

# Integrating Landscape Architecture and Engineering Concepts to Foster Nature-Based Solutions

Presented by  
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Anchor QEA

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# Overview

- Introduction
- Engineering With Nature context
- Proving Ground collaboration
- Project examples
- Why does this matter?



# Project Collaborators



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Coastal Eng./Modeling Lead

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Editorial Project Manager

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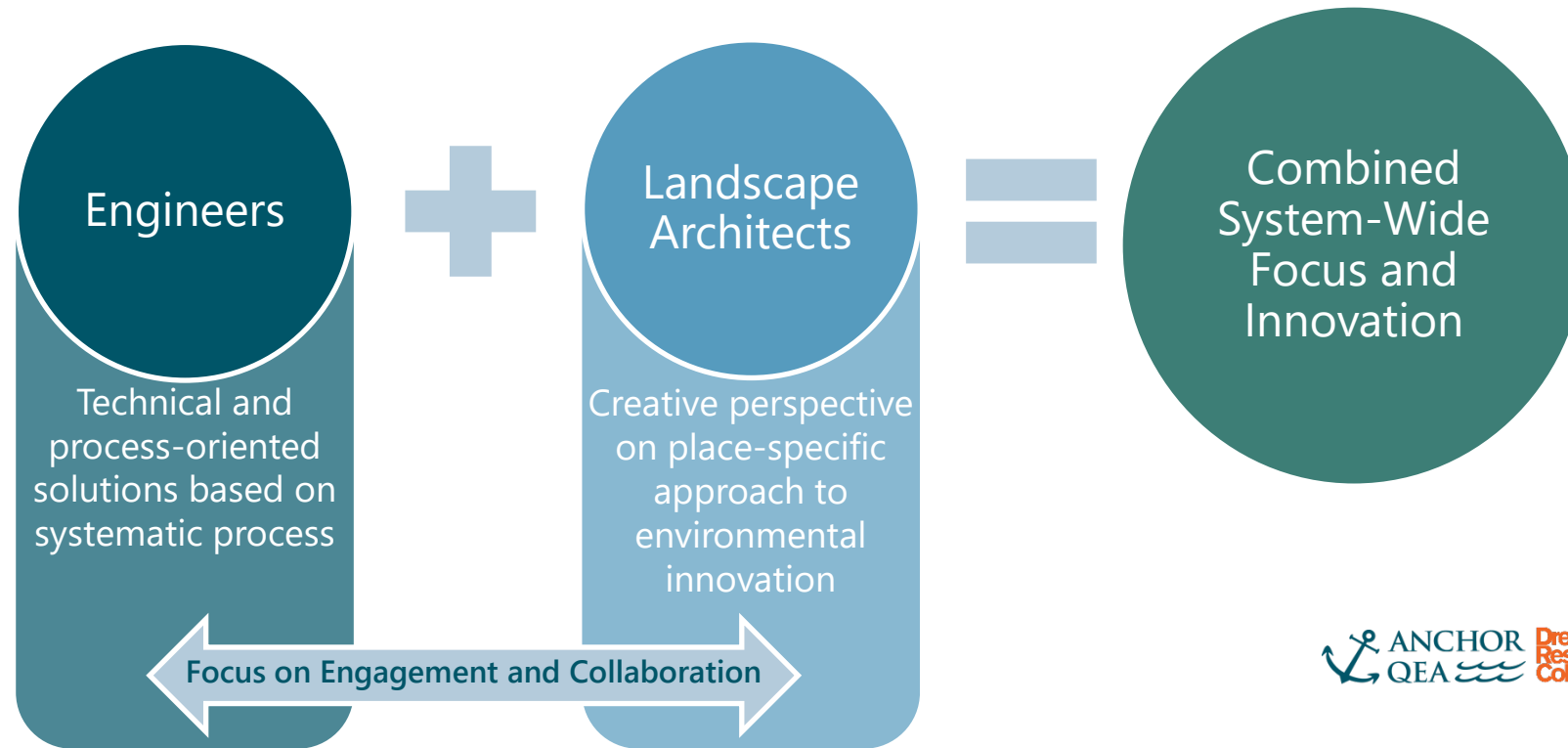
University of Pennsylvania

**Theresa Ruswick**

University of Pennsylvania/  
ORISE Fellow

# Combined Disciplines for System-Wide Focus

- Collaboration allows for unique solutions through an iterative process of concept development, technical assessment, and refinement
- **Engineers:** Precise and analytical approach based on values that can be quantified
- **Landscape Architects:** Synthetic approach that considers cultural values alongside environmental characteristics





