28 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	30.7	Tidal freshwater	Fall	High, mid, and low marsh	Patuxent River catchment	NA	MIMS	Merrill and Cornwell, 2000
Jug Bay Wetlands Sanctuary, Maryland	$120 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	131.4	Tidal freshwater	April through October	High, mid, and low marsh		DNR reported was the grand mean of all rates measured	MIMS	Greene, 2005
Patuxent River, Maryland	$38 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	41.6	Subtidal freshwater	Annual average	High marsh	Patuxent River estuary (Patuxent basin is 2,256 km ²)	DNR rates reported in Table 5 were weighted for spatial variation	N ₂ flux	Boynton et al., 2008
Patuxent River, Maryland	$32 \mu\text{mol N m}^{-2} \text{ h}^{-1}$	35.0	Subtidal freshwater	Annual average	Low marsh	Patuxent River estuary (Patuxent basin is 2,256 km ²)	DNR rates reported from Table 5 were weighted for	N ₂ flux	Boynton et al., 2008

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

DRAFT 11/25/13

Submitted by:

Jana Davis, Nathan Forand, Kevin DuBois, Jeff Halka, Scott Hardaway, George Janek, Lee Karrh, Eva Koch, Lewis Linker, Pam Mason, Ed Morgereth, Daniel Proctor, Kevin Smith, Bill Stack, Steve Stewart, and Bill Wolinski

Submitted to:

Urban Stormwater Work Group
Chesapeake Bay Partnership

Final Date is TBD



Pictures courtesy of Jana Davis (CBT) taken at Cheston Point, MD.

Prepared by:

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

and

Bill Stack, Center for Watershed Protection, Inc. and EPA CBPO Sediment Reduction and
Stream Restoration Coordinator

Status/Next Steps

- Refine science based recommendations
- Reach consensus
- Present to EPA CBP
- Refine, repeat
- CBP inputs panel findings into the CB TMDL

A photograph of a group of students and a man in a river. The students are standing on the bank, some holding clipboards and pens, while one student is in the water holding a net. The man is standing in the water, holding a net. The background is a lush green forest.

Questions/Comments

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