

Living Shoreline Timeline Review

Evolution of policy & practice in Virginia since 2006

Resources for Professionals

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Living Shoreline Professional Workshop



Living Shoreline Timeline Review

- Living Shoreline Initiative
- Virginia activity highlights since 2006
 - Outreach
 - Research
 - Law & policy
- Practice evolution

Cumulative Impacts of Shoreline Hardening 2000 - 2005

Growing evidence of complex interrelated nature of habitats &
landscape effects of hardening on living resources

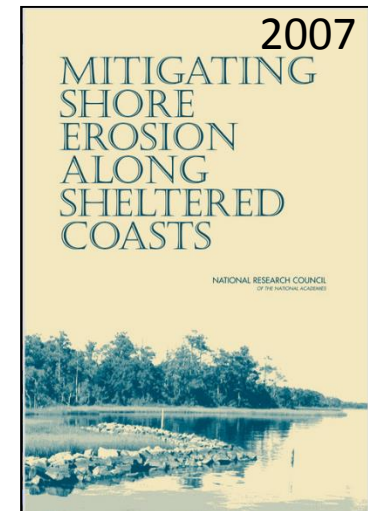
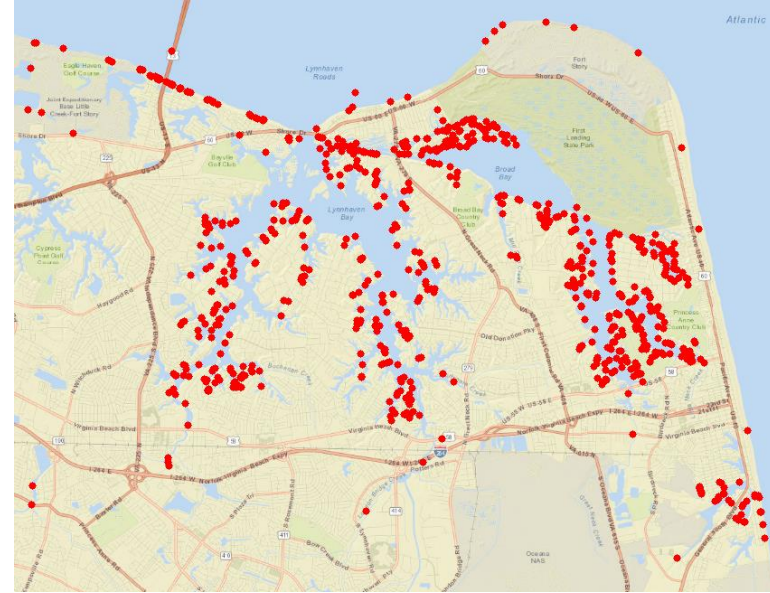
impacts to riparian forests, wetlands, beaches, & shallow water benthic habitats



Cumulative Impacts of Shoreline Hardening

- Habitat loss & fragmentation
 - Decreased habitat diversity
- Sediment supply & transport altered
 - Increased scour & turbidity
- Increase in invasive species
- Decrease in fish & benthos
- Decrease in marsh bird diversity
- Habitat migration interrupted
- Evidence of low thresholds
 - e.g. >5% riprap no SAV increase

Permitted Projects in Virginia Beach



Name Change was a Game Changer

- ‘**Vegetative Stabilization**’ has always been a preferred alternative for low energy, minor erosion problem solving but not widely used
 - 2004 new initiative started in Maryland & Virginia
 - to re-invigorate interest in **low impact stabilization**
 - Fueled by data from cumulative impact analyses & scientific research of hardened shorelines
 - **Annual miles of shoreline hardening**
 - **Acres of tidal wetland loss** compared to mitigation acres
- ‘Living Shorelines’ became the name of the game**

Coastal States with Living Shoreline Programs

due to concerns for shoreline hardening trend

- Northeast
 - Connecticut
 - Rhode Island
 - New York
 - New Jersey
 - Delaware
- Mid-Atlantic & Southeast
 - Maryland
 - Virginia
 - North Carolina
 - Florida
- Gulf Coast
 - Alabama
 - Mississippi
 - Texas
- West & Northwest
 - California
 - Oregon
 - Washington
- Great Lakes
 - Michigan
 - Ohio
 - New York

What are Living Shorelines?

