

Mid-Atlantic Living Shorelines Summit

Understanding Lessons From Science

Session Moderator:

Karen Duhring

Virginia Institute of Marine Science
College of William & Mary

December 10, 2013
Cambridge, MD

Understanding Lessons From Science: Session Objective

Gain an understanding of scientific studies and research focusing on ecological and project performance of Living Shorelines



Understanding Lessons From Science: Session Format

- Moderator will establish Living Shorelines Research Framework
- 3 invited presenters will synthesize & highlight research findings
- Clarification Questions

LIVING SHORELINES RESEARCH FRAMEWORK

Understanding Lessons From Science: Focus Area

Mid-Atlantic Sheltered Coasts

Chesapeake Bay

Albemarle-Pamlico Estuary

Delaware Estuary

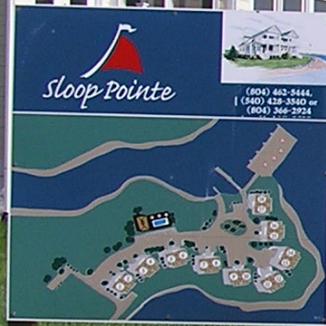
Coastal Bays

Does not include:

Atlantic Ocean coast

Non-tidal rivers, streams, & lakes

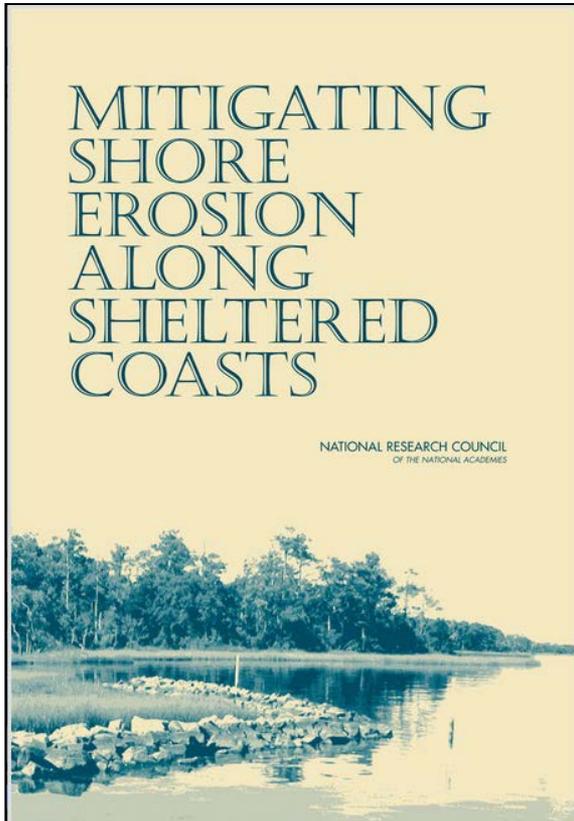
We know that coastal development continues to drive demand for shoreline protection in the Mid-Atlantic region



2007

National Review of Shoreline Management

National Research Council, 2007



SOME OF THE FINDINGS

SHORELINE HARDENING TREND:

“hold the line” armoring approach is most popular **in spite of other available alternatives**

CUMULATIVE IMPACTS: Many small shoreline projects over time ...can alter large geographic areas even where shoreline structures are absent

INFORMATION GAPS: a general lack of knowledge and experience regarding all options, **especially those that retain more of the shoreline’s natural features**

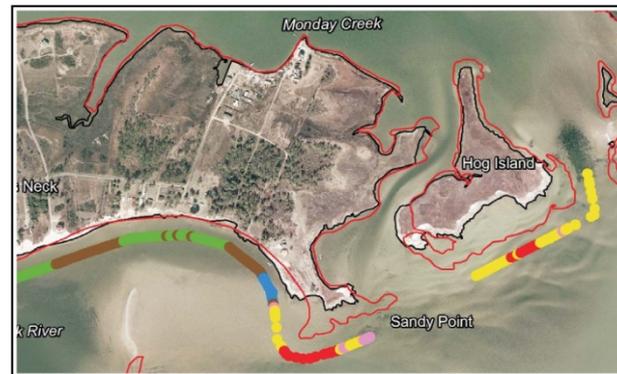
MORE RESEARCH NEEDED

Shoreline Research at

Shoreline & Tidal Marsh Inventories depict land uses, shoreline conditions & protection structures in Virginia, Maryland, Delaware, & North Carolina (Chowan basin)

