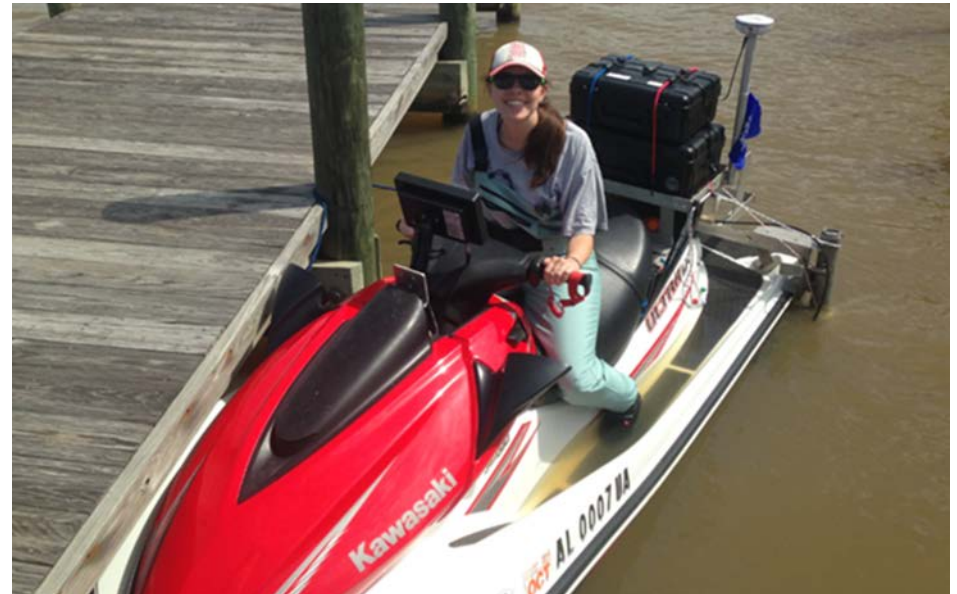
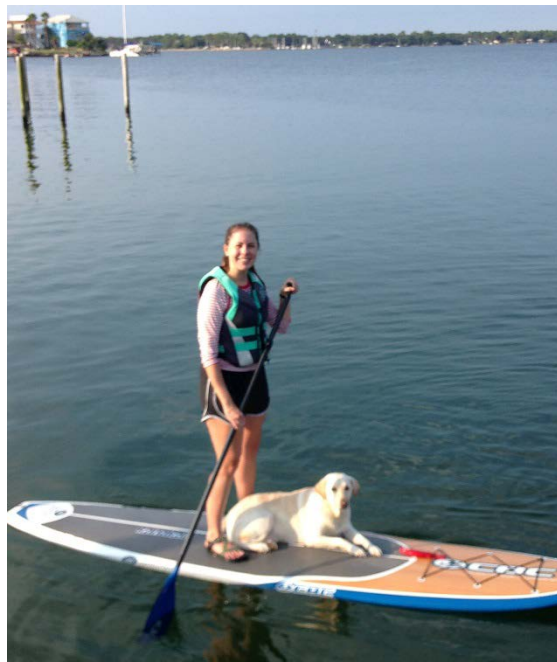




# Implementing Low-Crested Artificial Oyster Reef Breakwaters into Restoration Practice

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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



