

Mon Louis Island Living Shoreline Project

Coastal Engineering Services
provided for the



Mobile Bay
National Estuary Program
and
Mon Louis Island property owners

by

South Coast Engineers

PO Box 72

Fairhope, AL 36533

www.southcoastengineers.com



MBNEP Project Purpose and Objectives

Purpose

Promote the wise stewardship of the water quality and living resources of the near shore area along the western shore of Mobile Bay on Mon Louis Island

Objectives

1. Optimize sandy areas along approximately 670 feet of shoreline
2. Establish a low energy inshore area to restore emergent marsh vegetation
3. Install reef structure to expand quality oyster settlement opportunities



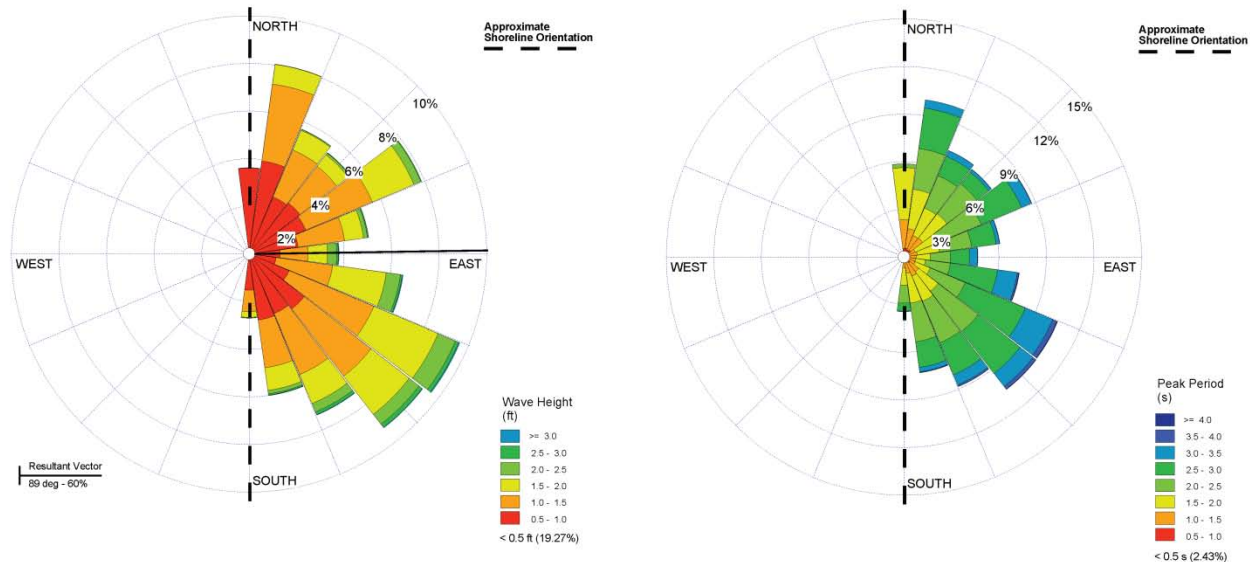
Coastal Processes



University of South Alabama
Department of Civil Engineering

Mon Louis Island Community
Base Restoration Meeting

Wave Climate - North



February 17, 2011

Bret M. Webb, PhD

Webb (2011)

South Coast Engineers

4-12-2012



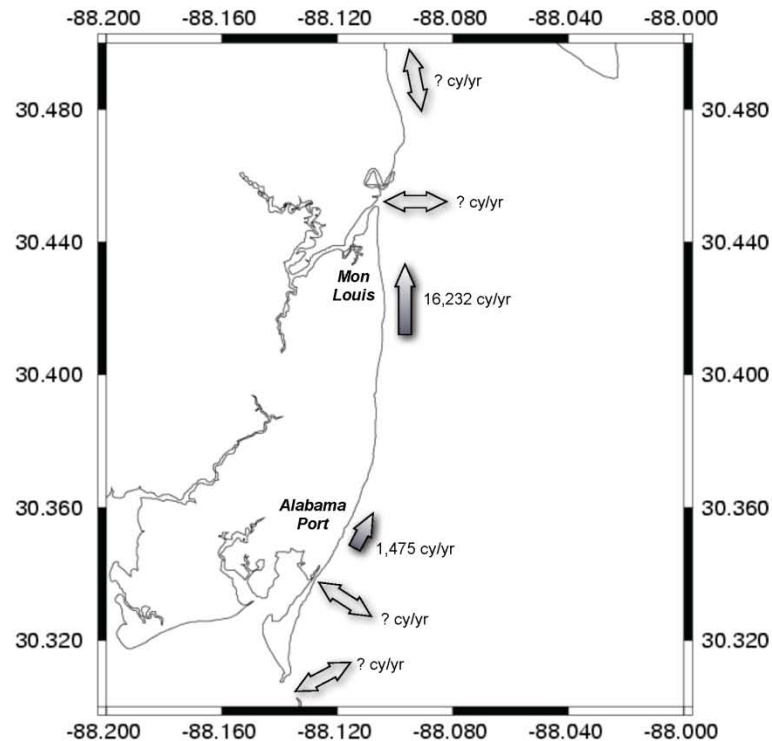
Coastal Processes



University of South Alabama
Department of Civil Engineering

Mon Louis Island Community
Base Restoration Meeting

Average Annual Sediment Transport Patterns



February 17, 2011

Bret M. Webb, PhD

Webb (2011)