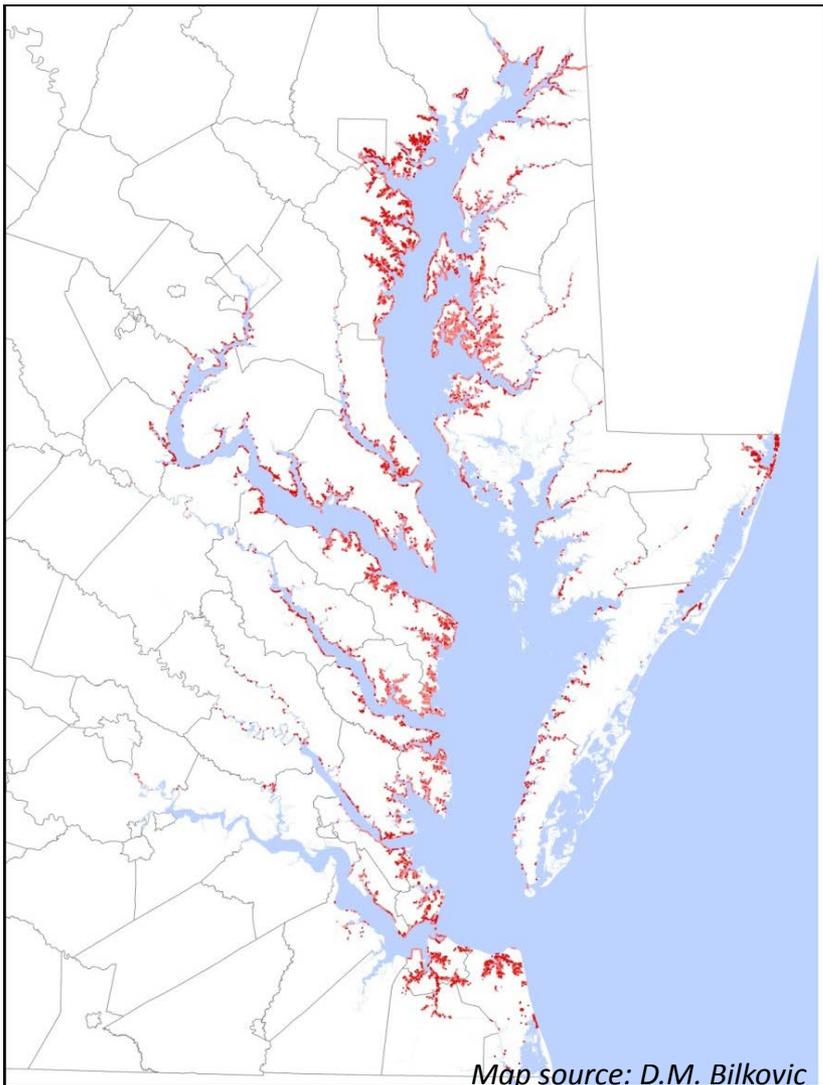
Shoreline Evolution Reports shoreline changes since 1937 plotted to estimate historic erosion-accretion

Shoreline Management Model preferred shoreline best management practices based on observed, mapped, & forecasted conditions



See Also:
Maryland
&
North Carolina
Coastal Atlases

Cumulative Shoreline Hardening in Mid-Atlantic Region



Current shoreline hardening in
Chesapeake Bay - Bulkhead & Riprap

Percentage of Shoreline Surveyed with Bulkhead & Revetment	
Delaware	12%
Maryland	28%
Virginia	11%
North Carolina	13%

Source: [VIMS Shoreline Inventory](#)

Social Science & Regulatory Research

Investigating the human element
& reasons for shoreline choices

- Marine Contractor Needs Assessments
- Marine Contractor & Property Owner opinion surveys
- Collective analysis of permit records & permit decisions

Bulkheads & revetments still more popular than non-structural and hybrid alternatives

Skepticism & unfamiliarity about living shoreline project performance were common reasons for choosing bulkheads & revetments

Planted Tidal Marshes for Erosion Protection

Research in 1970's - 1990's

Ed & Joanna Garbisch - *Maryland*

C. Scott Hardaway, Jr. & others - *Virginia*

Stephen Broome, W.W. Woodhouse, E.D. Seneca
& Spencer Rogers - *North Carolina*

Knutson & Others



Main Findings from Planted Tidal Marsh Research

It is possible to create tidal marshes

A “well-established” planted marsh grass fringe can be an effective method of abating shoreline erosion

Offshore wave attenuation structures are sometimes necessary for planted marsh success



Performance & As-Built Surveys of Hybrid Projects

2005 Assessment of Hybrid Type Shore Erosion Control Projects in Maryland's Chesapeake Bay Phases I & II

D.G. Burke, E.W. Koch, J.C. Stevenson

2006 Constructed Wetlands for Shoreline Erosion Control: Field Assessment and Data Management

J. Bosch et. al

2006 Survey of Existing Marsh Toe Protection Structures in Virginia *K. Duhring, C.S. Hardaway, Jr., T. Barnard*

2007 Performance of Sills: St. Mary's City, Maryland.

C.S. Hardaway, Jr. et al.