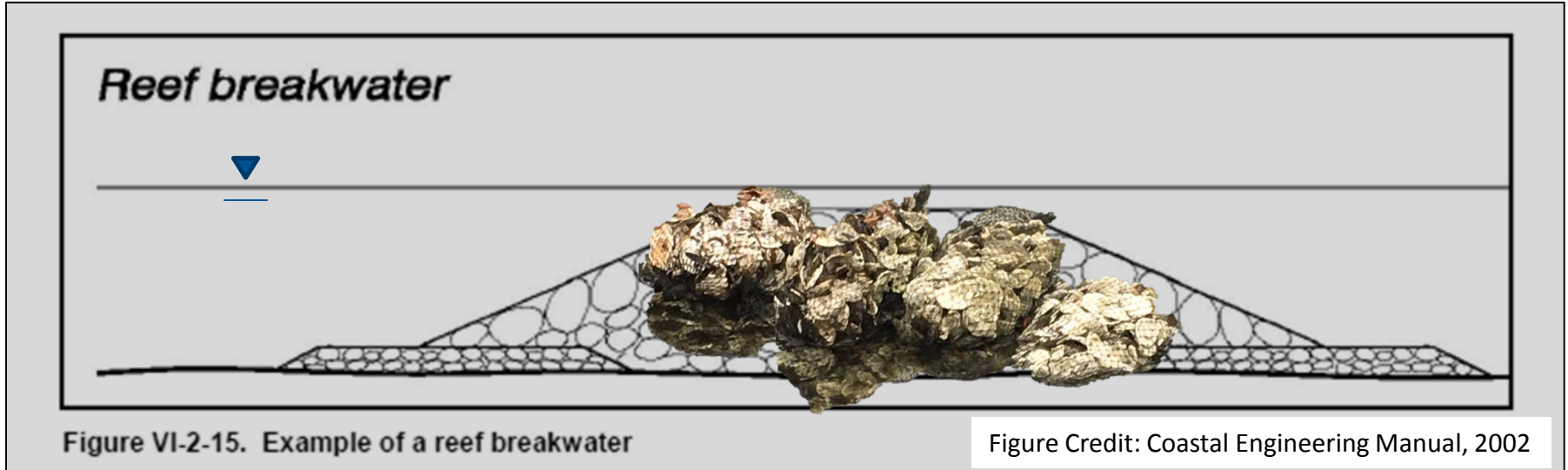
Photo Credit: <http://www.keependacolabeautiful.org/oyster/>