South Coast Engineers

4-12-2012

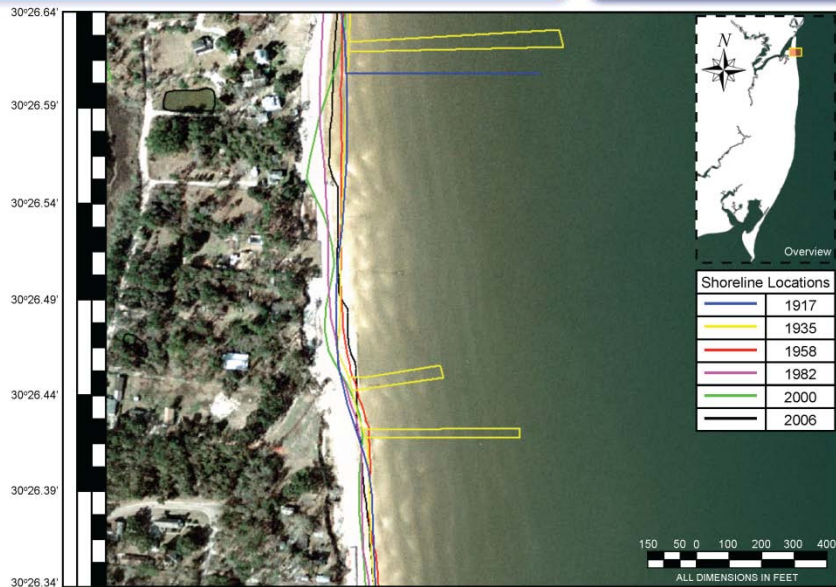
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Coastal Processes



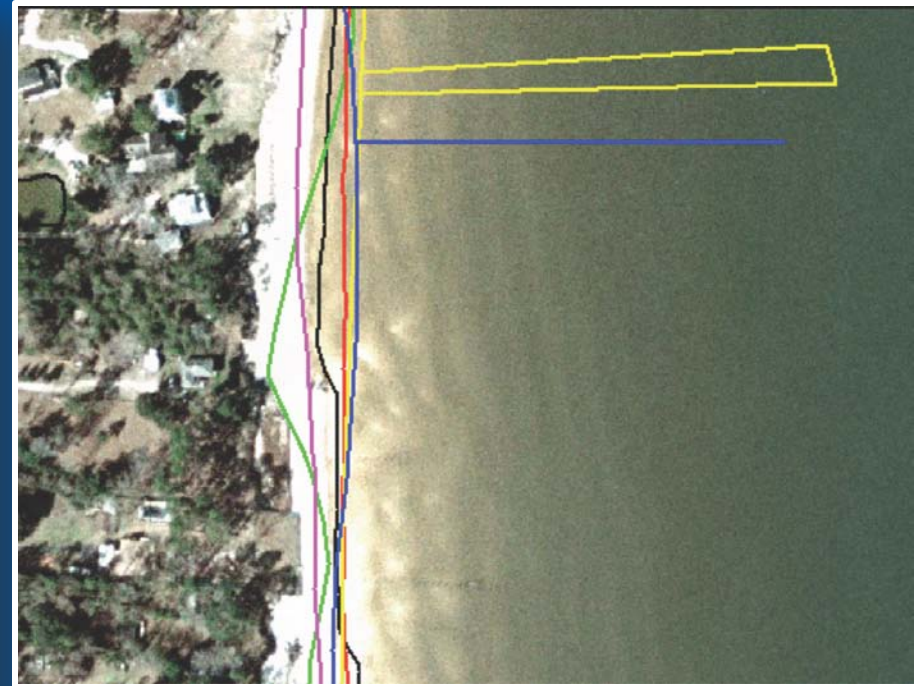
University of South Alabama
Department of Civil Engineering

Mon Louis Island Community
Base Restoration Meeting



February 17, 2011

Bret M. Webb, PhD



Webb (2011)

South Coast Engineers

4-12-2012



Field Investigation

Oyster Habitat



Met with
Marine Resources Division
to discuss oyster habitat creation

Nearshore sandy beach area



Preserve existing, sandy
nearshore flounder habitat



Field Investigation

Marsh Vegetation



Stout (1990)

“Suggestions for Planting and Maintaining
Wetlands in Coastal Alabama”
/Knutson et al.

