Learning from Past Projects: Step in the Right Direction

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December 10, 2018
Erosion Is Not Necessarily a Bad Thing

A necessary process to maintain beach, marsh and offshore habitats.

Ecological health of the estuary depends on it!!
• MD’s shoreline- approx. 7,532 miles.

• Shorelines continually eroded by the movement of water, waves, and wind.

• Human activities like high speed boating and hardened shorelines on adjacent properties can increase rates of erosion.

• Erosion affects all 16 coastal counties.
Traditional Methods of Erosion Control Methods

Wooden Bulkhead

Rip-rap or Revetment
Excessive ??

Great Wall of China
• Over 200 miles of shoreline armored in the Chesapeake Bay (and that is just Maryland)

• More than 50% of Bay tributary shorelines are hardened.
Problems Associated with “Structural” Approach
<table>
<thead>
<tr>
<th>Rate of change</th>
<th>Shoreline Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Miles</td>
</tr>
<tr>
<td>Accretion</td>
<td>2,006</td>
</tr>
<tr>
<td>No Change</td>
<td>75</td>
</tr>
<tr>
<td><strong>Slight erosion</strong></td>
<td>3,740</td>
</tr>
<tr>
<td>0 to -2 feet/year</td>
<td></td>
</tr>
<tr>
<td><strong>Low erosion</strong></td>
<td>618</td>
</tr>
<tr>
<td>-2 to -4 feet/year</td>
<td></td>
</tr>
<tr>
<td><strong>Moderate erosion</strong></td>
<td>173</td>
</tr>
<tr>
<td>-4 to -8 feet/year</td>
<td></td>
</tr>
<tr>
<td><strong>High erosion</strong></td>
<td>48</td>
</tr>
<tr>
<td>Over -8 feet/year</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,659</td>
</tr>
<tr>
<td>Items</td>
<td>Structural Projects</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td># of Projects</td>
<td>484</td>
</tr>
<tr>
<td>LF of shoreline protected</td>
<td>201,649</td>
</tr>
<tr>
<td>Sq ft of marsh created</td>
<td>12,412</td>
</tr>
<tr>
<td>Amount of State loans</td>
<td>$31,511,944</td>
</tr>
</tbody>
</table>
Options for Living Shorelines

- Marsh creation
- Edging
- Biolog
- Rock groins with marsh plantings
- Rock sill with marsh plantings
- Breakwater
Lesson- 1: KNOW YOUR SITE
Marsh Creation

VIMS Center for Coastal Resources Management

Courtesy: Angler Environmental, Inc.
Know Your Site:
Salinity and Choice of Marsh Grasses
Know Your Site: Topography
• **Lesson- 2: Learn from Research**
Arundel-on-the-Bay: Old Project

- High-energy environment
- Chesapeake Bay
- Approx. 30 mi fetch southerly
Tombolo Ratio
Source: Hardaway et al
Arundel-on-the-Bay: New Project
## Project Selection Criteria

**DNR-SCS**

<table>
<thead>
<tr>
<th>Creek, Cove</th>
<th>Minor River</th>
<th>Major Tributary</th>
<th>Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth</td>
<td>-1.0 to -2.0</td>
<td>-2.0 to -4.0</td>
<td>-4.0 to -15.0</td>
</tr>
<tr>
<td>Fetch</td>
<td>0.5 mile</td>
<td>1.0 to 1.5 mile</td>
<td>2.0 or more</td>
</tr>
<tr>
<td>Erosion</td>
<td>2 ft/yr or less</td>
<td>2 to 4 ft/yr</td>
<td>4 to 8 ft/yr</td>
</tr>
</tbody>
</table>

**Low wave energy**

**Medium wave energy**

**High wave energy**

**Non-Structural**

**Hybrid**

**Structural**

**Type I**
- Beach replenishment
- Fringe marsh creation
- Marshy islands
- Coir logs edging and groins

**Type II**
- Marsh fringe w/stone groins
- Marsh fringe with stone sills
- Marsh fringe with stone breakwaters
- Marsh edging with stone
- Stabilization of streambanks with vegetation and stone

**Type III**
- Stone breakwaters with beach replenishment and appropriate vegetation

**Type IV**
- Bulkheads
- Revetments
- Stone reinforcing
- Pre-cast concrete units

<table>
<thead>
<tr>
<th>Least expensive</th>
<th>Medium priced</th>
<th>High priced</th>
<th>Expensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100 - $200/L.F.</td>
<td>$250 - $400/L.F.</td>
<td>$450 - $600/L.F.</td>
<td>$500 - $1,500/L.F.</td>
</tr>
</tbody>
</table>
Take-Home Message-1:

“Less is More”
Take-Home Message-2:

“One Size Does Not Fit All”
Take-Home Message-3:

“AM: Work WITH Nature; Not Against”
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