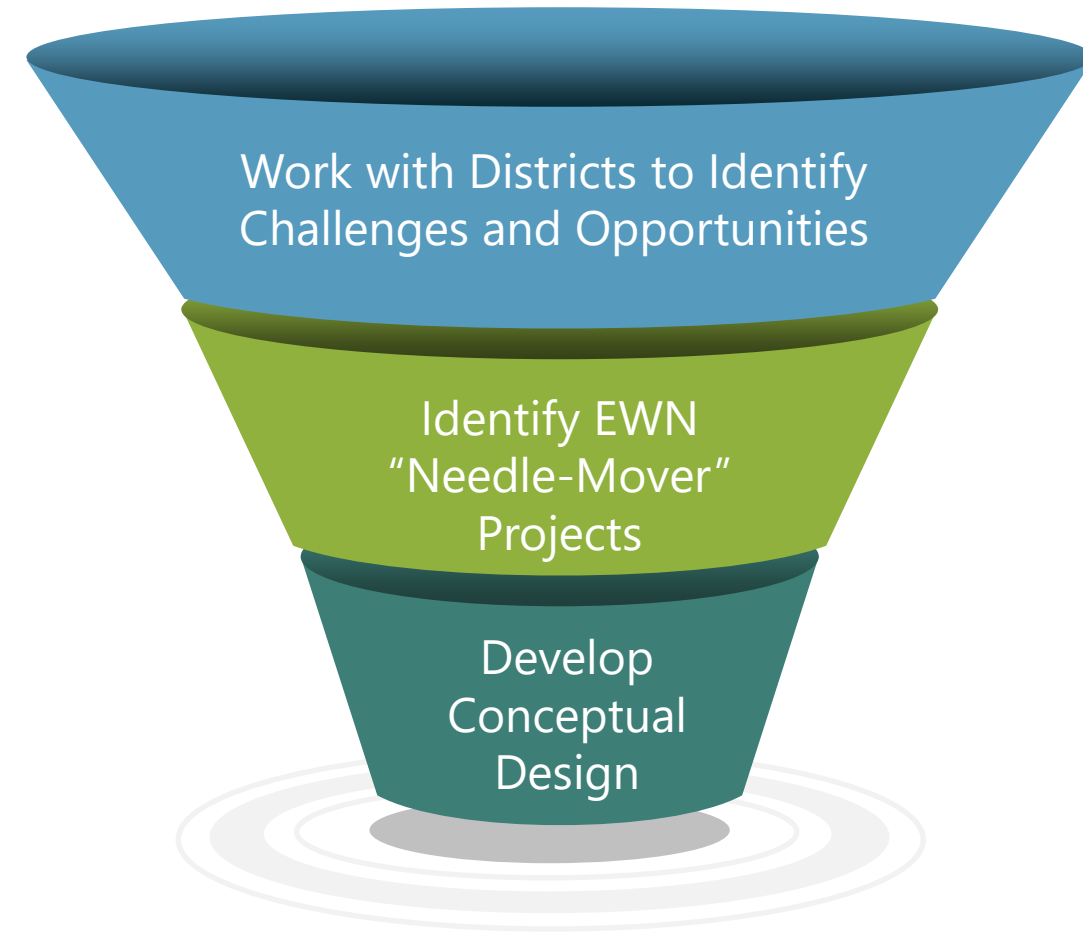


# EWN Proving Ground Collaboration

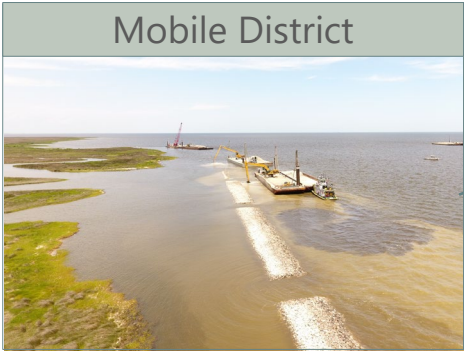
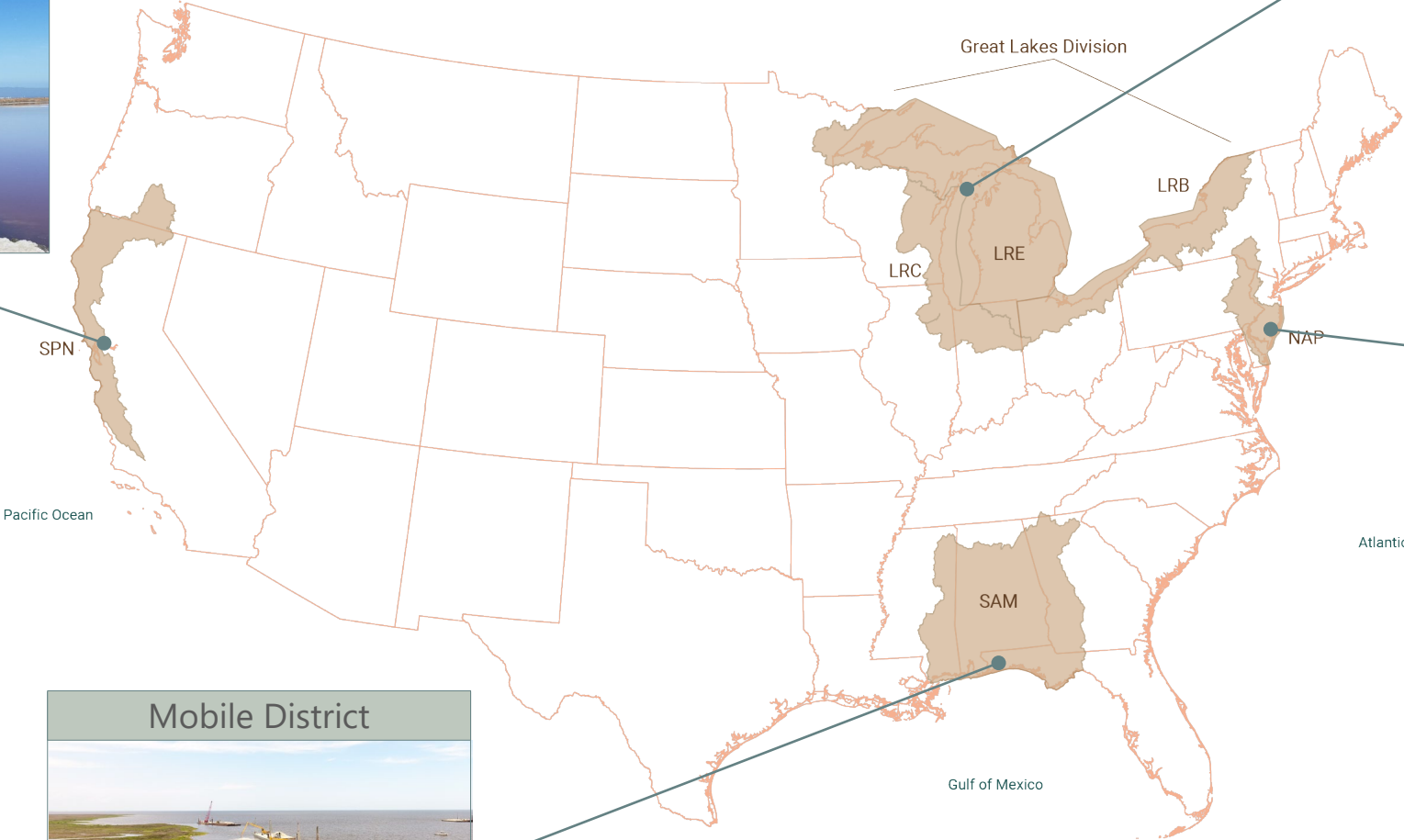


# EWN Proving Grounds: Work Strategy

- Goal is to promote selection and appropriation of large-scale, regional EWN projects for actual construction
- Collaboration between engineers, landscape architects, districts, and local stakeholders
- Concept development and illustration for USACE leadership (e.g., Headquarters) and congressional briefing
- Meant for use by Districts to incorporate EWN ideas into existing or planned projects
- Two Deliverable Packages
  - Handbook of National Project Ideas
  - Specific District Report with Projects