Average Fetch

0 – 1000 m BEST

1000 – 9000 m ACCEPTABLE

Mon Louis Island

Average Fetch

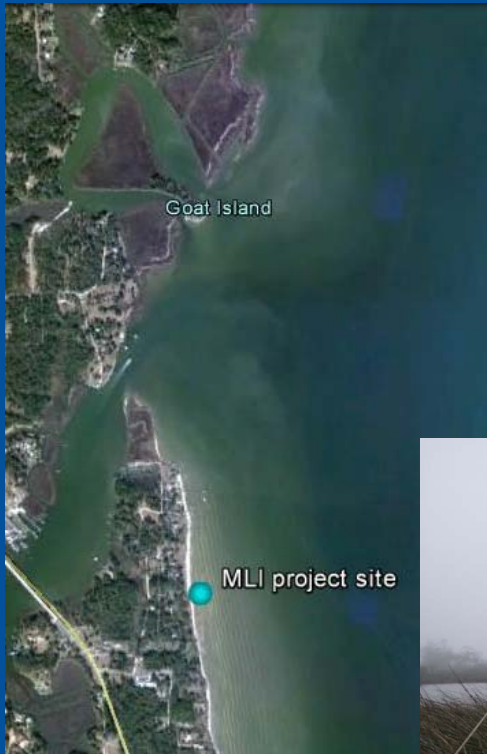
72,000 ft (22,000 m)

Longest Fetch

117,000 ft (36,000 m)

Field Investigation

Marsh Vegetation



We saw both *Spartina alterniflora* and *Juncus roemerianus* at elevations ranging from about -0.5 ft up to +1.5 ft, NAVD.

...just below MLLW to just above MHHW



Stout (1990)

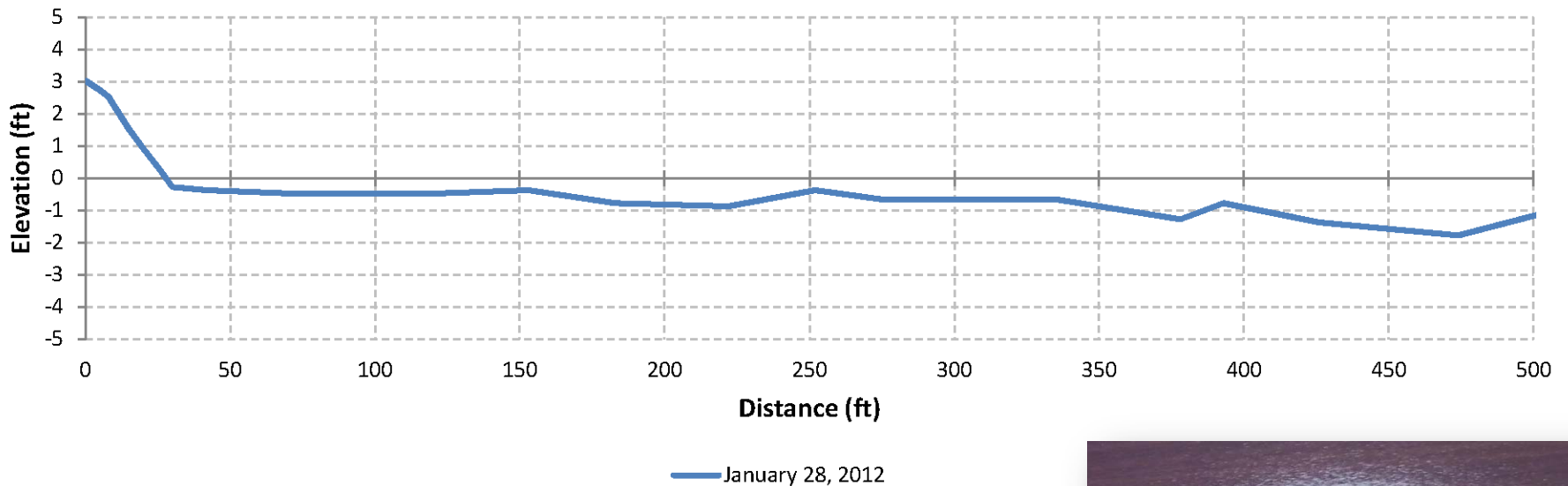
Spartina alterniflora – regularly flooded area of the marsh (MLW to MHW)

Juncus roemerianus - Irregularly inundated area of the marsh (MHW to high spring tide level)

Field Investigation

Beach Profile Elevations

Mon Louis Island Beach Profile



Sand Collection



South Coast Engineers



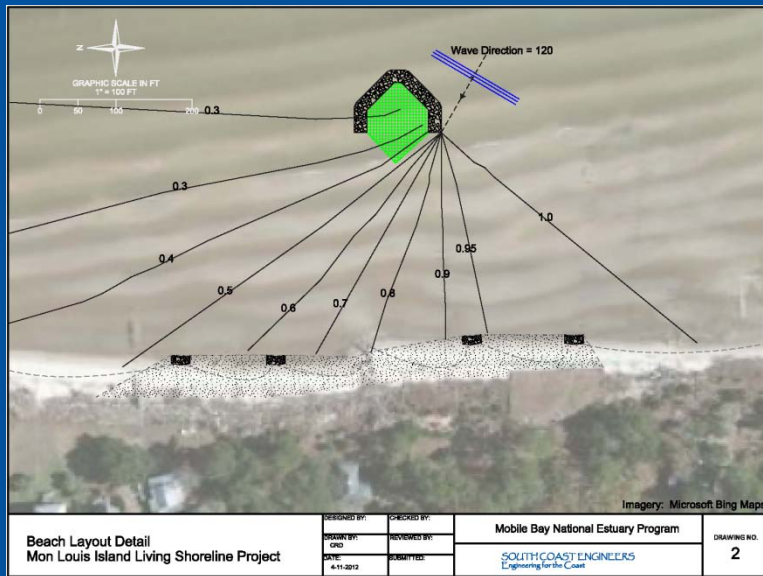
Specific Components of the Design

1. Sand beach nourishment with a nearshore, headland breakwater system for shoreline stabilization
2. An offshore island with a rock breakwater, sand fill and marsh plantings
3. Two submerged rock breakwaters in shallow water farther offshore for oysters

