Second Generation Living Shorelines in Maryland

Kirk Mantay, PWS
Director of Watershed Restoration
South River Federation
Our Vision: To return the South River, in one generation, to its condition two generations ago.
Since 2010, the Federation has constructed...

• 11 living shoreline projects
• 20 residential scale bioretention projects
• 13 community bioretention projects under $100,000
• 17 major stream and wetland projects over $100,000
• 4 major reforestation projects
• 22 residential scale projects (as funder/partner)

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90 Restoration-related Projects

And we will build our 100th Project in 2017!
Maryland’s Regulatory Path

- Pre-2003: State subsidized revetments with grants and loans, **discouraged living shorelines**
- 2003-2008: Living shorelines “recommended”
- 2013-present: Living shorelines required *

* Indicates regulatory enforcement requirement
When the Rules Rule: 2008 Maryland Regulations Discourage Innovation and Minimization

- Stability is the priority
- 2-species planting plan
- Must be 85% vegetated every year, for 5 years
- Penalized for accretion or sand movement
- 90% clean, coarse sand
- No coarse woody debris “or other junk”

These create a “snapshot mentality” for living shoreline partners – how it looks on Day 1 is how it should look in Year 30.
Typical First Generation Living Shoreline Features in Maryland

Design does not allow for natural processes / dynamics: silted in, intertidal wetland replaced by marginal wetland and *Phragmites*

MHW + 1.5’ – huge subtidal footprint, huge cost.

Continuous sill – no egress for fish, wildlife, sediment, organics

*Photo: University of Connecticut*
Why Change?

- Stability is “a” priority, not “the” priority
- What other ecosystem functions are we leaving on the table?
- Cost: Over 6,000 miles of eroding shoreline in the Chesapeake Bay
- Are static shorelines really resilient?
Some “Frontiers for Change”

- Allowing for dynamic profiles and cross sections
- Rethinking the “Spartina meadow”
- Increasing organic carbon in constructed marshes
- Use of woody debris for habitat
Three “Second Generation” Mid-Chesapeake Projects (Pre-Construction)

Hail Point Living Shoreline / Reef (2009-2011)

Arundel on the Bay Living Shoreline (2014)

Pines on Severn Living Shoreline (2015)
Living Shoreline Permits Denied!

Maryland Neighborhood Trying to “Do the Right Thing”—CLA Volunteer Files Suit Against MDE

Recently, the Pines on the Severn Community of Arnold Maryland was dumbfounded when its permit to build a “living shoreline” to replace a crumbling bulkhead and collapsing banks of Chase Creek was denied by the Maryland Department of the Environment (MDE). Construction of a living shoreline, a natural stabilization technique which recreates habitat and improves water quality, is MDE’s preferred shoreline protection and restoration method. Communities that initiate such plans are usually commended, but the Pines permit was denied due to rigid application of criteria that did not account for site specific factors around which the plan was tailored. With the assistance of CLA volunteer attorney, Jesse Iliff, the community filed an appeal in Circuit Court.
Frontier: Diverse/Dynamic Plan Form and Profile: Pines on Severn Living Shoreline
Pines on Severn Living Shoreline, 90 days after construction
Fish and Waterfowl Reef location between the breakwaters and along the Arc of Stone
Arundel on the Bay Living Shoreline
Arundel on the Bay Living Shoreline / first growing season
Innovation Frontier: Adding Carbon!

- Bilkovic and Mitchell, 2012:
  - Living shoreline sediment organic matter and total organic carbon are not equivalent to natural marshes
  - Lower abundance and biomass of infauna than natural marshes
  - More coarse sand and small gravel, less clay and silt than natural marshes
  - Epifauna may outcompete infauna
Adding soil organics for soft-bodied invertebrates

Adding significant organic material to legal fill sand at Arundel on the Bay living shoreline, 2013

Arundel on the Bay soil sample after two growing seasons
2 Growing Seasons: Arundel on the Bay
Frontier: Vegetation: *Spartina* only?
2 species planted on six constructed LS sites, 2004-2009
Change in vegetation assemblage accelerates after 2 growing seasons
Mean of 13 species observed on completed LS over two years old
Recommends closer look at salinity, reference wetlands, other factors.
Woody Debris: “Stumps and Other Trash”
Photo: Arundel on the Bay, low tide
Fish and Bird use of woody debris in South River living shorelines (Anderson, 2014-unpublished)

- Fish and bird survey on 3 sites with woody debris, 3 sites without
- Mean fish observation 20.67 (WD sites) vs. 6.17 (no WD sites) (P < 0.001)
- Mean bird observation 8.20 (WD sites) vs. 1.50 (no WD sites) (P < 0.001)
- “The inclusion of coarse woody debris in living shorelines plays a significant role in habitat enhancement.”
Conclusion (1)

We can potentially spend less, build less, and get more functional return out of living shoreline ecosystems by installing dynamic and resilient projects that have more features in common with reference wetlands.
Conclusion (2):

Last generation’s living shoreline pioneers in the Chesapeake Bay are actively learning from the rapid innovations going on in other regions. Keep up the good work!
Thank you!

Kirk Mantay, Director of Watershed Restoration
kirk@southriverfederation.net
410-224-3802

www.southriverfederation.net

South River Federation  @SouthRiverFed