# EWN Handbook: Proving Grounds





# *Concept Development Process*



**Site Visits**



**Early Collaboration**



**Workshops**

## Collaborative Effort

- Districts
- Engineers
- Landscape Architects
- Local stakeholders

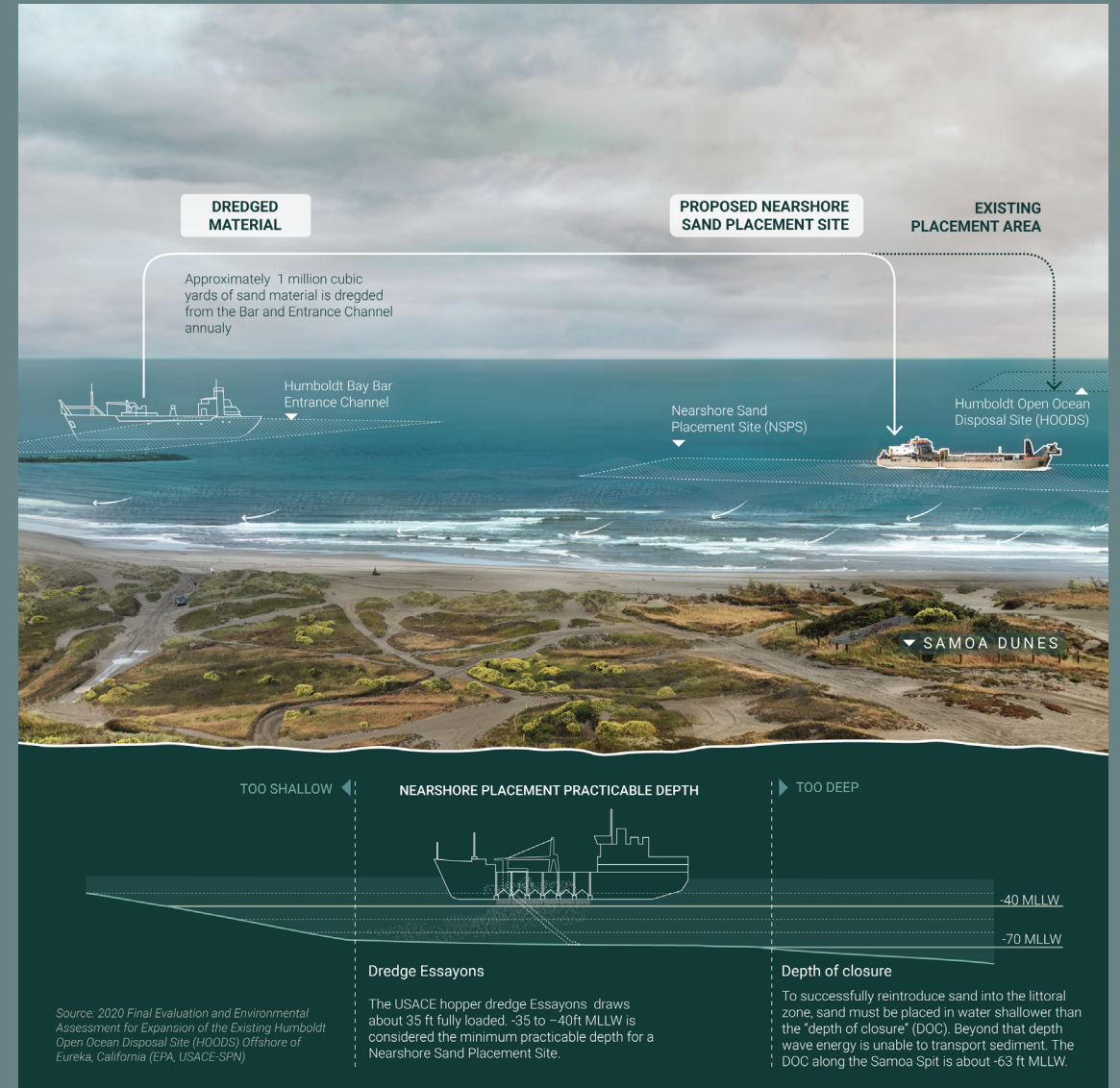
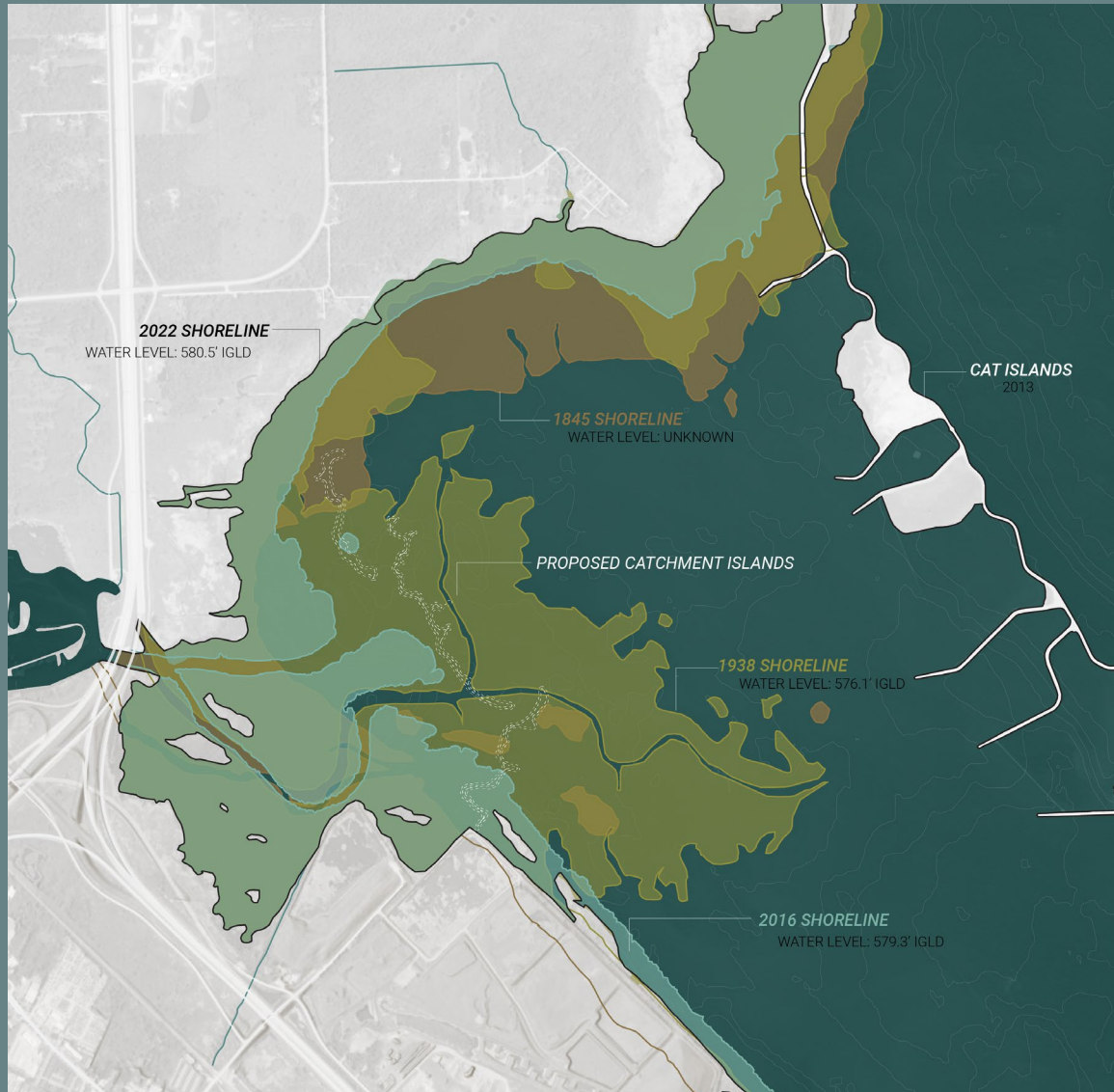
## Process

- Data collection/site visits
- Concept development workshops
- Concept development
- Preliminary modeling as proof of concept
- Iterative refinement