As defined in Code of Virginia

A shoreline management practice that

Provides erosion control and water quality benefits

Protects, restores or enhances natural shoreline habitat

and

Maintains coastal processes through the strategic placement of plants, stone, sand fill, and other structural and organic materials

What are Living Shorelines?

Alternatives for bulkheads & revetments

Where erosion cannot be tolerated &
Risk reduction is necessary

Mimic by design or improve existing native habitats

Riparian buffers tidal marshes sand beaches
+
Shellfish reefs SAV

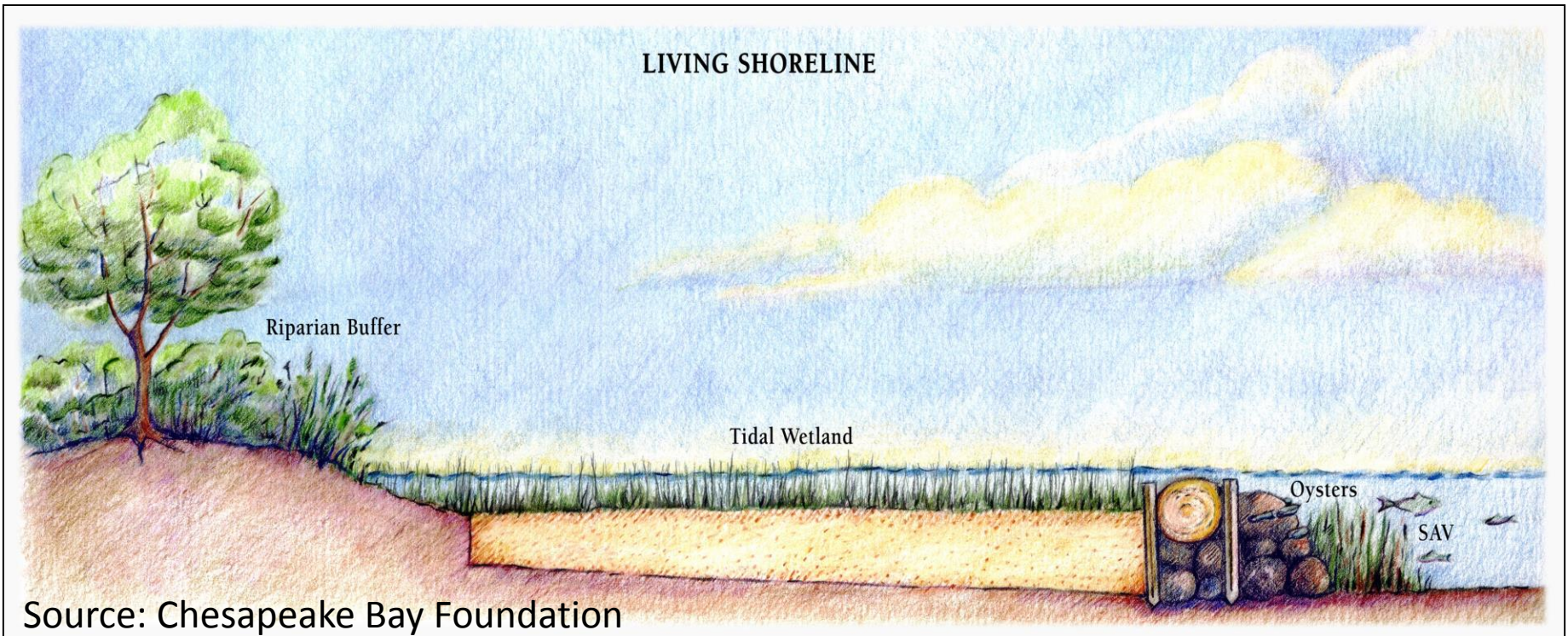
What are Living Shorelines ?

