

Expert Panel Report on Shoreline Management Practices

Urban Stormwater Work Group

April 18, 2018

Bill Stack

(Retired) Shoreline Management Expert Panel Chair



Shoreline Management Expert Panel Report Approved by the WQGIT on 7/13/2015 after much debate.



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

Submitted by:

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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

Chesapeake Bay Partnership

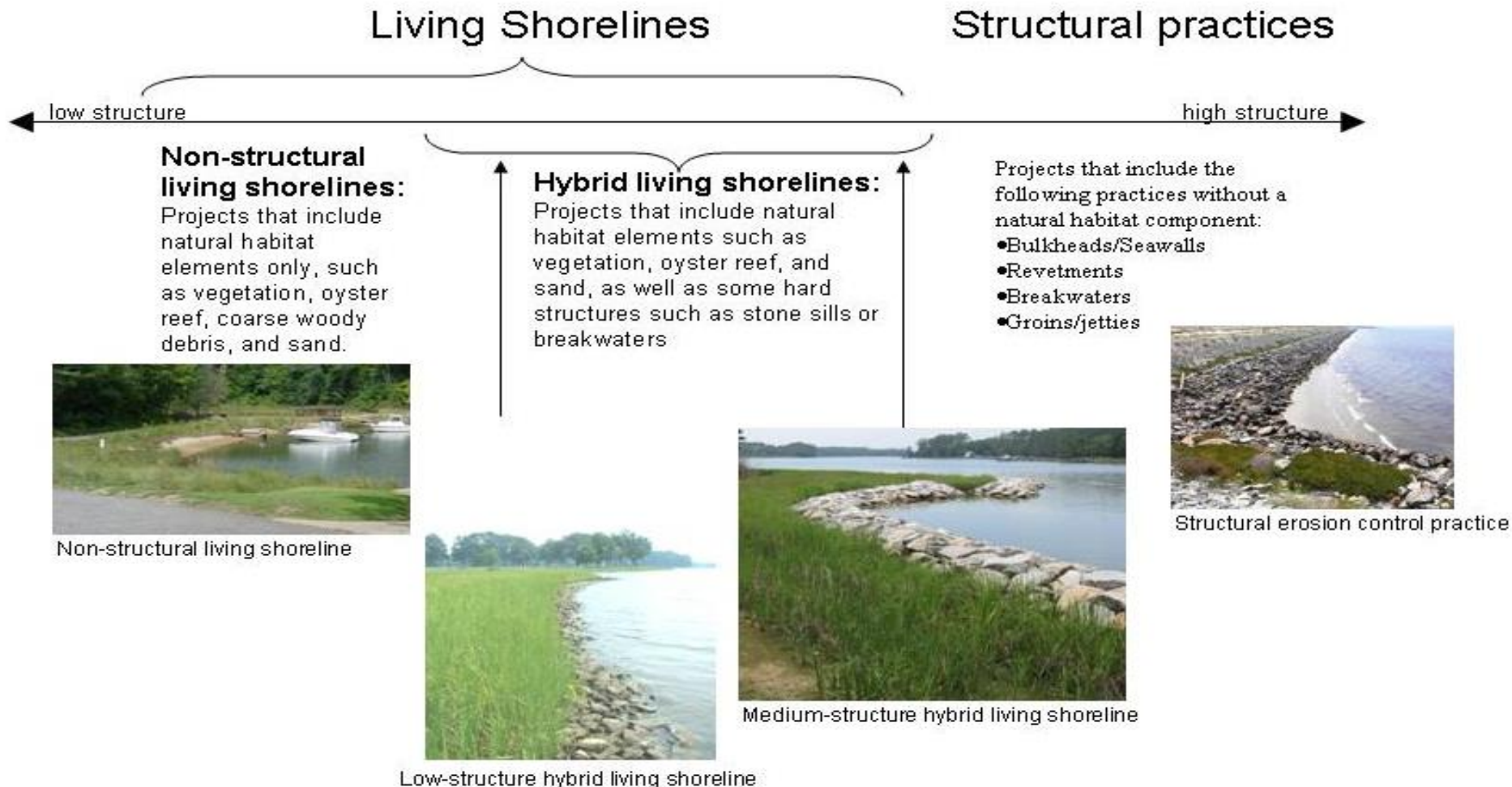
Prepared by:

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Expert Panel Definition

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



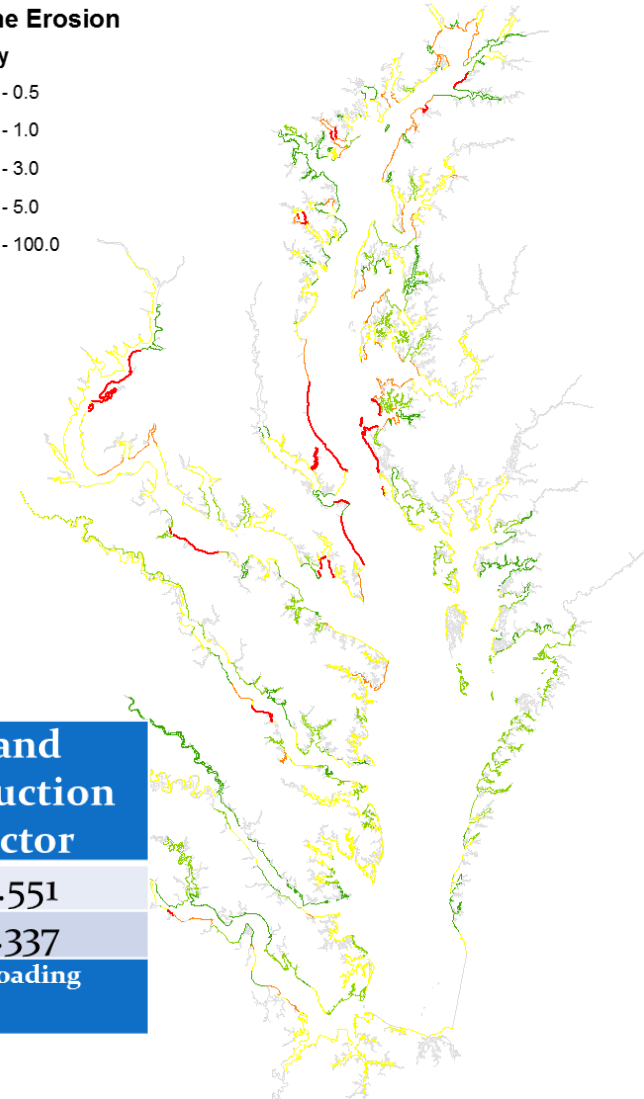
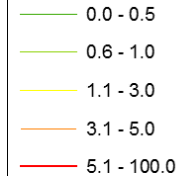
Protocols based on processes associated with sediment and nutrient removal

- Prevented Sediment
- Tidal Marsh Denitrification
- Sediment Trapping through Accretion
- Marsh Redfield Ratio

Prevented Sediment

- Prevention of tidal shoreline sediments through structural (revetments) or hybrid systems.
- Removal rates are determined based on monitoring data or average shoreline erosion rates. Assumes 100% effective. Why?

Shoreline Erosion
KG/M/Day

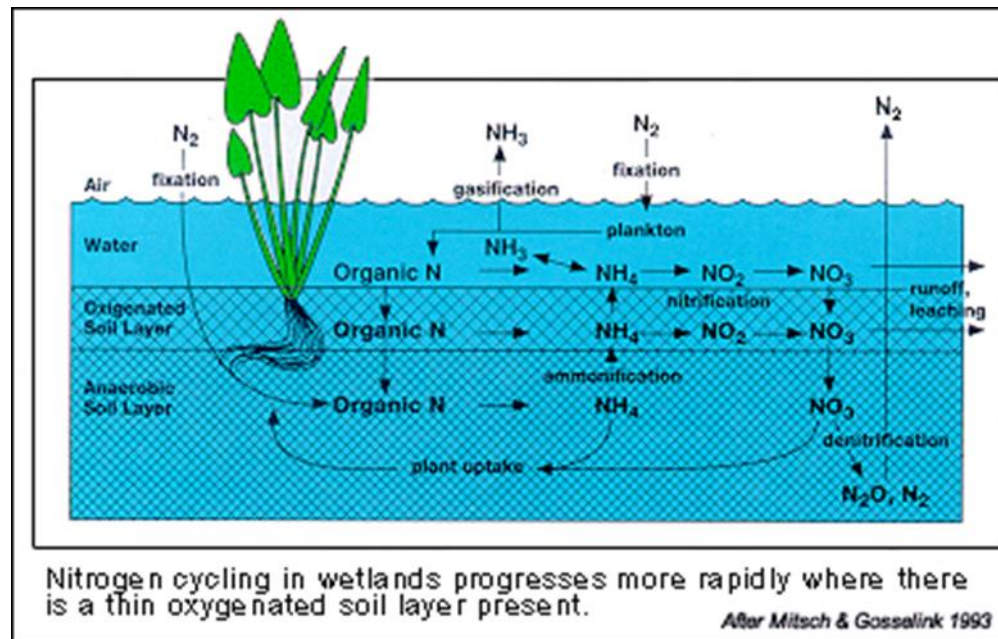


State	Loading (kg/m/d)			Sand Reduction Factor
	Total	Fines	Coarse	
Maryland	2.43	1.34	1.02	0.551
Virginia	1.01	0.34	0.67	0.337

Source: Chesapeake Bay shoreline characteristics and shoreline erosion mass loading (averaged) (Cerco, 2010).