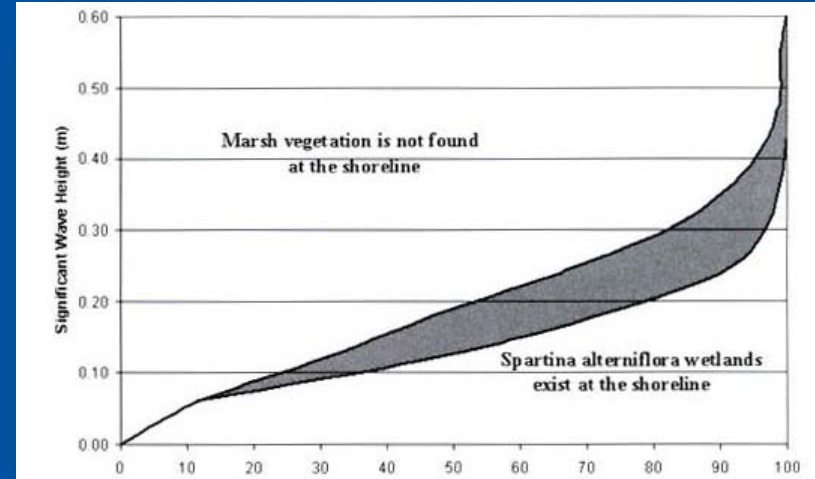


Engineering Tools

Wave Diffraction

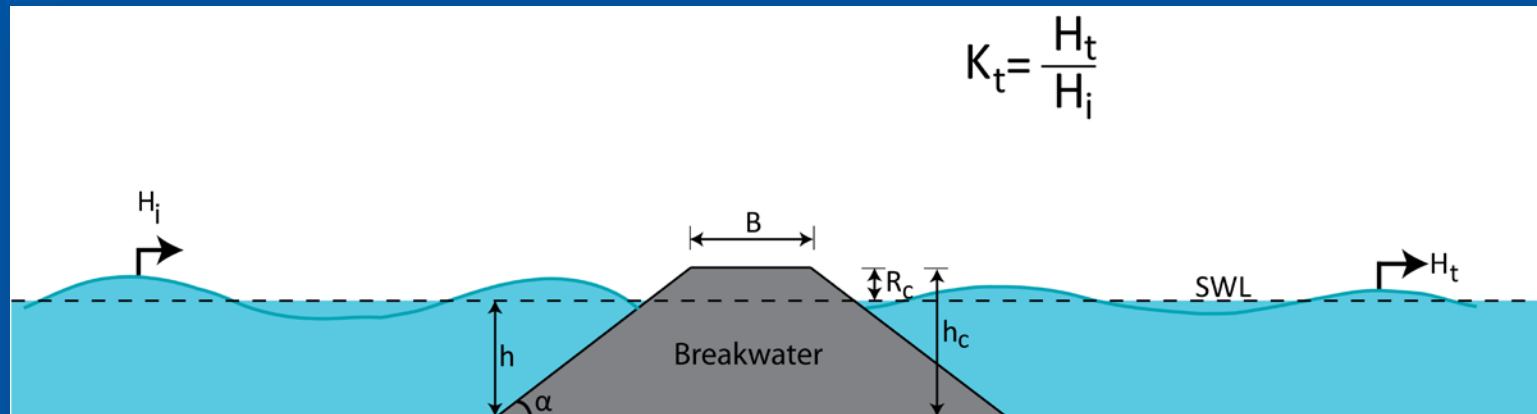


Wave Tolerance of *S. alterniflora*

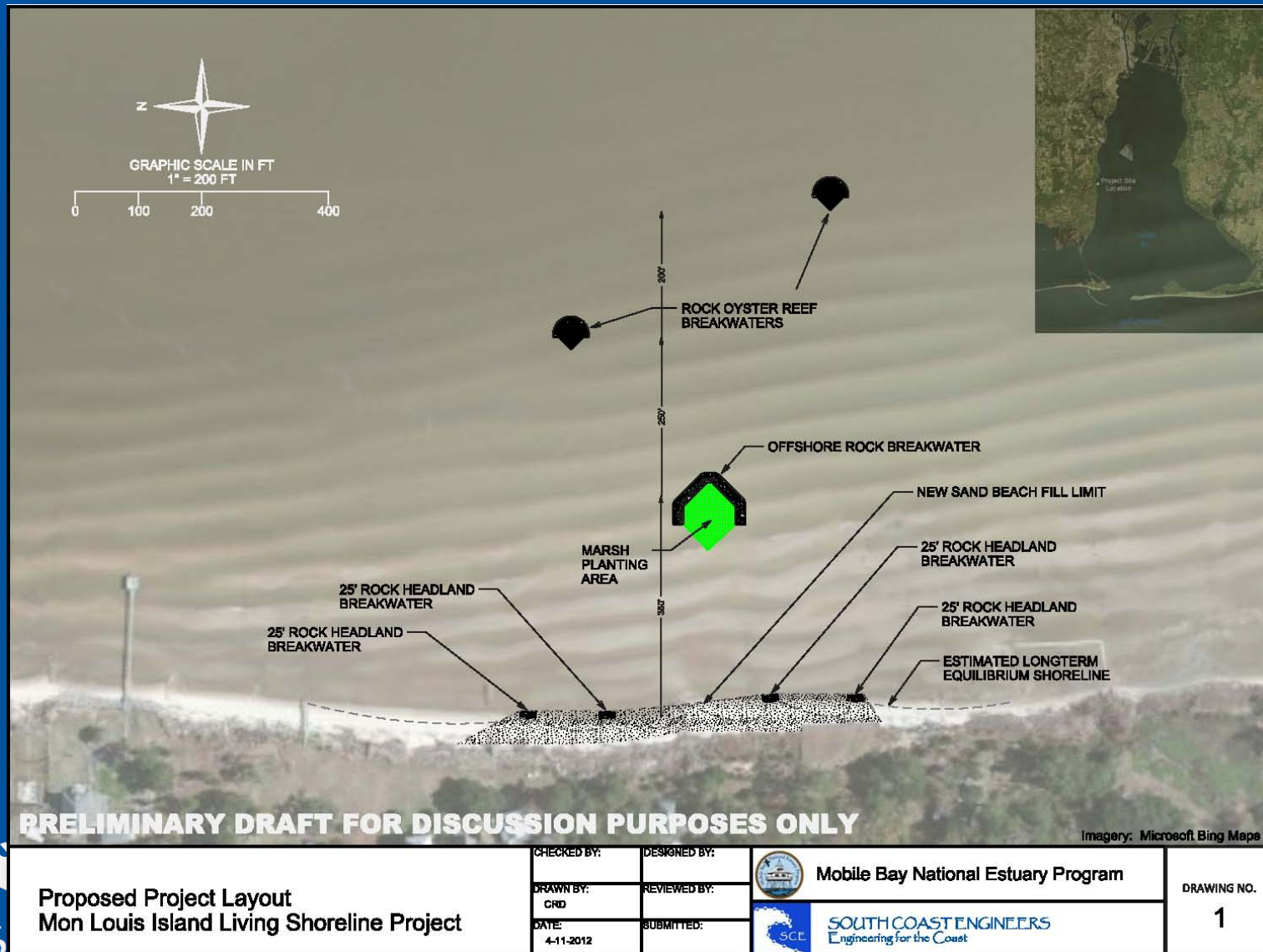


Wave Transmission

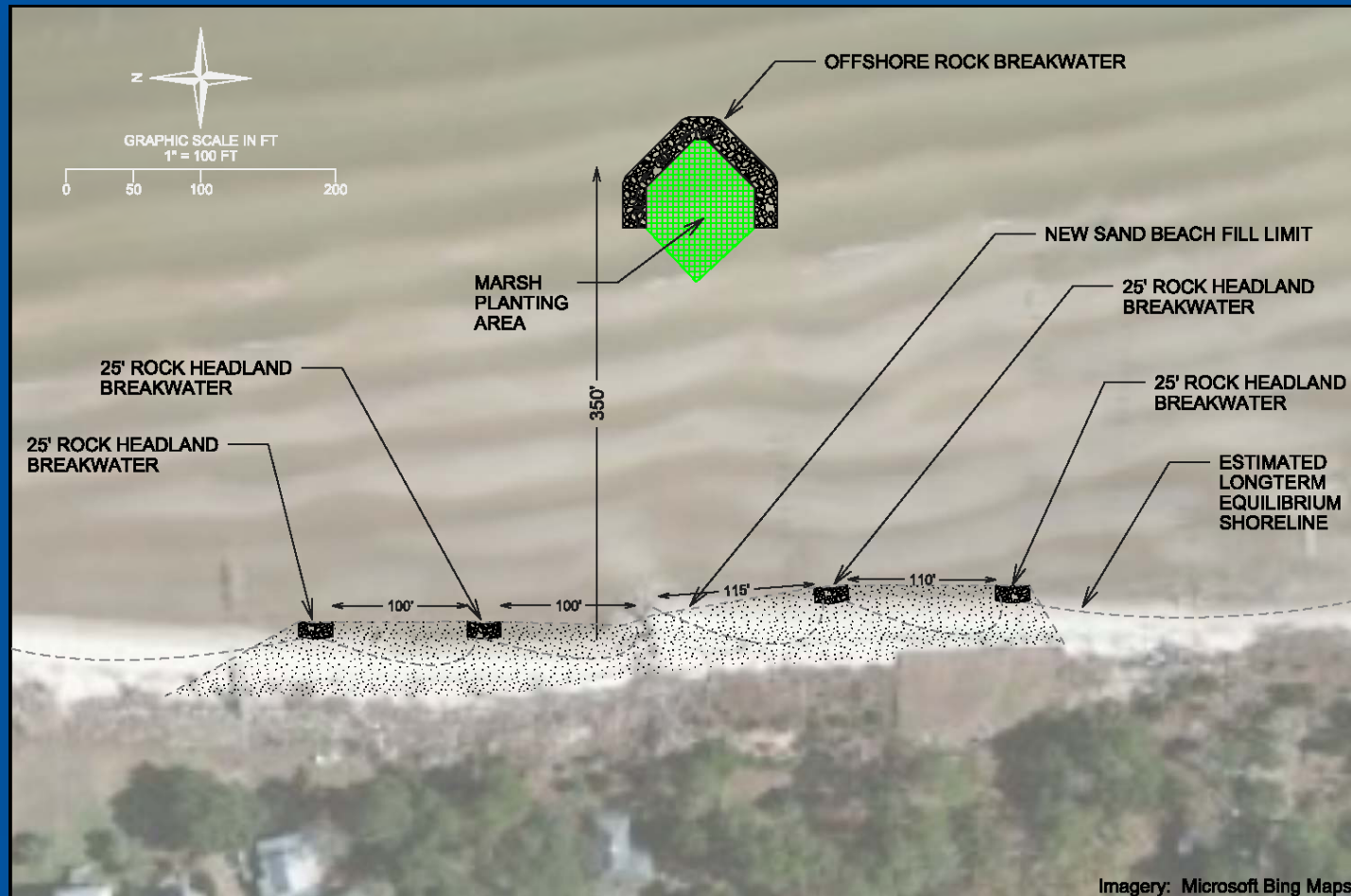
$$K_t = \frac{H_t}{H_i}$$



Project Layout



Sand beach nourishment with a nearshore, headland breakwater system for shoreline stabilization