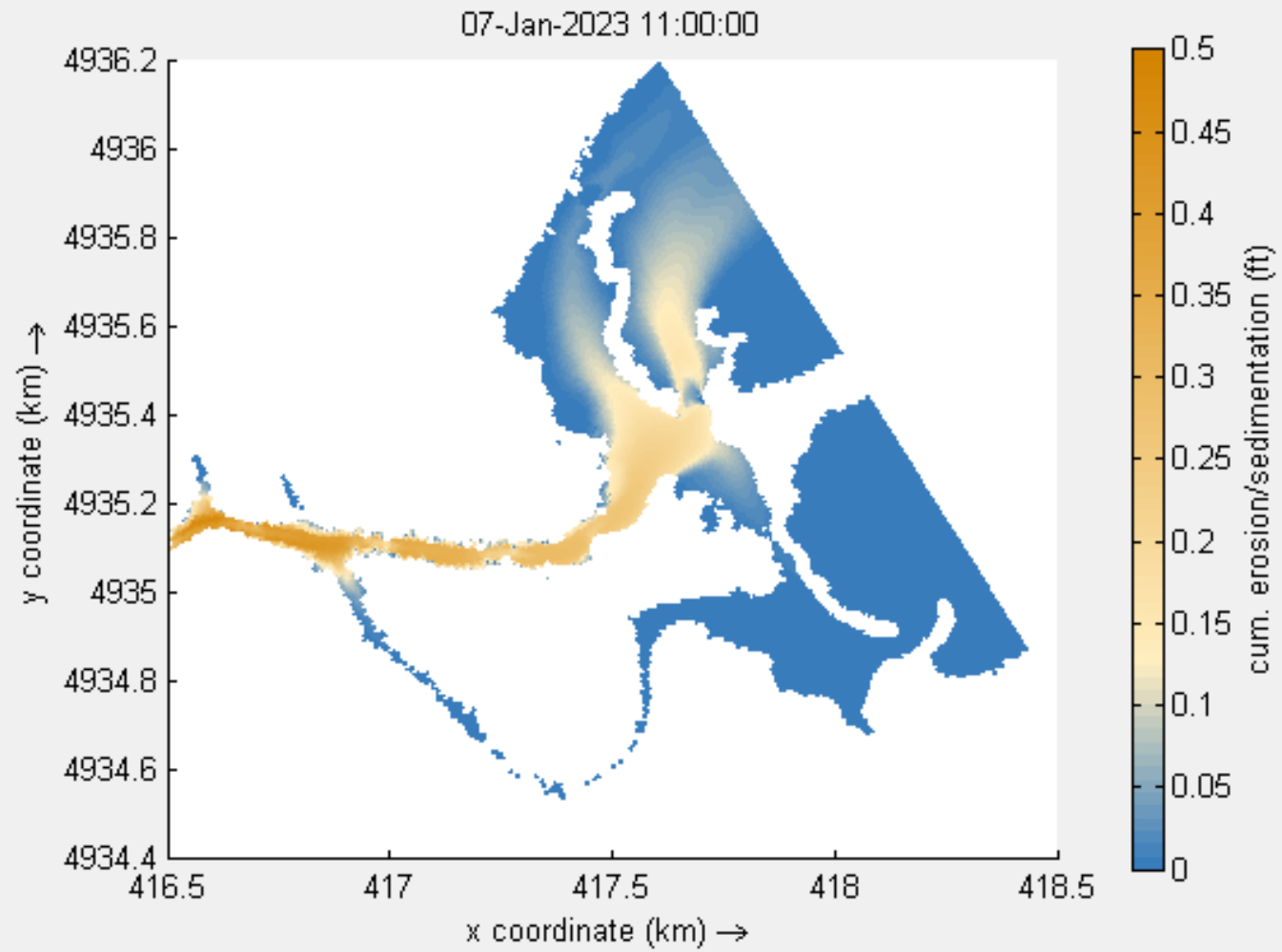


# Concept Visualization

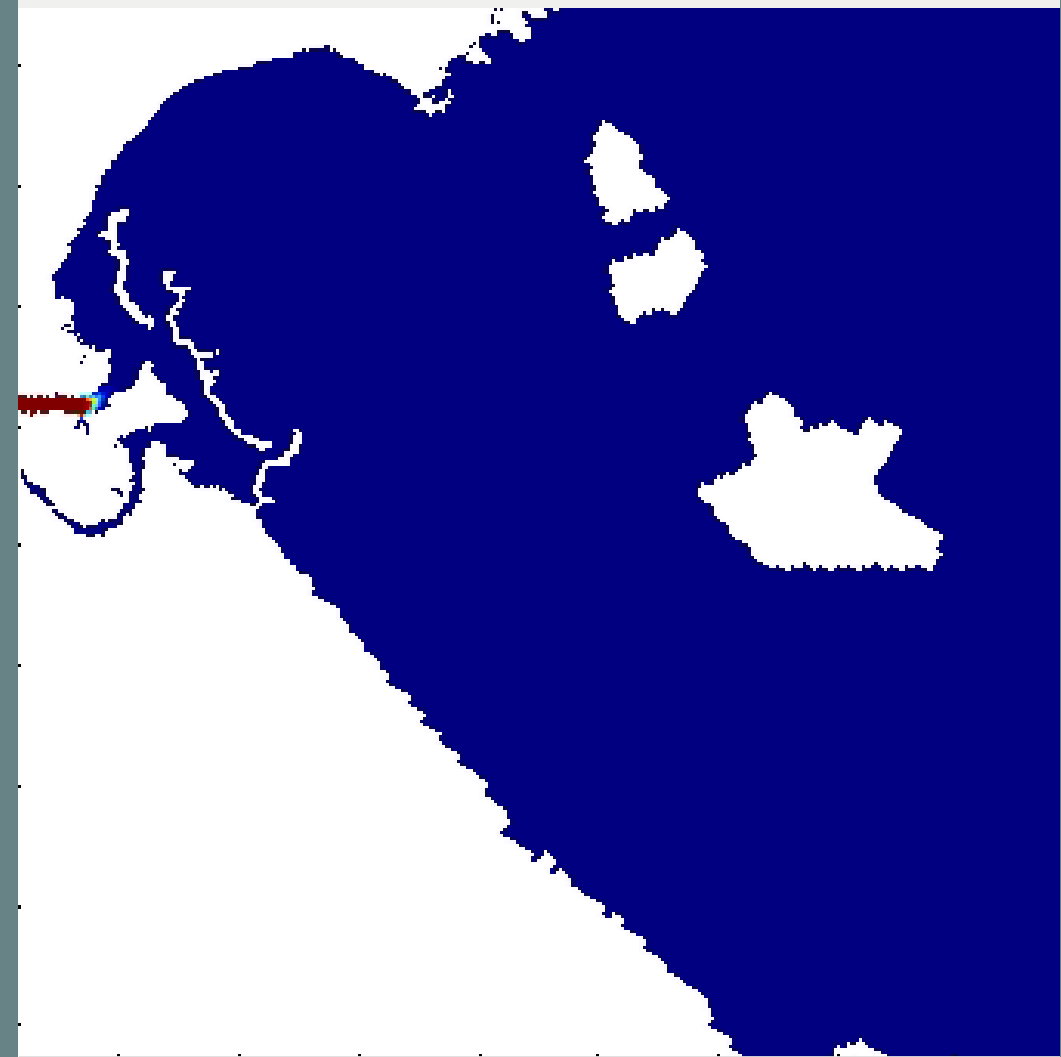


Source: EWN Proving Ground – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)

# *Proof-of-Concept Modeling*



**Sediment Deposition Modeling**



**Hydrodynamic Modeling**



# EWN Proving Grounds

Project Examples



# New Jersey Back Bays

- Storm surge mitigation
- Habitat restoration
- BUDM
- Little Egg Inlet not included for structural solutions outline in the NJBB CSRM Study



# New Jersey Back Bays: Non-Structural Concepts



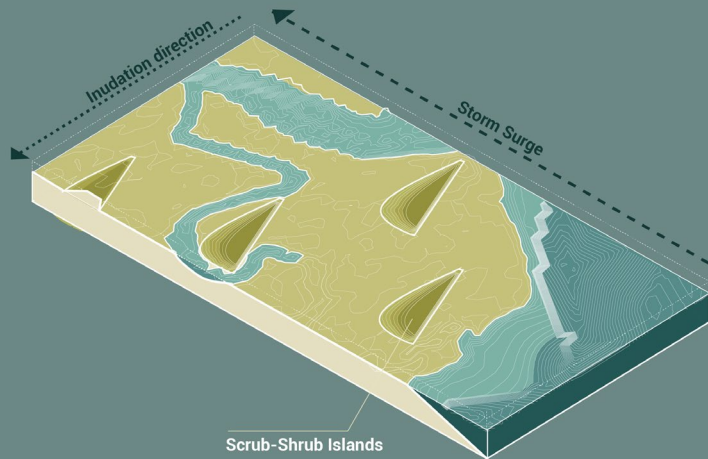
Source: EWN Proving Ground, Philadelphia District – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)



# New Jersey Back Bays: Non-Structural Concepts (Cont.)

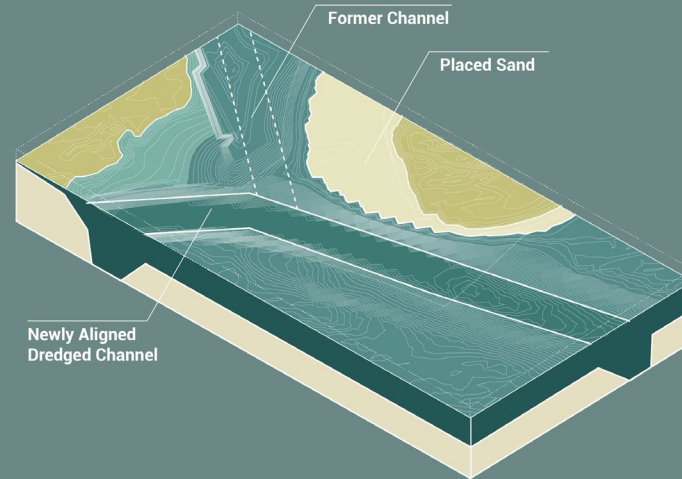
## WETLAND SLOPES

Create upland scrub-shrub islands throughout Holgate Peninsula, perpendicular to storm surge.