2011 Assessment of 27 Marsh Sills in North Carolina

J. Fear, B. Bendell

**Is it possible to protect coastal development at risk
without ecosystem harm?**

Restaurant On the Edge

Natural Habitats of Eroding Shoreline



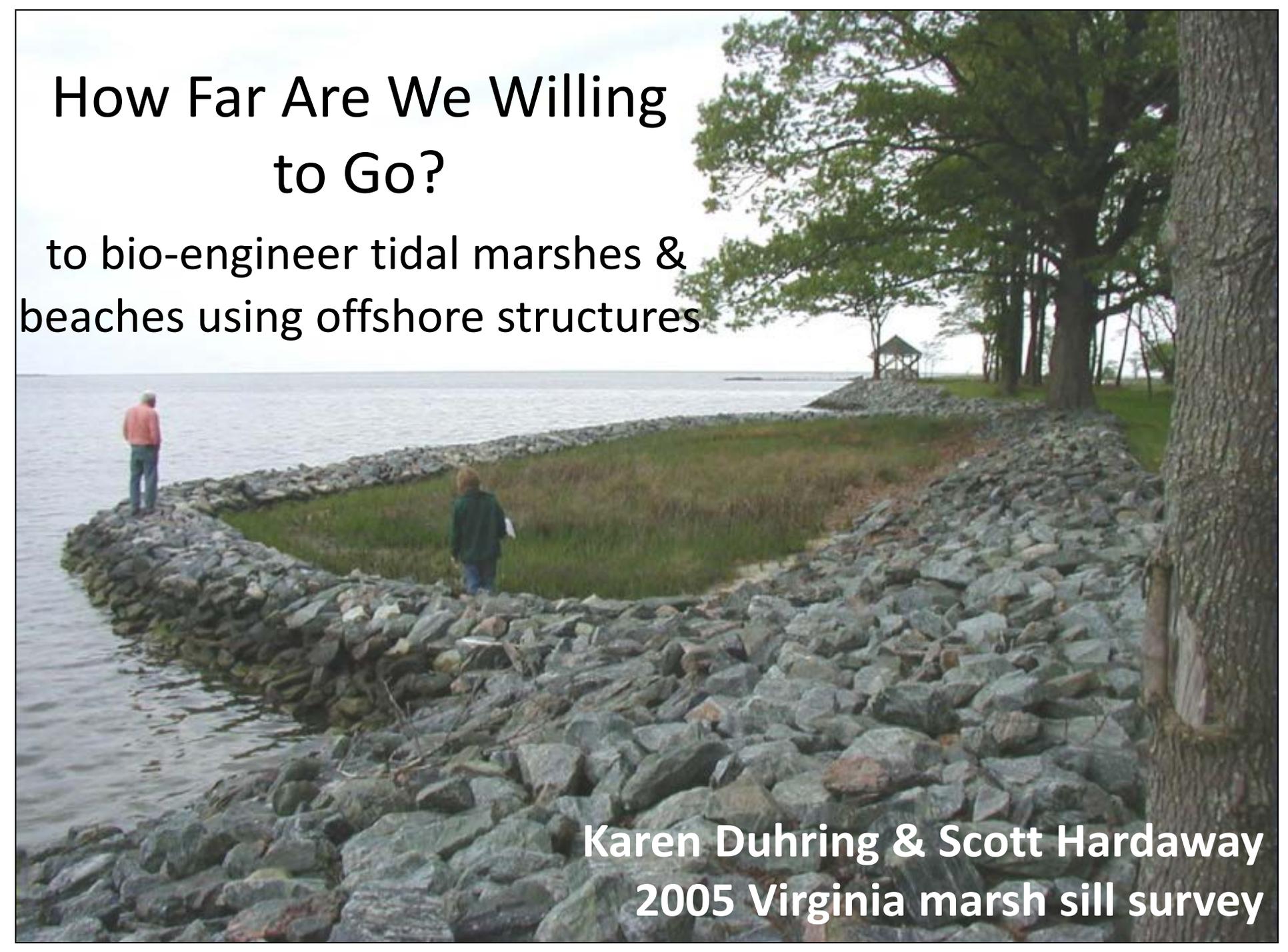
Are Living Shorelines a Better Way? Compared to Bulkheads & Revetments



W. Priest

How Far Are We Willing to Go?

to bio-engineer tidal marshes &
beaches using offshore structures



Karen Duhring & Scott Hardaway
2005 Virginia marsh sill survey

Highlights of Living Shorelines Scientific Findings & Implications

Invited Research Presenters

Dr. Carolyn Currin NOAA

Dr. Donna Bilkovic Virginia Institute of Marine Science

Sadie Drescher The Center for Watershed Protection, Inc.

Please Hold Your Questions Until the End