Beach Layout Detail
Mon Louis Island Living Shoreline Project

DESIGNED BY:
DRAWN BY: CRD
DATE: 4-11-2012

CHECKED BY:
REVIEWED BY:
SUBMITTED:



Mobile Bay National Estuary Program



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DRAWING NO.

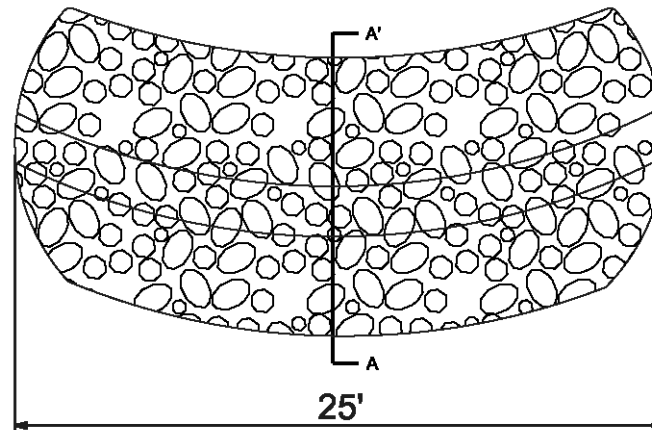
2



Sand beach nourishment with a nearshore, headland breakwater system for shoreline stabilization

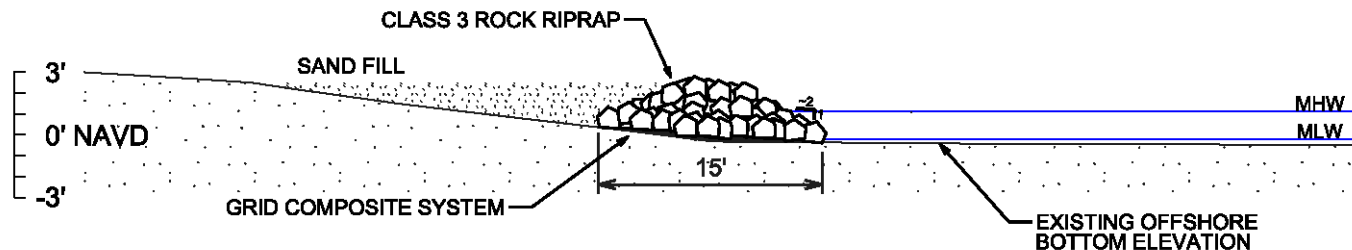