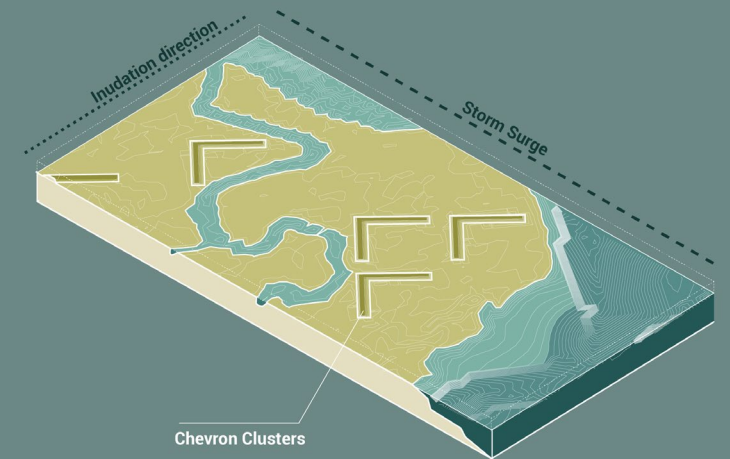
## CHANNEL RE-ORIENTATION

Encourage storm surge and movement through the center of the bay instead of the highly developed barrier bar. Re-orient the inlet channel towards the south of Holgate Peninsula. Lengthen the end of Long Beach Island.



## CHEVRON

Chevrons are designed to both capture sediment and reduce storm surge. The angle of the centerline of the chevron is perpendicular to the predominant storm surge angle. Chevrons are grouped in triangle clusters, which are offset from one another.

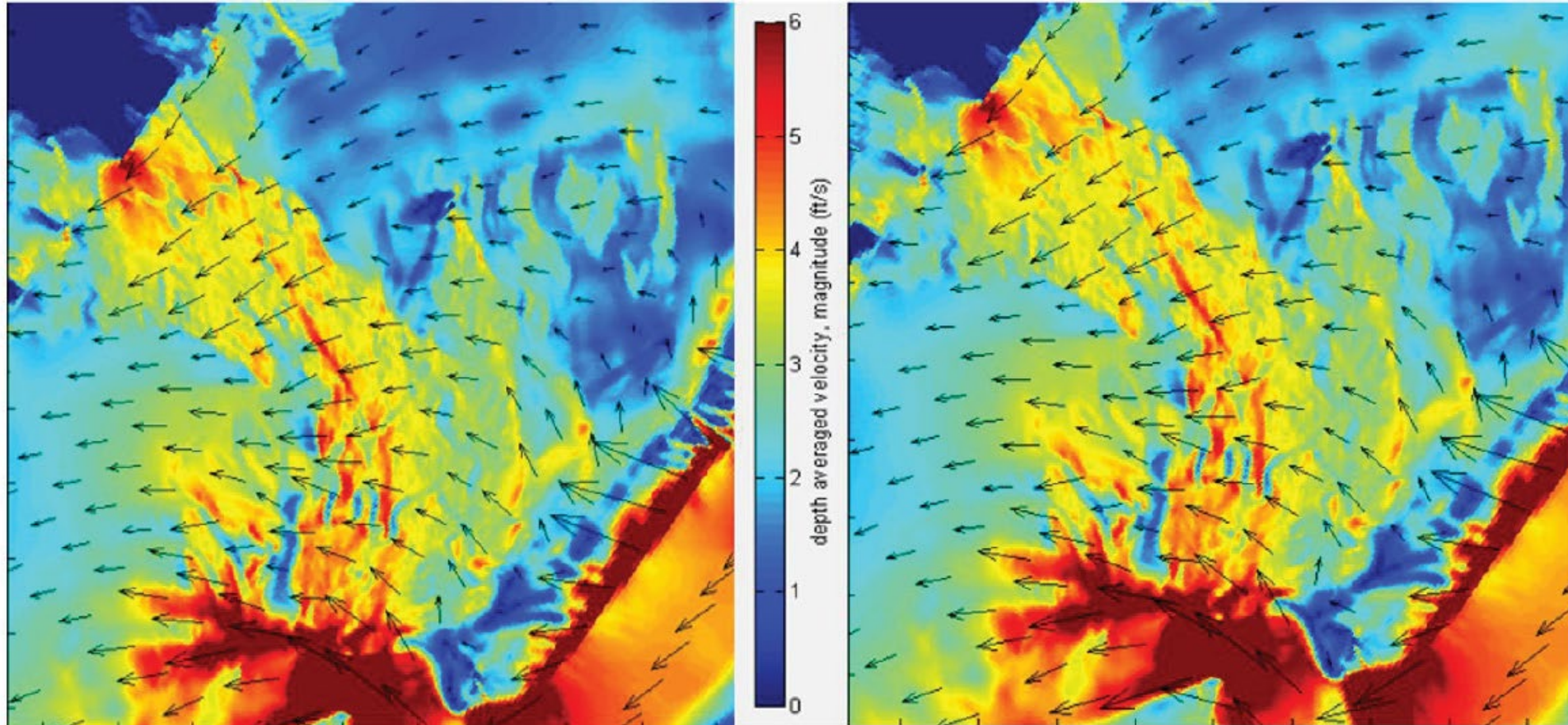


Source: EWN Proving Ground, Philadelphia District – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)

