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
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
- 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

VIMS Marsh Sill Study
Living Shorelines Summit
Integrated Guidance Document
VIMS GIS Suitability Model
Senate Joint Resolution 35
VIMS Living Shoreline Benthos Comparison Study (Ongoing)
VIMS Living Shorelines Website Launch
Senate Joint Resolution 35 Study
Senate Bill 964
VIMS CCRMPs (ongoing)
VIMS CCRMP Orientation Training (ongoing)
VIMS Shoreline Best Management Practices Course
VIMS Nutrient Research
HB 911
SB 569
VIMS Living Shorelines Workshop
VIMS Nutrient Research

Group 1 General Permit
Low Interest Loan Program

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
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, online, combo, willingness to pay
  - \(N=256\) professionals

Special Thanks to those who participated in this survey!
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*
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

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

*Timeline courtesy C.S. Hardaway, VIMS*
Evolution of Practices

No elevation or slope changes
Simple staking below MHW

Sand fill to raise planted marsh elevation

Higher elevation placement

Using both mats & logs

More aggressive staking
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
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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