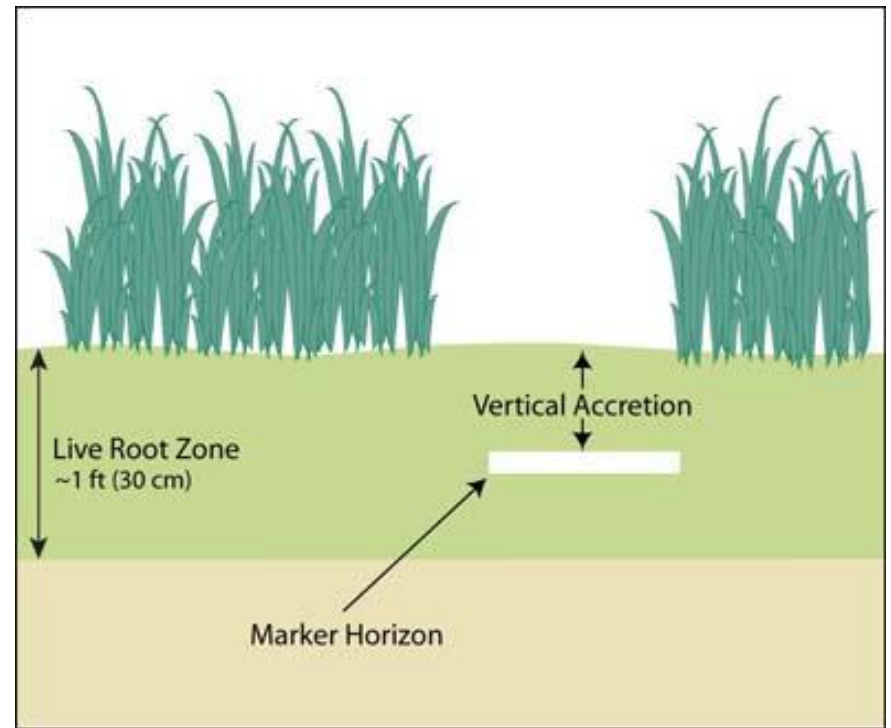
Tidal Marsh Denitrification

- Average denitrification rates are averaged from studies of tidal marshes and multiplied time the marsh area.



Sediment Trapping through Accretion

- Reviewed literature studies in the Chesapeake Bay tributaries to determine the annual sediment accretion rate for tidal marshes and TP associated with these sediments.



USGS, Patuxent Wildlife Refuge

This averaged rate is then multiplied times the surface area of the created marsh.

Marsh Redfield Ratio

- The Marsh Redfield ratio which is the ratio of C:N:P in the standing crop of marsh vegetation was not that variable and was hence averaged and used to estimate and annualized reduction credit.
- The surface area of the created marsh is multiplied by the average per square meter values determined from the literature. (i.e., 23 g TN m⁻² and 1 g TP m⁻²) and annualized.



Average erosion rates used for Default rate

Annual	MD	VA
Length (total) – (meters)	2,912,000	4,060,000
Length (unprotected) – (meters)	1,993,000	3,276,000
% Protected	32	19
Loading MT/yr - total	2,733,000	1,500,000
Fines	1,503,000	506,000
Coarse	1,153,000	994,000
Organic	77,000	-
Loading (kg/m/day) - total	2.43	1.01
Fines	1.34	0.34
Coarse	1.02	0.67
Organic	0.07	-
m = meters MT = metric tons		

Chesapeake Bay shoreline characteristics and shoreline erosion mass loading (averaged) (Halka, 2013).

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	NA at this time*	NA at this time*	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	(NA at this time)*	(NA at this time)*	164/42**

Issues raised regarding Protocol 1

- Protocol 1 BMPs remove sand (which is beneficial) in addition to fine sediment.



- Projects involving armoring should not receive any credit because of negative impact to aquatic life

Note: WTWG recommended to eliminate the nutrient credit for Protocol 1 pending further study.

Issues raised regarding Protocol 1

- WTWG raised concerns about the availability/reactivity of TP and TN associated with shoreline sediments and the impact that nutrient crediting might have on TMDL accounting.
- Concerns that the cumulative BMP loading reductions could possibly exceed available simulated loadings.

Response to Issues

- State agency flexibility when SAV's are impacted
- Protocol 1 only for TSS approval at this time
- Modeling Team to study sediment/nutrient reactivity. Nutrient credit may be added later as a result of this evaluation pending WTWG and WQGIT approval
- Fine sediment cap based on WQSTM analysis



The new numbers are in!

- Need to get the word out
- Address version control issues
- Make sure the report executive summary is updated
- Update project examples accounting for sand reduction factor
- Other?