# Modeling: Sometimes Drives a Change in Plan

Existing Conditions:  
Without NNBF

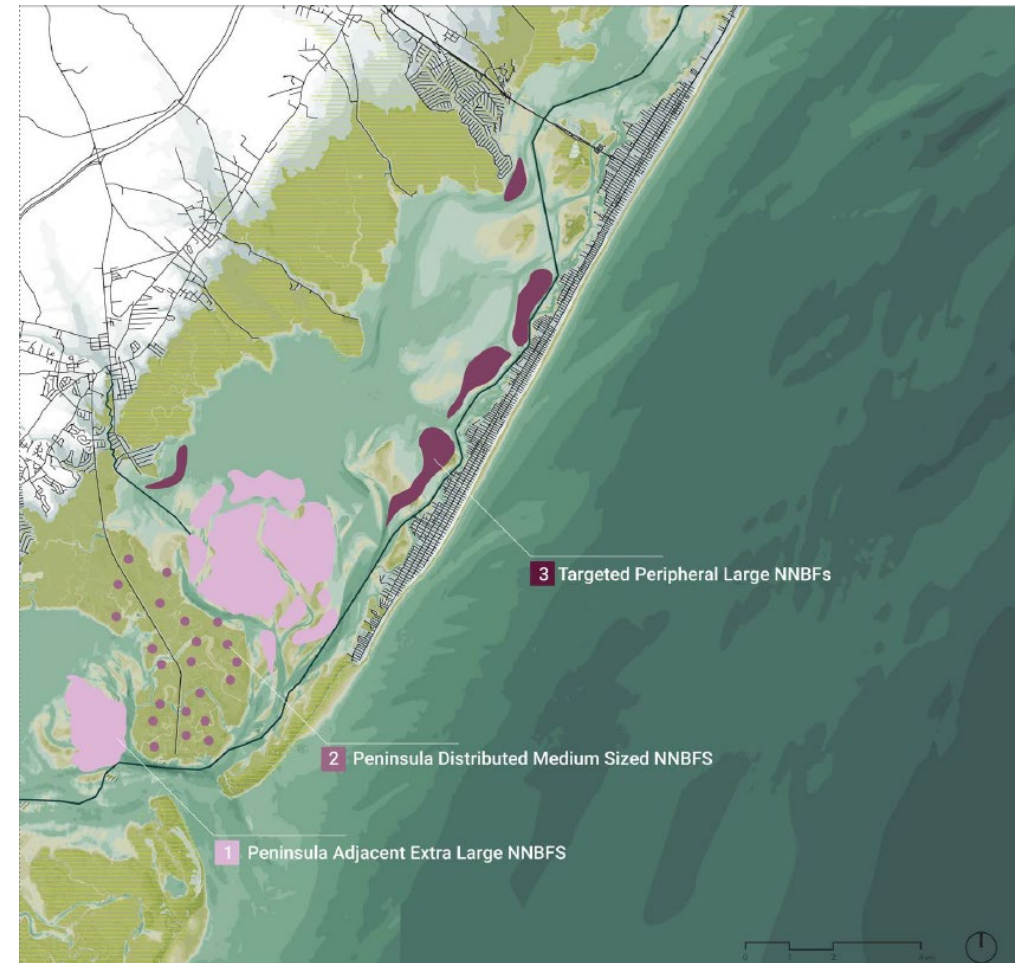
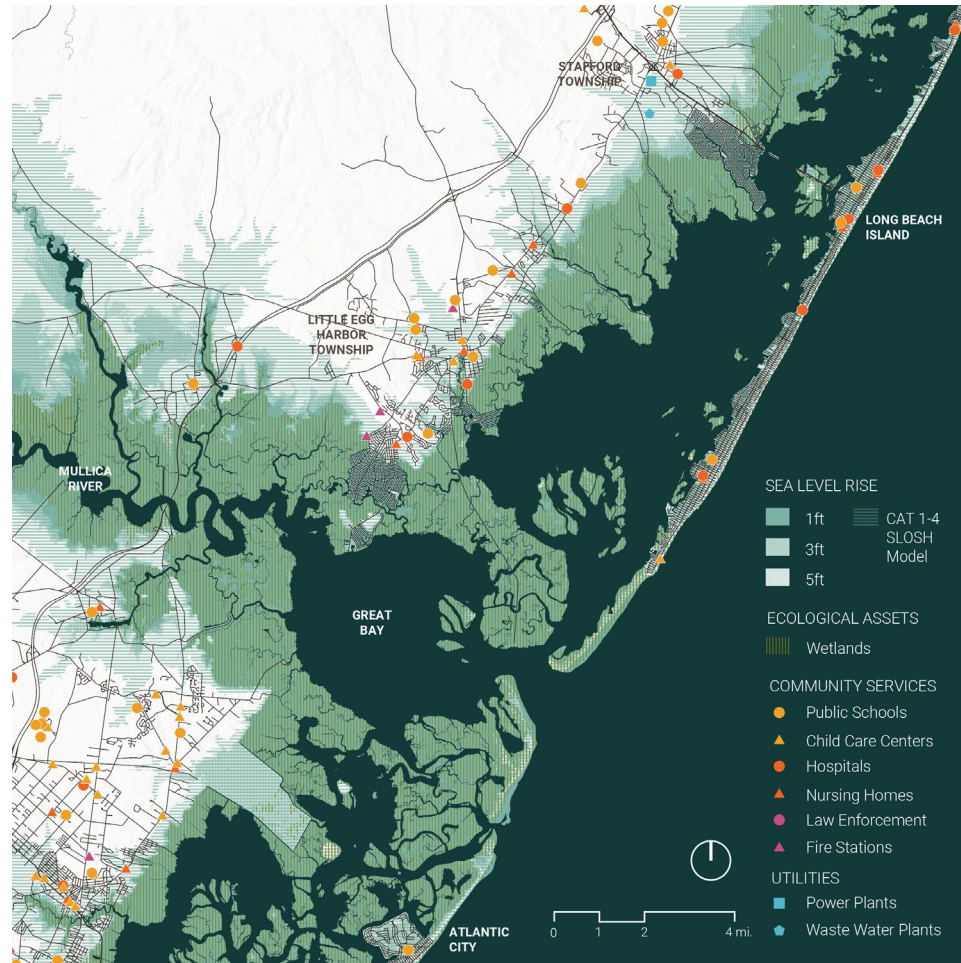
Proposed Conditions:  
Channel Reorientation Design



Source: EWN Proving Ground, Mobile District – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)