# 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 Overtopping

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

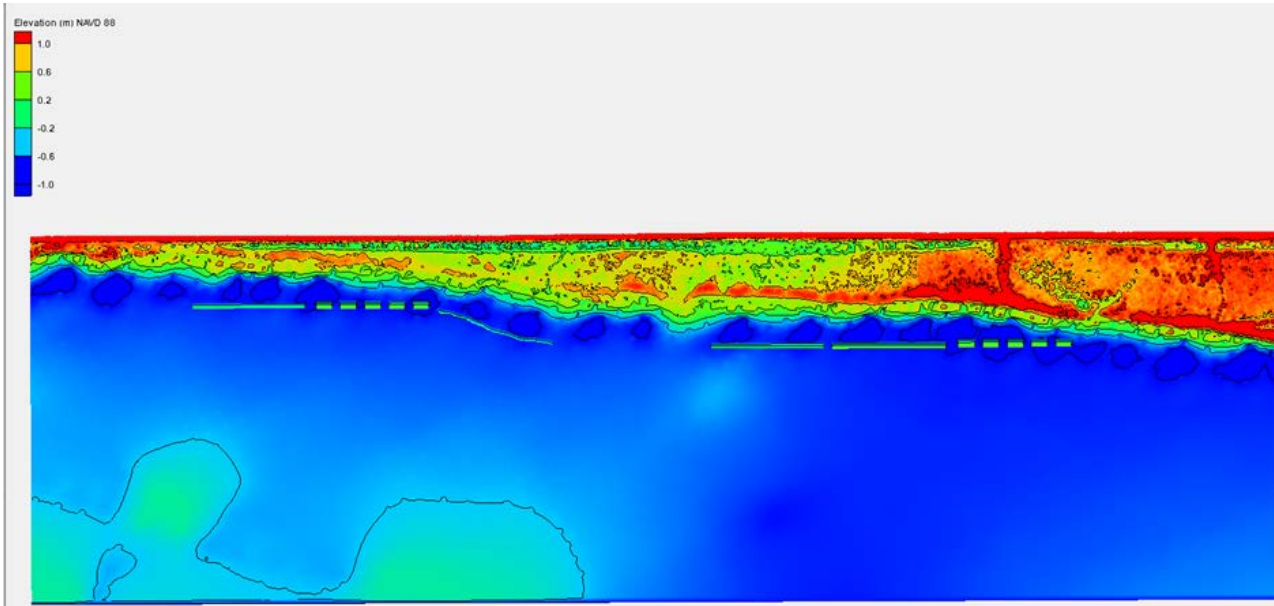


# Examples of engineering & design unknowns?





# How are we expanding our knowledge?



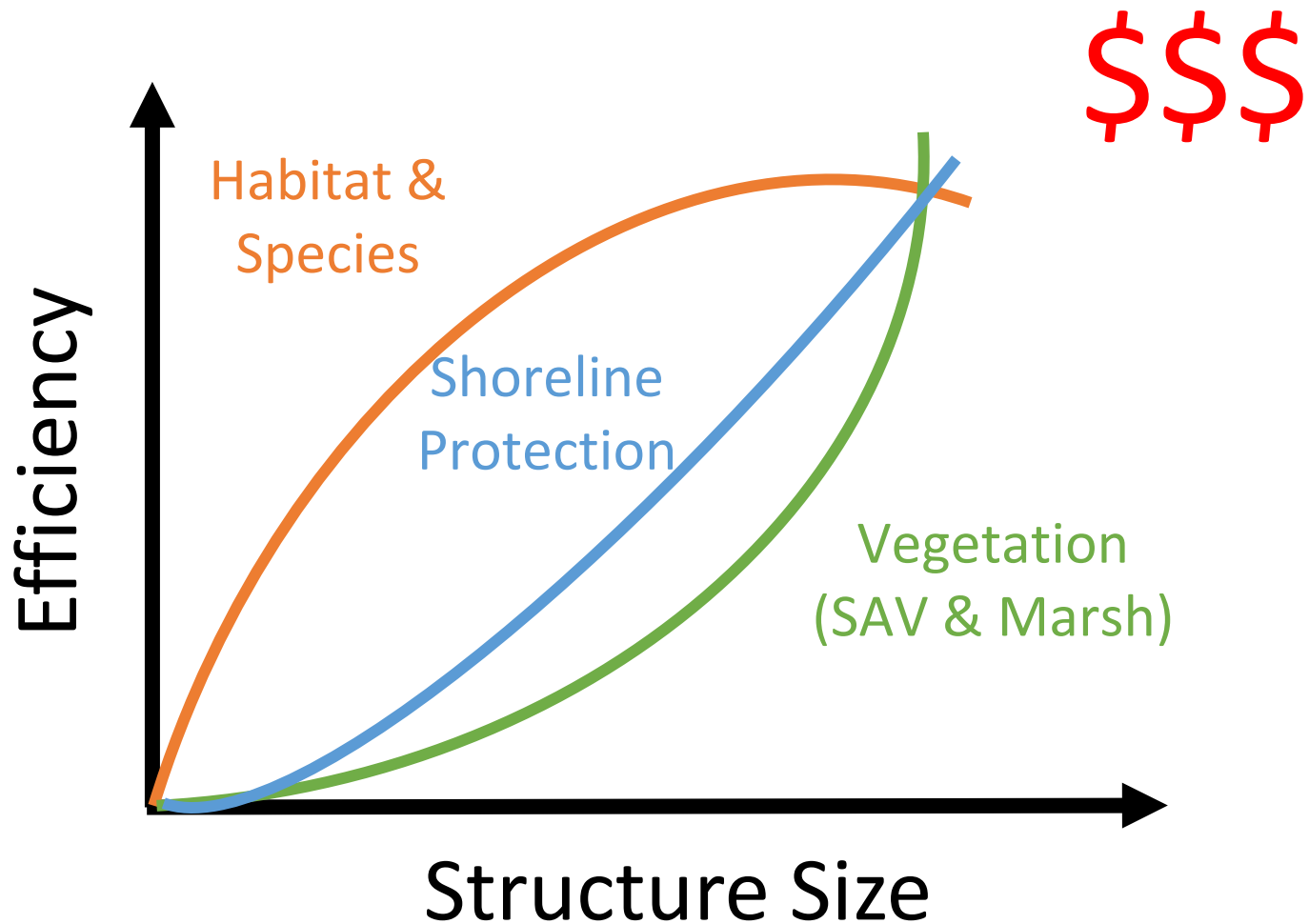
- ❖ Modeling
- ❖ Monitoring
- ❖ Research



