Implementing Low-Crested Artificial Oyster Reef Breakwaters into Restoration Practice

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About Me
Presentation Outline

• Why: Reasons & Goals
• How & What
• Challenges & Concerns
• Needs
• Future
Why are artificial oyster reef breakwaters implemented into restoration projects?

1. Protect & stabilize eroding shorelines
   A. Reducing wave energy
   B. Increase sediment deposition & retention

2. Grow, enhance, & restore coastal ecology
   A. Substrate and habitat
   B. Facilitating openings & natural transitions

Bayview Park, Pensacola FL

Photo Credit: http://www.keeppensacolabeautiful.org/oyster/
Difference between restoration **success** and **failure** when low-crested artificial oyster reef breakwaters are used?

Why are we seeing this type of response???
Coastal engineering design guidance for reef breakwaters:

Wave Transmission, $K_t = (H_t / H_i)$
Wave Diffraction, $K_d = (H_d / H_i)$
Wave Reflection, $K_{re} = (H_{re} / H_i)$
Wave Refraction,
Wave Over-topping
Wave Setup
Sediment Transport
Shoreline Response

What do we really know about the proprietary technologies in the restoration market today???
“Bubba-Shrimp” Phenomenon

“You can barbecue it, boil it, broil it, bake it, sauté it…”

Oyster ...
- Shells
- Concrete Rings
- Bags
- Cages
- Balls
- Domes
- Piles
- Pyramids
- Castles
Examples of engineering & design unknowns?
How are we expanding our knowledge?

- Modeling
- Monitoring
- Research
What and how much structure will you need?

- Good Habitat | Some Attenuation | Potential Problems
- Great Habitat | Poor Wave Attenuation

Webb 2013b
What are your restoration priorities?

Efficiency

Structure Size

Habitat & Species

Shoreline Protection

Vegetation (SAV & Marsh)

Webb 2013a
Variability of project success

Failed to harmonize restoration project goals
Example: Project GreenShores (Phase 1 vs. Phase 2)

Phase 1:
Multi-award winning project
Completed in 2003
7 acres of oyster reef
8 acres of salt marsh/seagrass habitat
Minimal replanting in ‘04

Phase 2:
Constructed in 2007
2 submerged reef breakwaters (crest 0.5 ft below MLW)
Not as successful as Phase 1
How to accomplish your restoration priority?

**Must Haves:**
- Good Site Selection
- Knowledgeable Professionals

- Physical Coastal Processes
  - (waves, tides, currents, and sediment transport)

- Coastal Engineering
  - (structures, nourishment, and construction)

- Coastal Ecology
  - (vegetation, oysters, fishes, and habitat)
Thank you!
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