# New Jersey Back Bays: Advancement

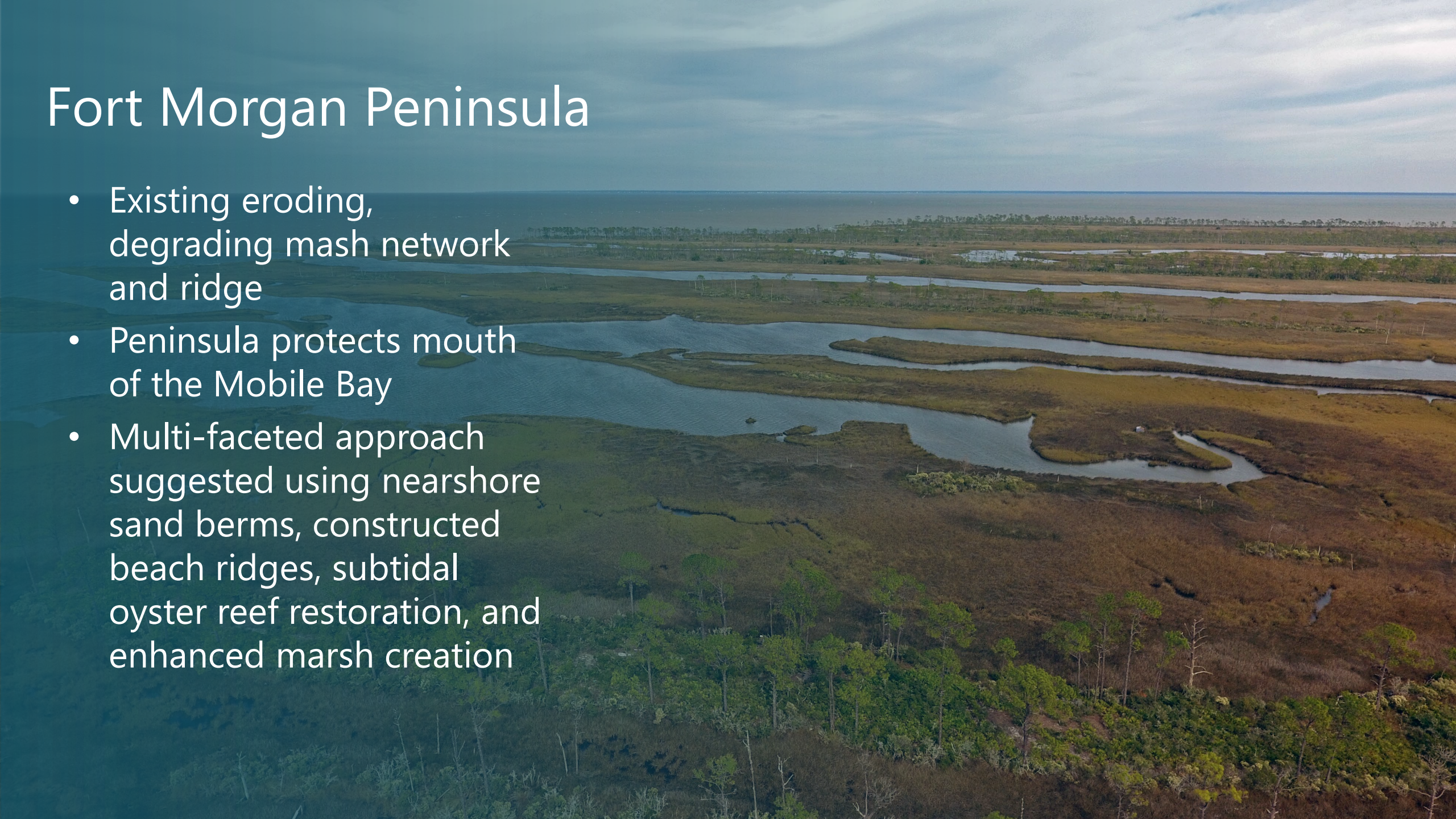


Source: EWN Proving Ground, Philadelphia District – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)



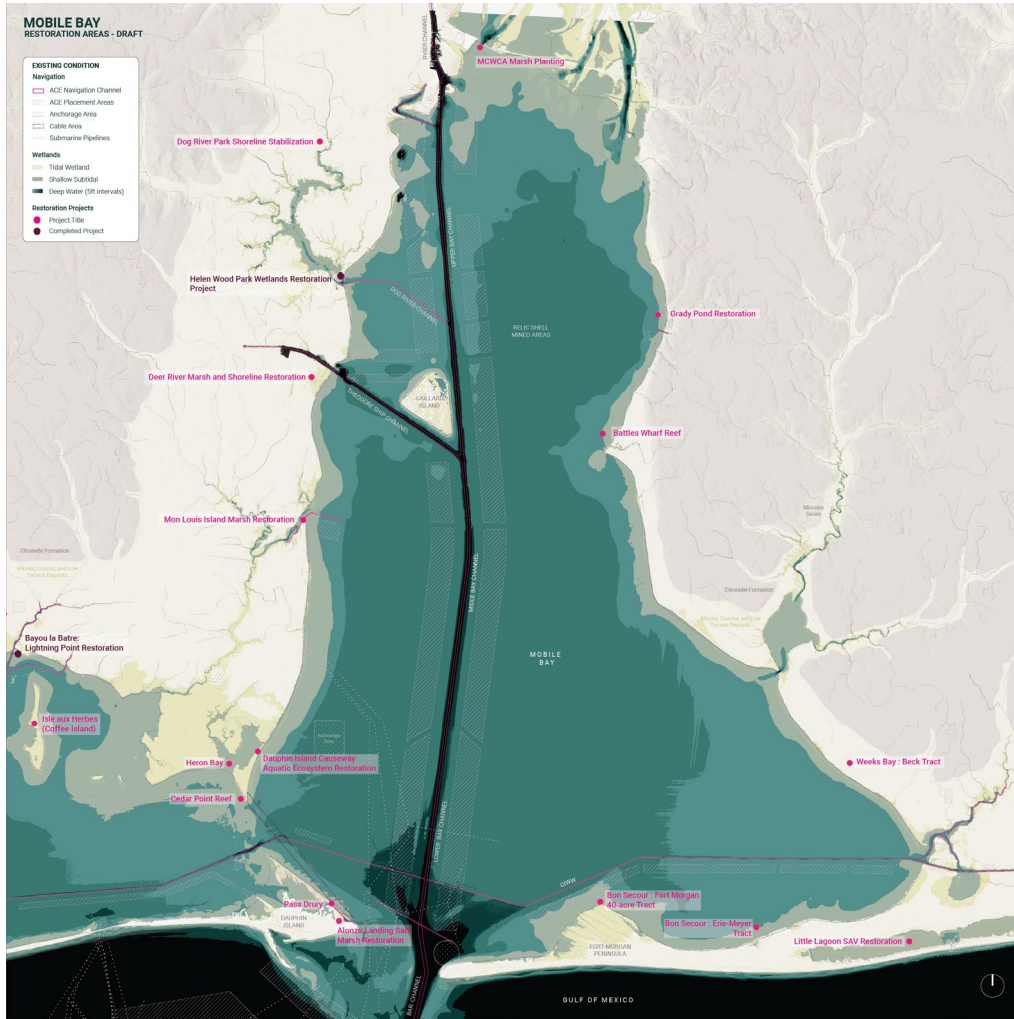
# Fort Morgan Peninsula

- Existing eroding, degrading marsh network and ridge
- Peninsula protects mouth of the Mobile Bay
- Multi-faceted approach suggested using nearshore sand berms, constructed beach ridges, subtidal oyster reef restoration, and enhanced marsh creation





# Fort Morgan Peninsula: Nature-Based Features



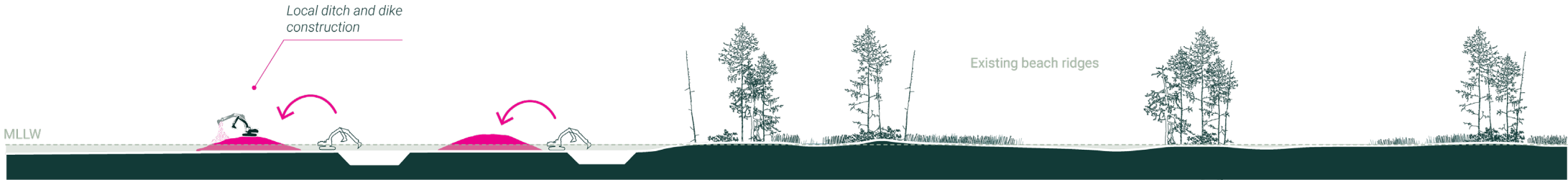
Source: EWN Proving Ground, Mobile District – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)