Native Vegetation is dominant

Riparian Buffer Wetland Beach

Bank Grading & Sand create suitable slopes & elevations

Stone & other engineered structures are minor elements to support living habitats



Non-Structural Approaches

Forest Stewardship



Enhance Existing
Riparian Buffer



Bank Grading &
Restore Riparian Buffer



J. Scalf

Planted Marsh & Fiber Logs



Beach Nourishment
& Dune Creation

Hybrid Approaches

Vegetated & Sand Beach Habitats with supporting structures



Planted Marsh with Sill

Tidal Marsh
Dominated Shorelines

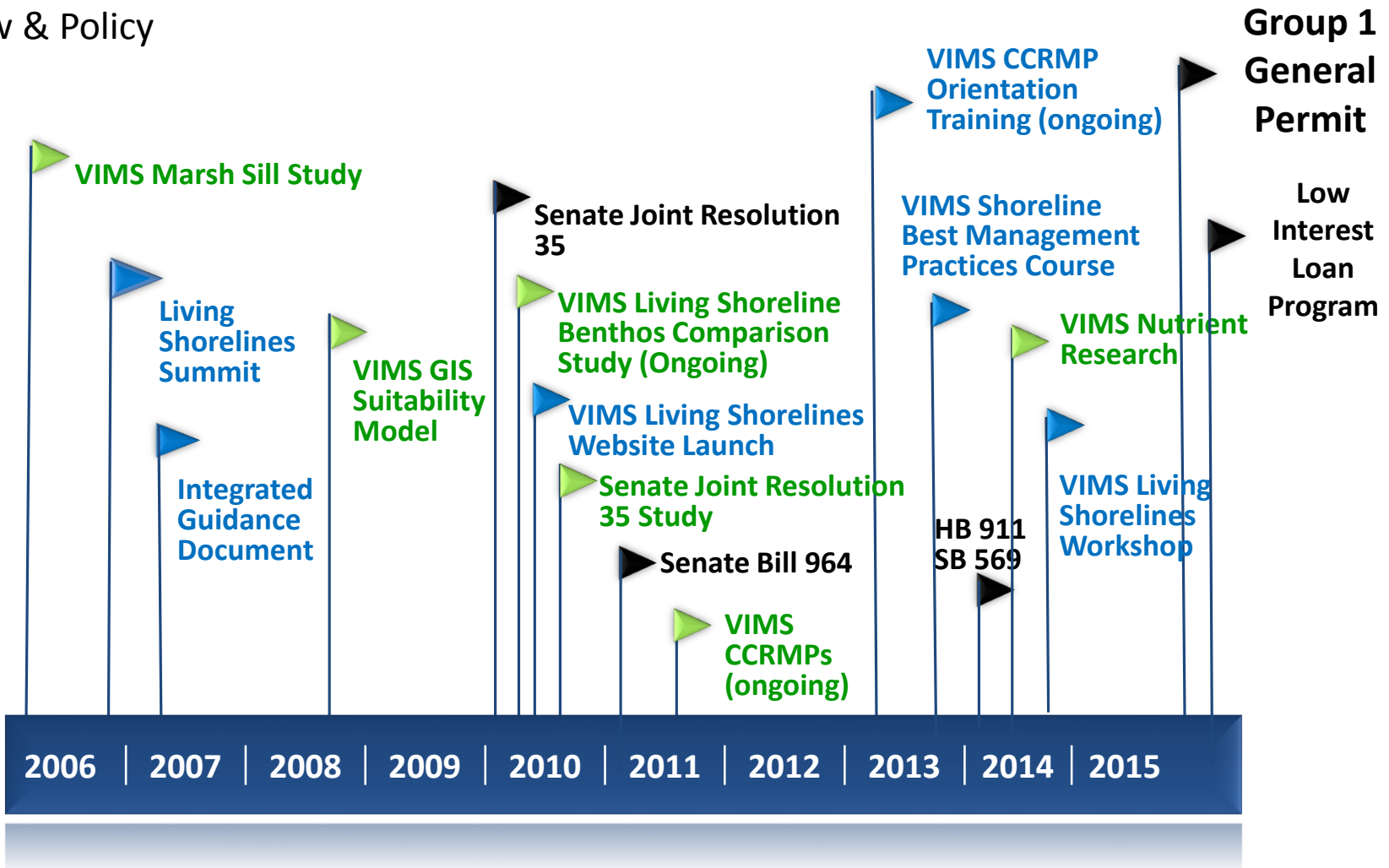


Offshore Breakwaters
with Beach Nourishment

Sand Beach
Dominated Shorelines

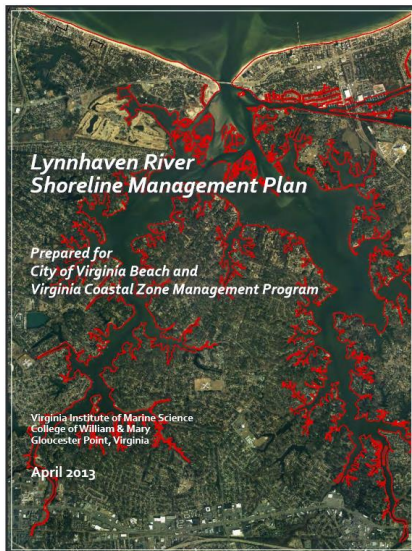
Virginia Living Shoreline Activities 2006 - 2015

- ▶ Outreach
- ▶ Research
- ▶ Law & Policy



Initiative Support in Virginia

- 2005-present VA Coastal Zone Management Program Shoreline Management Strategy =
 - 2006 Living Shoreline Summit
 - Workshops, classes & web site
 - Shoreline & Tidal Marsh Inventories
 - Shoreline Management Plans



► Outreach Programs for Shoreline Professionals

- 2005 Special forum for marine construction community
- 2006 Living Shorelines Summit (shore professionals = 18%)
- 2008 Living Shorelines Online Course for Contractors (*static*)
- 2008 Living Shorelines theme workshop & on-line survey
- 2010 Living Shorelines Design Manual & Course
- 2010 Living Shorelines web site
- 2013 Shoreline Best Management Practices on-line course
- 2014 Living Shorelines theme workshop
- 2015 Living Shoreline workshop for professionals w/ *Tool Box*

Most of these events have resource materials available on-line

► Research Programs for Shoreline Professionals