PLANVIEW

PRELIMINARY DRAFT FOR DISCUSSION PURPOSES ONLY



TYPICAL CROSS-SECTION

A - A'



Rock Headland Breakwater Detail [25' Long]
Mon Louis Island Living Shoreline Project

DESIGNED BY:	CHECKED BY:
DRAWN BY: CRD	REVIEWED BY:
DATE: 4-11-2012	SUBMITTED:



Mobile Bay National Estuary Program



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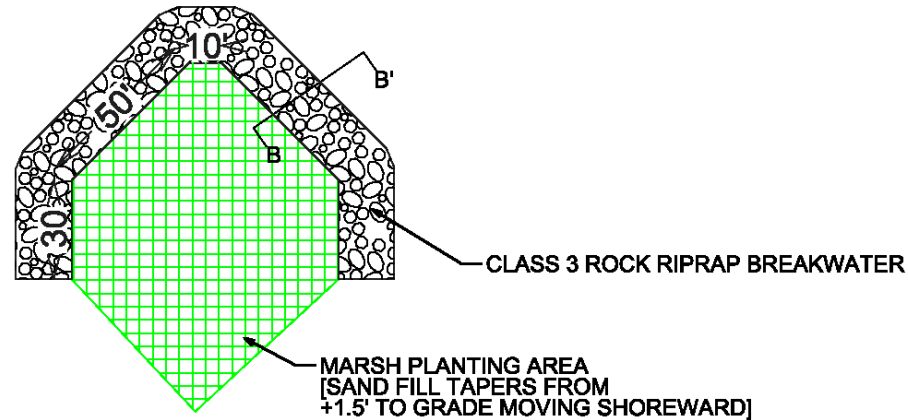
DRAWING NO.

