Living Shorelines Types
from large to small
Downsizing a Living Shoreline; Retail-scale Options for Private Properties on Exposed, Rapidly-Eroding Coasts

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and

Taylor “Chips” Kirschenfeld
Environmental Consultant
Project Location
Existing Conditions
Owner's Mission

Reduce Upland/Shoreline Erosion

Maintain Recreational Beach

Be a Good Neighbor

Utilize a Living Shoreline

("...like Project Greenshores")
Average Erosion @ Project 1997 - 2013 ~ 2 ft/yr
Over 1 ft/mo from 2008 - 2010
Site Analysis

Calculated Net LST Potential (cu yd / yr)
LST potential shows accumulation:

Why isn't the project accreting?

No southern sediment supply

If shorelines are retreating, where is all that eroded sand going?

Offshore
(see offshore profiles)
CONCEPTS
Optimize reef bw performance to:
Eliminate/reduce upland erosion & offshore transport
Sill; dissipate high steep waves; pass low long waves

Maintain the saltmarsh
Average Hs < Hₜₜ (Douglas & Stout, 2004)

Permit adequate longshore transport
Salient good; tombolo bad; bobcat OK

Adapt to sea level rise
Rise with it: 1) maintenance {cheap}; 2) oysters {free}

Survive extreme events
Stay low; stay flat
Design profile

![Graph and Table]

**Table: Dimension**

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Alongshore</th>
<th>Crossshore</th>
<th>Crest Elevation (ft, MLW)</th>
<th>Area (ft²)</th>
<th>Volume (ft³)</th>
<th>Volume (yd³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef Breakwater</td>
<td>135</td>
<td>50</td>
<td>0.33</td>
<td>6,213</td>
<td>9,533</td>
<td>353</td>
</tr>
<tr>
<td>Oyster Shell Layer</td>
<td>135</td>
<td>50</td>
<td>0 - 0.2</td>
<td>4,970</td>
<td>391</td>
<td>14</td>
</tr>
<tr>
<td>Marsh</td>
<td>85</td>
<td>25</td>
<td>0.6</td>
<td>2,125</td>
<td>2,996</td>
<td>111</td>
</tr>
<tr>
<td>Upland Berm</td>
<td>155</td>
<td>25</td>
<td>7.5</td>
<td>3,875</td>
<td>7,750</td>
<td>287</td>
</tr>
<tr>
<td>SUMS</td>
<td>17,183</td>
<td>20,671</td>
<td>766</td>
<td>8338</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submerged Land Area Covered</td>
<td>(0.2 acres)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Reimer - Moore Living Shoreline Project**

*Emerald Ocean Engineering LLC*

Dwg. No: RM-3  
BY: ddm  
Date: 10/18/2013  
Rev. No:  

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107 Acola Drive  
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Voluntary Adaptive Management Plan

erosion > 2 ft/yr

Deposition

Bypass

03/13/16
CONSTRUCTION
Cost Comparison
For 155 ft of shoreline protection:

Traditional Bulkhead - $40-60 K
Living Shoreline – $ 70 K
Offshore Emergent Breakwater > $100 K
State-mandated Monitoring

11 Profiles extending ~200' offshore
250' N & S of project bounds

Neighborhood seminars
Semi-annually, 3 yrs
1 Week Post Construction
I Week Post Construction
1 Year Post Construction
1 Year Post Construction
Missions Accomplished! (?)

OWNER'S

- Reduce erosion  √
- Recreational beach  √
- Neighborly  √√
- Living Shoreline  √√√

DESIGNER'S

- Reduce erosion  A
- Maintain saltmarsh  A
- Allow LST  C ??
- Survive  Incomplete
- Adapt to SLR
  - Cheap  A
  - Free  D
LESSONS

- Saltmarsh vegetation can thrive on exposed bay shorelines
- Submerged Reef BW perform well in X-shore dominated shorelines
- Submerged reef BW can be:
  - *Reef habitat* as valuable as marsh
  - *Breakwaters* as effective as emergent bw
Questions?

Low tide visitor ↑
High tide visitor →
Offshore Profiles => Offshore Trx.
15 yrs upland erosion ~ Vol. > P0
Profile 4S – Local Effects
(LST-o-meter)
As Built