- 2013 Formal Certificate Program *Feasibility Study*
 - Funded by College of William & Mary
 - Looked at model courses for landscape & forestry industries
 - Training needs survey to determine preferred venue & delivery mechanism e.g. in person, on line, combo, willingness to pay
N=256 professionals

Development of a Coastal Resources Certificate Program for

Marine Contractors & Consultants

Karen A. Duhring & Julie G. Bradshaw



October 2013

College of William & Mary
Creative Adaptation Fund - Project Report



**Special Thanks
to those who
participated in this
survey!**

► Research Programs for Shoreline Professionals

- 2013 Formal Certificate Program Feasibility **Results**
 - Preferred 1 - 3 days classroom & field experiences
 - Less interest in self-paced online learning
 - Real world case studies
 - Various instructors, incl. experienced peers, regulatory agency staff & academics
 - Semi-formal certificate element desired
 - for official recognition, referral lists (high public demand)

Today's workshop incorporates some of these elements

► Outreach Programs for Shoreline Professionals

- 2016 Chesapeake Bay Landscape Professional Certification Program (*in progress*)
 - Voluntary, regional credentialed network of sustainable landscape professionals *who design, install, maintain small-scale stormwater BMPs & conservation landscapes*
 - Core curriculum to include wetlands & shoreline horticulture
Align landscape + marine industries for living shoreline projects
 - 3 tracks: Design – Installation – Maintenance

Virginia Coordinator: Shereen Hughes, Wetlands Watch



Chesapeake
Conservation
Landscaping
Council

<http://www.chesapeakelandscape.org/our-programs/landscape-professional-certificate/>