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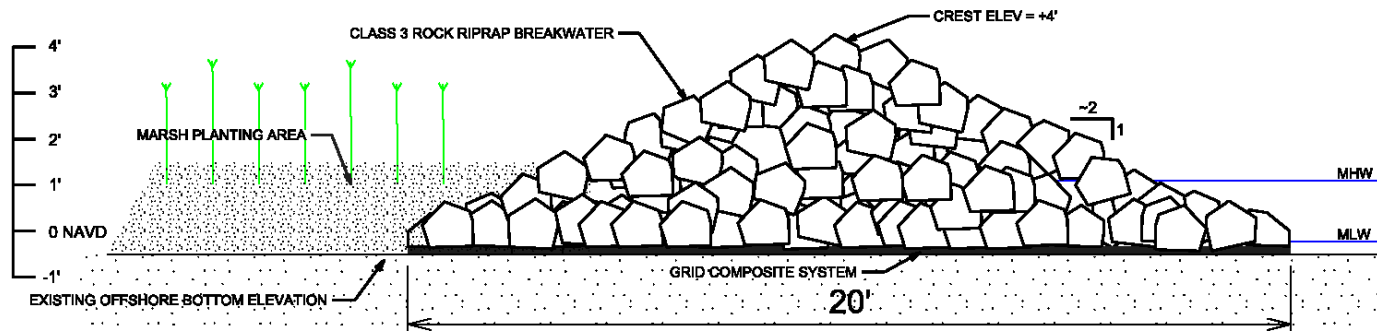
An offshore island with a rock breakwater, sand fill and marsh plantings

PLAN VIEW



TYPICAL CROSS-SECTION

B - B'



Marsh Island Detail
Mon Louis Island Living Shoreline Project

DESIGNED BY:	CHECKED BY:
DRAWN BY: CRD/TJB	REVIEWED BY:
DATE: 4-11-2012	SUBMITTED:

Mobile Bay National Estuary Program

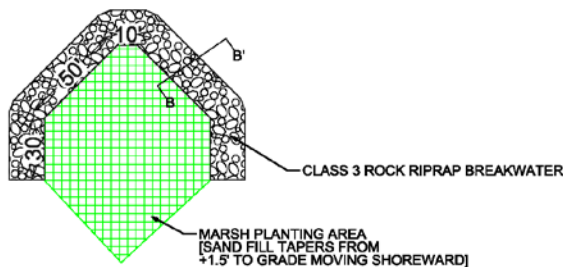
 **SOUTH COAST ENGINEERS**
Engineering for the Coast

DRAWING NO.

5

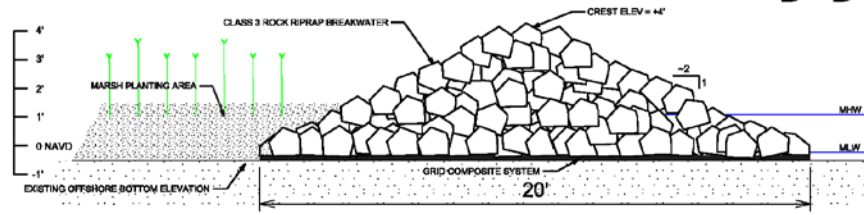
An offshore island with a rock breakwater, sand fill and marsh plantings

PLAN VIEW



TYPICAL CROSS-SECTION

B - B'



Marsh Island Detail
Mon Louis Island Living Shoreline Project

DESIGNED BY:
CHECKED BY:
DRAWN BY:
DATE:
4-11-2012

REVIEWED BY:
REVISIONS:

Mobile Bay National Estuary Program

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Engineering for the Coast

DRAWING NO.
5

We decided that sand should be added to the back of the main offshore breakwater, where we are creating a “marsh island,” to raise the elevation to the upper end of the range we observed at Goat Island, or about +1.0 ft, NAVD.

We suggest having some higher and lower spots in elevation on the design plans, which could be constructed by volunteers.

We also suggest planting both *Spartina alterniflora* and *Juncus roemerianus*.



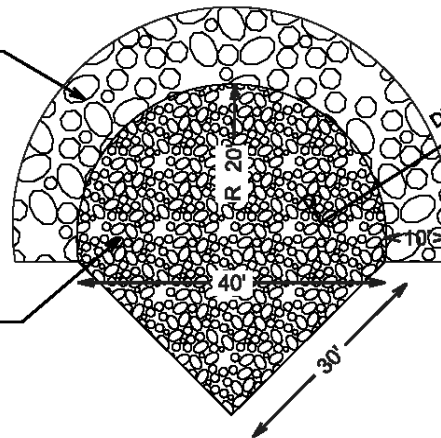
Two submerged rock breakwaters in shallow water farther offshore for oysters