# What and how much structure will you need?



# What are your restoration priorities?



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



Phase 1

Phase 2

# Phase 1 vs. Phase 2 (April 2016)

Phase 1



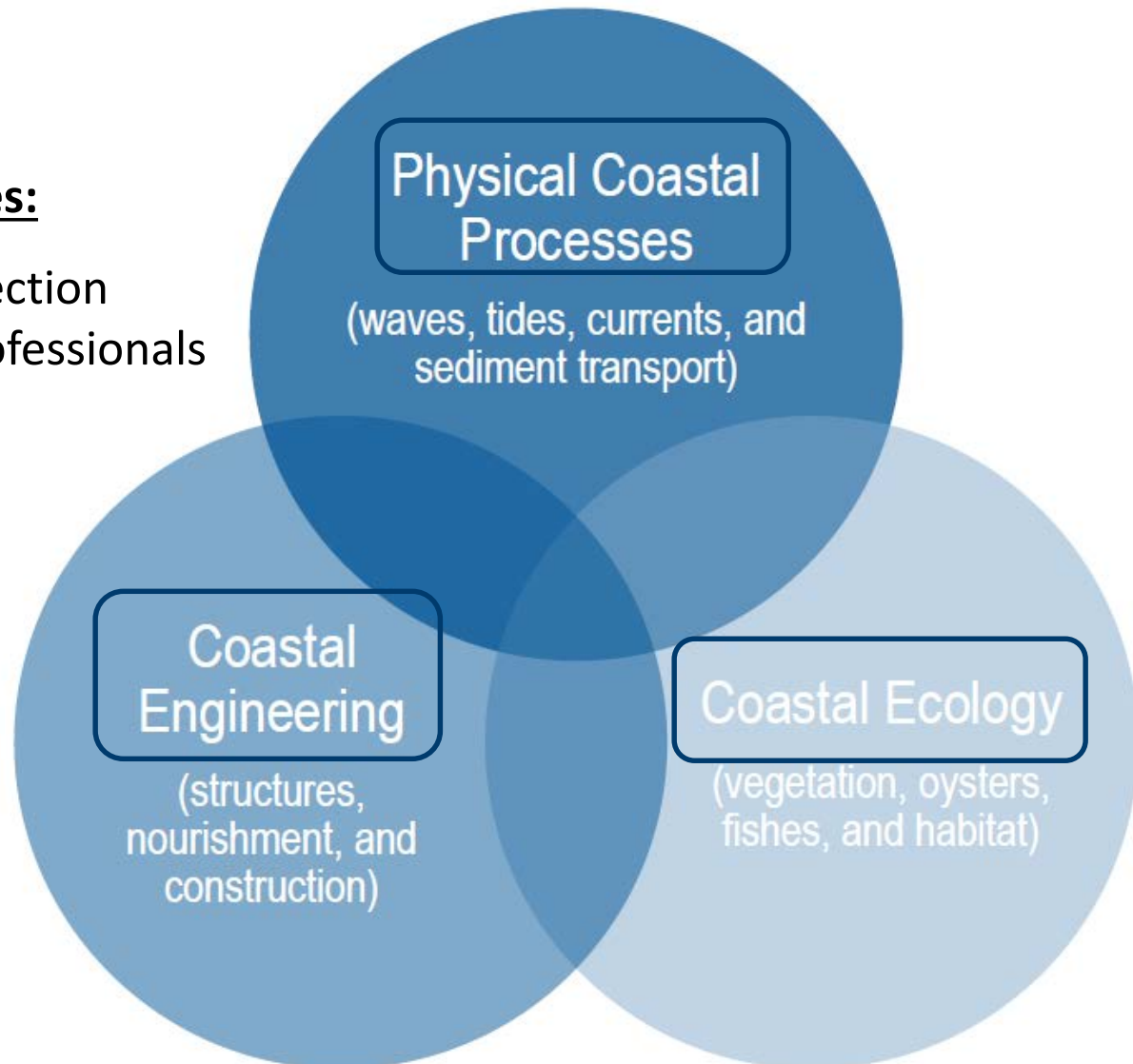
Phase 2



# How to accomplish your restoration priority?

## Must Haves:

Good Site Selection  
Knowledgeable Professionals



# Thank you!

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