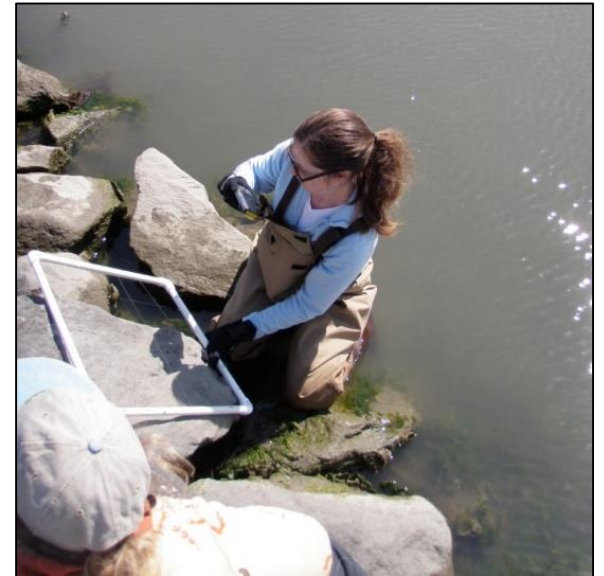
Timeline Highlights

- VIMS CCRMPs 22 localities completed
 - Comprehensive Coastal Resource Management Portals
 - *City of Virginia Beach completed 2012*
 - Shoreline & Tidal Marsh Inventories
 - Shoreline Best Management Practices model output
 - *Basis for current VIMS Reports*
 - Sea level rise map viewer



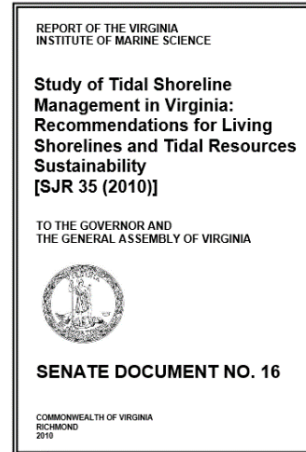
Timeline Highlights

- VIMS Living Shorelines Ecology Research
 - Comparing shoreline types natural - marsh sill - hardened
 - Habitat tradeoffs & productivity at marsh sills
 - Nutrient processes in planted marshes



Timeline Highlights

- **2010** Senate Joint Resolution 35
 - Directed VIMS to conduct a study of shoreline management practices & make recommendations for improvements
- **2011** Senate Bill 965
 - directed VIMS, VMRC, & Local Governments to update & adopt new shoreline management guidance
 - Established [preference for living shoreline practices](#)
 - Authorized development of General Permit for living shorelines
- **2014** Senate Bill 569 / House Bill 911
 - Amended Tidal Wetlands & Coastal Primary Sand Dune - Beaches Acts to allow for living shorelines general permit



Timeline Highlights

- 2013 US Army Corps of Engineers Norfolk District Regional Permit 19
 - Revisions include living shorelines
- 2015 Living Shoreline Group 1 General Permit
 - Approved by VA Marine Resources Commission September 28, 2015
 - Non-structural activities, e.g. planted marshes, sand fill, oyster shell
- 2015 House Bill 1734 Low-interest loans *
 - Authorizes State Water Control Board to provide loans from the VA Water Facilities Revolving Fund to local governments for the purpose of establishing living shorelines
- 2015 Chesapeake Bay Program TMDL credits *
 - Expert panel recommendations for shoreline management practices approved, extra credits for living shoreline projects with vegetation components