PLANVIEW

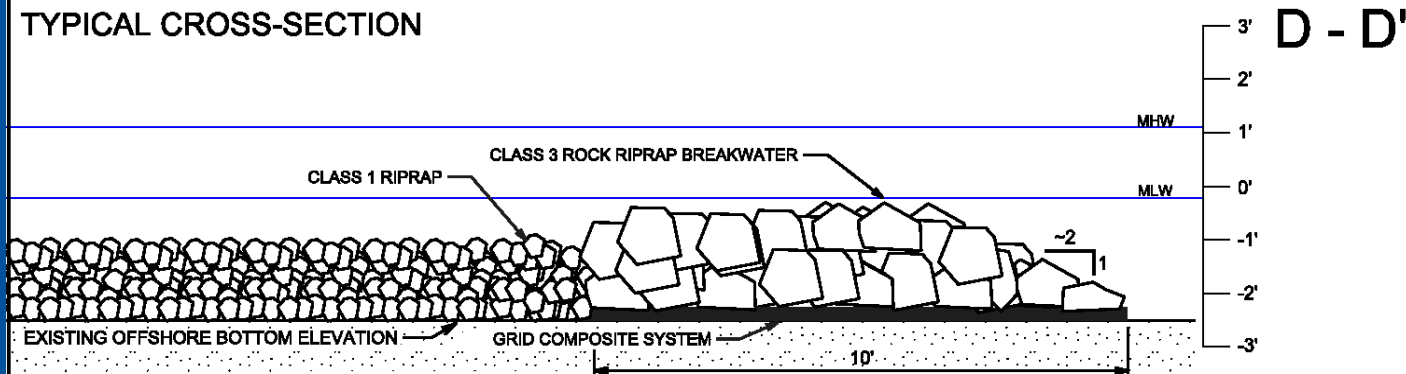
PRELIMINARY DRAFT FOR DISCUSSION PURPOSES ONLY

CLASS 3 RIPRAP BREAKWATER

CLASS 1 RIPRAP REEF



TYPICAL CROSS-SECTION



Rock Oyster Reef Breakwater Detail
600 ft Offshore
Mon Louis Island Living Shoreline Project

DESIGNED BY:
DRAWN BY:
DATE:
4-11-2012

CHECKED BY:
REVIEWED BY:
SUBMITTER



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Engineering for the Coast

DRAWING NO.

6

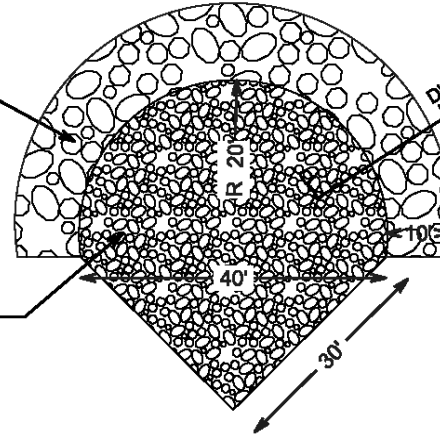
Two submerged rock breakwaters in shallow water farther offshore for oysters

PLANVIEW

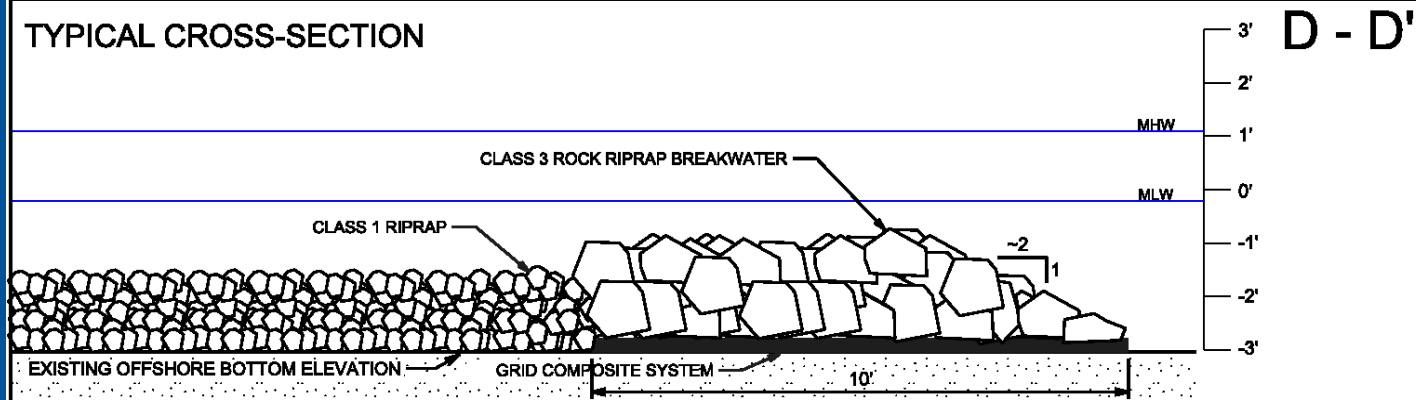
PRELIMINARY DRAFT FOR DISCUSSION PURPOSES ONLY

CLASS 3 RIPRAP BREAKWATER

CLASS 1 RIPRAP REEF



TYPICAL CROSS-SECTION



Rock Oyster Reef Breakwater Detail
800 ft Offshore
Mon Louis Island Living Shoreline Project

DESIGNED BY:
DRAWN BY: CRD
DATE: 2-25-2012

CHECKED BY:
REVIEWED BY:
SUBMITTED:



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Engineering for the Coast

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