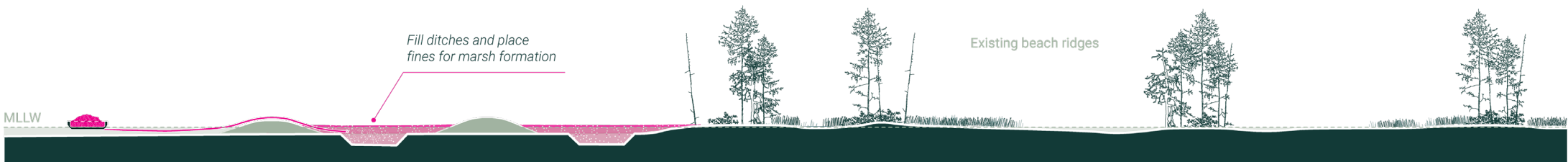
00  
EXISTING  
CONDITION



01  
SAND BERMS  
CONSTRUCTION



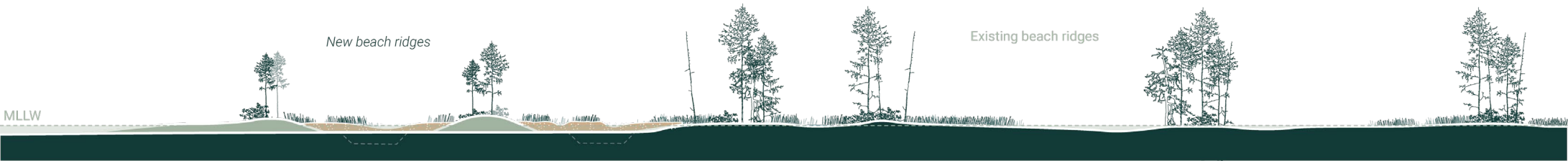
02  
FINES  
PLACEMENT



03  
PLANTING



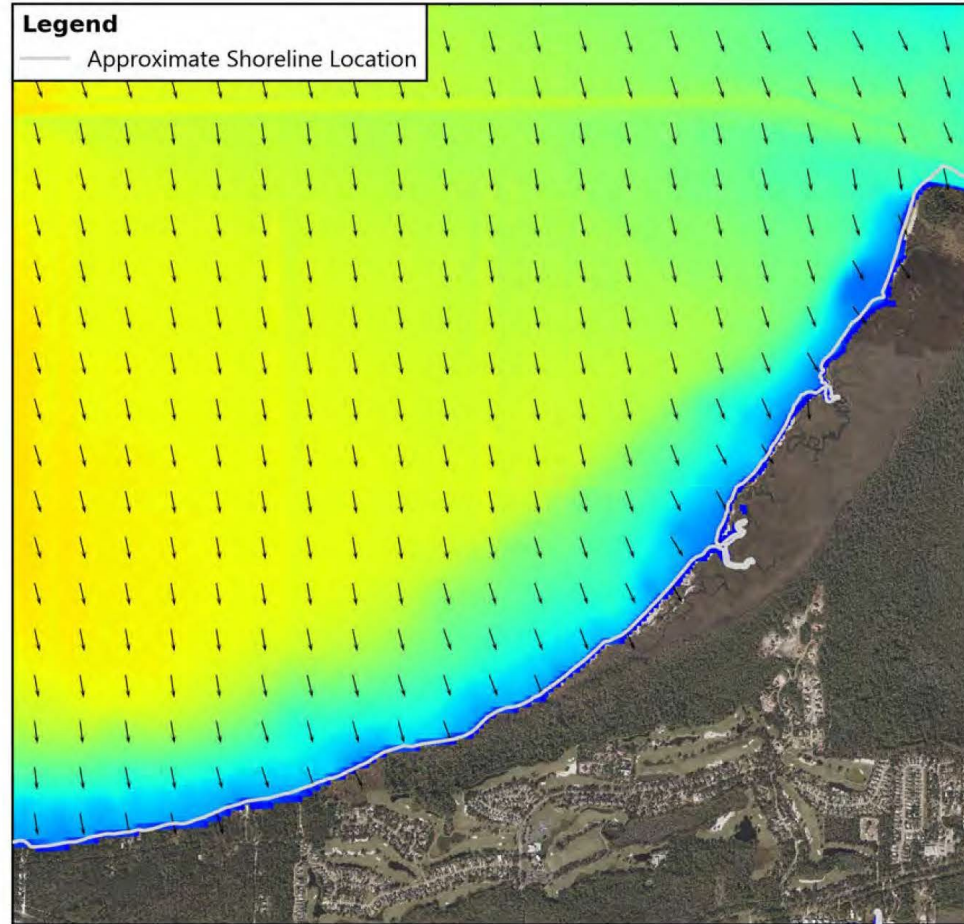
04  
CONSTRUCTED  
BEACH RIDGES



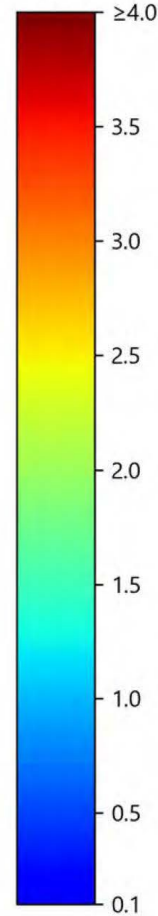


# Coastal Modeling: Concept Assessment

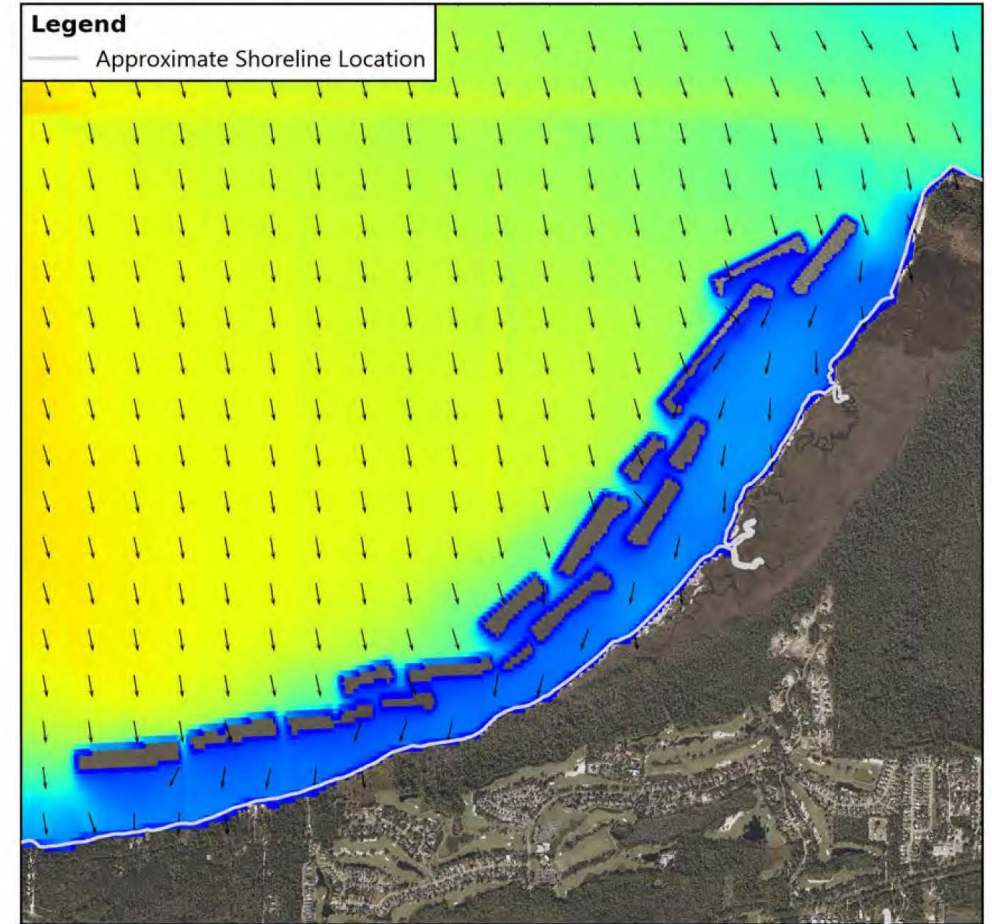
Existing Condition



Significant Wave Height (feet)



Proposed Condition: Alternative 2







CONSTRUCTED  
BEACH RIDGES

NEW  
MARSH

CONSTRUCTED  
BEACH RIDGES

NEW  
MARSH

EXISTING  
BEACH RIDGES

MOBILE BAY

+  
The Pines Public  
Boat Launch

+  
BSNWR Little  
Point Clear Unit

GULF OF MEXICO

FORT MORGAN PENINSULA



# Why does this matter?

- Project conceptualization should start based on engineering principles and science with an emphasis on social impacts and cultural values
- Encourage continued development of guidance documents and regulatory support for NBS
- Enhance engagement with key stakeholders (e.g., federal, states, local, NGOs, industries)
- Advance regional and national scale efforts to implement projects





# Thank you!

# Questions?

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Source: EWN Proving Ground, San Francisco District – Preliminary Concepts (Courtesy of DRC/Auburn University and Anchor QEA)