* Virginia process for local governments in progress by DEQ

► Outreach Grant-Funded Demonstration Projects

Hermitage Museum

Virginia Zoo

Coley Bay

Hull Springs

Jamestown 4H & Beach

Johns Point Landing

Phoebus Waterfront Park

Great Bridge Battlefield

Camp Occohannock

Mariners Museum

Coming Soon

Sleepy Hole Park

Captain Sinclair

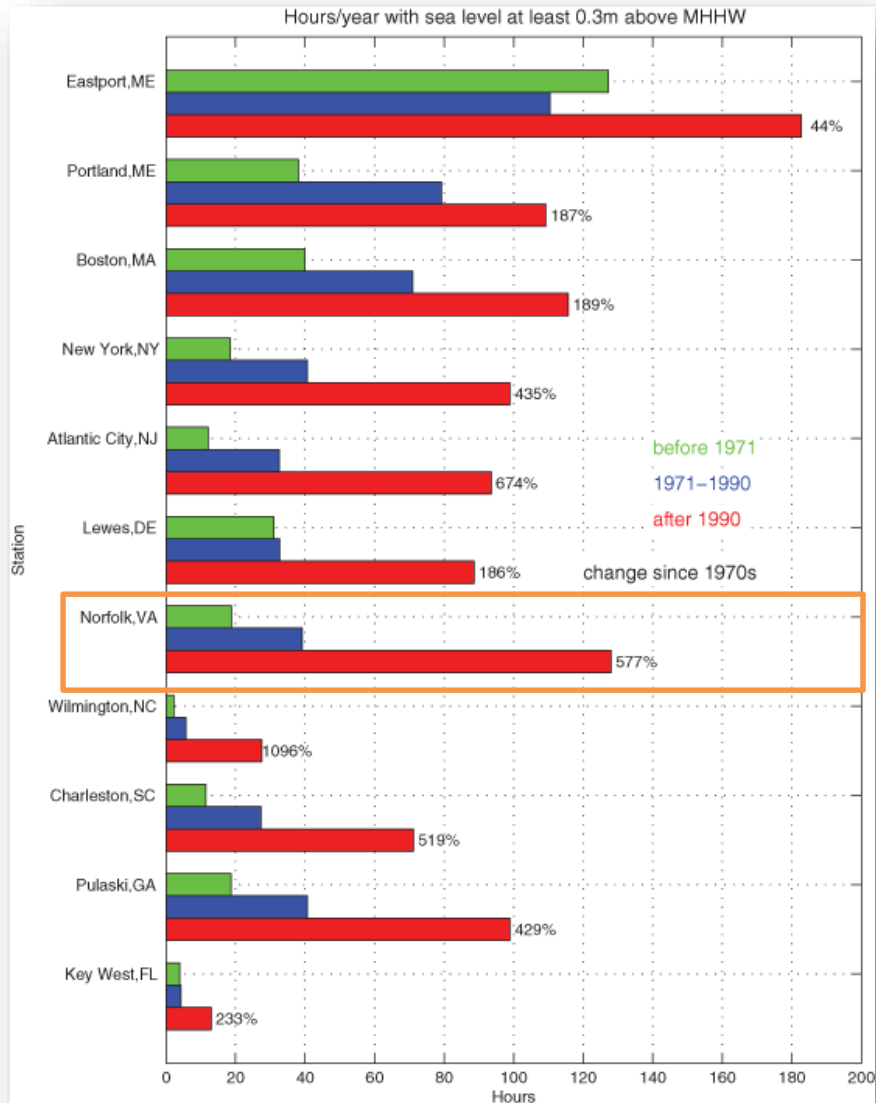
Werowocomico

Leesylvania State Park

Outreach education required
by funding agencies

Performance tracking over time

Sea Level Rise & Inundation Frequency



Hours of inundation above MHHW have increased greatly



Tidal marsh in Lynnhaven River becoming mud flat

Recent Coastal Storms

Sept 2003	TS Isabel
Sept 2006	TS Ernesto
Oct 2006	moderate Nor'Easter <i>with slightly higher water than Ernesto</i>
Nov 2006	moderate Nor'Easter
Nov 2009	Norlida <i>aka Veterans Day storm</i>
Sept 2010	TS Nicole <i>remnants</i>
Aug 2011	Hurricane Irene <i>minor in estuary, major on ocean coast</i>
Sept 2011	TS Lee <i>major rain event along I-95 corridor</i>
Oct 2012	Hurricane Sandy <i>bayside Eastern Shore hit worst</i>
March 2013	Winter Storm Saturn <i>heavy NNW winds</i>
June 2013	TS Andrea <i>mostly rain</i>
Oct 2013	Nor'Easter winter storm Atlas <i>remnants</i>
Oct 2015	Not Joaquin <i>record setting duration of high tide events</i>

Evolution of Practices

No elevation or slope changes
Simple staking below MHW



Sand fill to raise planted marsh elevation



Using both mats & logs



More aggressive staking



Higher elevation placement

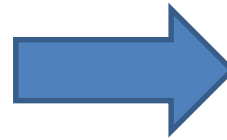


Evolution of Practices

Marsh toe revetments at existing marsh edges



Marsh sills with sand fill + planted marshes



Wide straight gaps



Narrow & offset or few gaps at all



Evolution of Practices

Stone for sill material



Oyster Reef Alternatives



Proprietary Concrete Products



Oyster Castles



Reef Balls



Ready Reef

Living Shoreline Timeline Review

Summary

- Living Shoreline Initiative now at a national scale due to growing evidence & concern about the cumulative impacts of shoreline hardening
- Living shorelines are now the preferred alternative for stabilization in Virginia as per VA Code
- Practices have evolved based on feedback from experience & will continue to adapt
- Multiple programs & resources now available for LS professionals

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