Upper Mobile Bay Wetland Creation
WEDA Gulf Coast Conference 2021

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Introduction

Alabama State Port Authority

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Project Goal

- Planning and Permitting for the creation of 1,200 acres of wetlands in the upper Mobile Bay through the beneficial use of dredged material
- Design of a 100-acre wetland creation area for initial construction

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Project Background

- Annually, 6 million cubic yards of sediment removed from Alabama's Mobile Harbor federal navigation channel and adjacent public berths.
- Have lost 10,000 acres of wetlands in Upper Mobile Bay over the last century. Project will create wetland where it can thrive.
- By constructing this project, sediments will remain in the Upper Mobile Bay system and be beneficially used for habitat.

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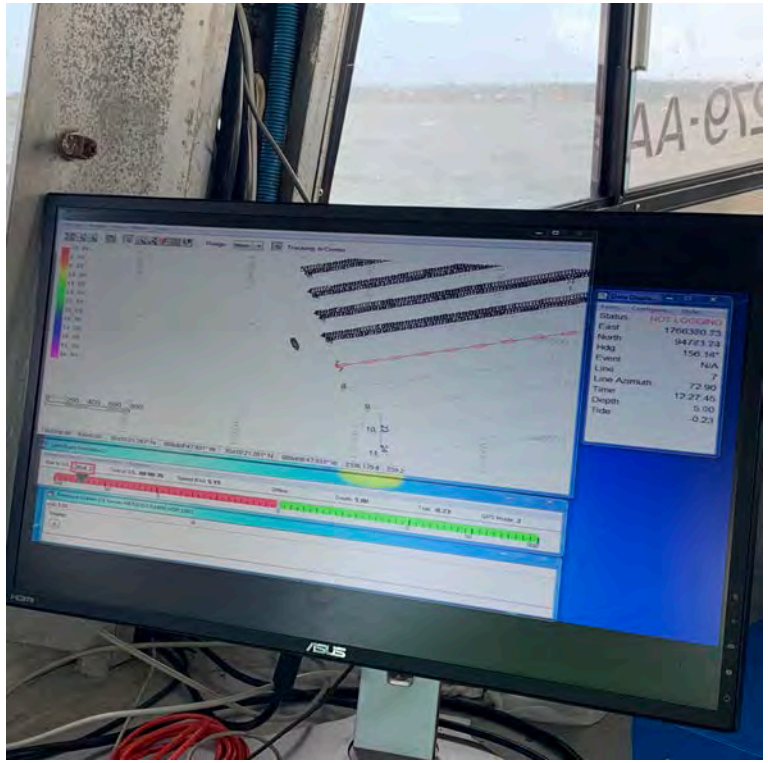
Project Benefits

- Increases in wetland nursery habitat
- Increased commercial fisheries habitat and recreational opportunities
- Increase in submerged aquatic vegetation habitat
- Improved water quality
- Reduced damage resulting from storm surge
- Wise environmental stewardship of sediment resources
- Reduced annual dredging costs for the public port, a revenue-based agency

Investigations and Studies

- Geotechnical
  - 80 soil borings
  - Soil Resistivity Survey
- Hydrographic Surveying
  - 2,000 acres
- Cultural Resource Assessment
- Submerged Aquatic Vegetation



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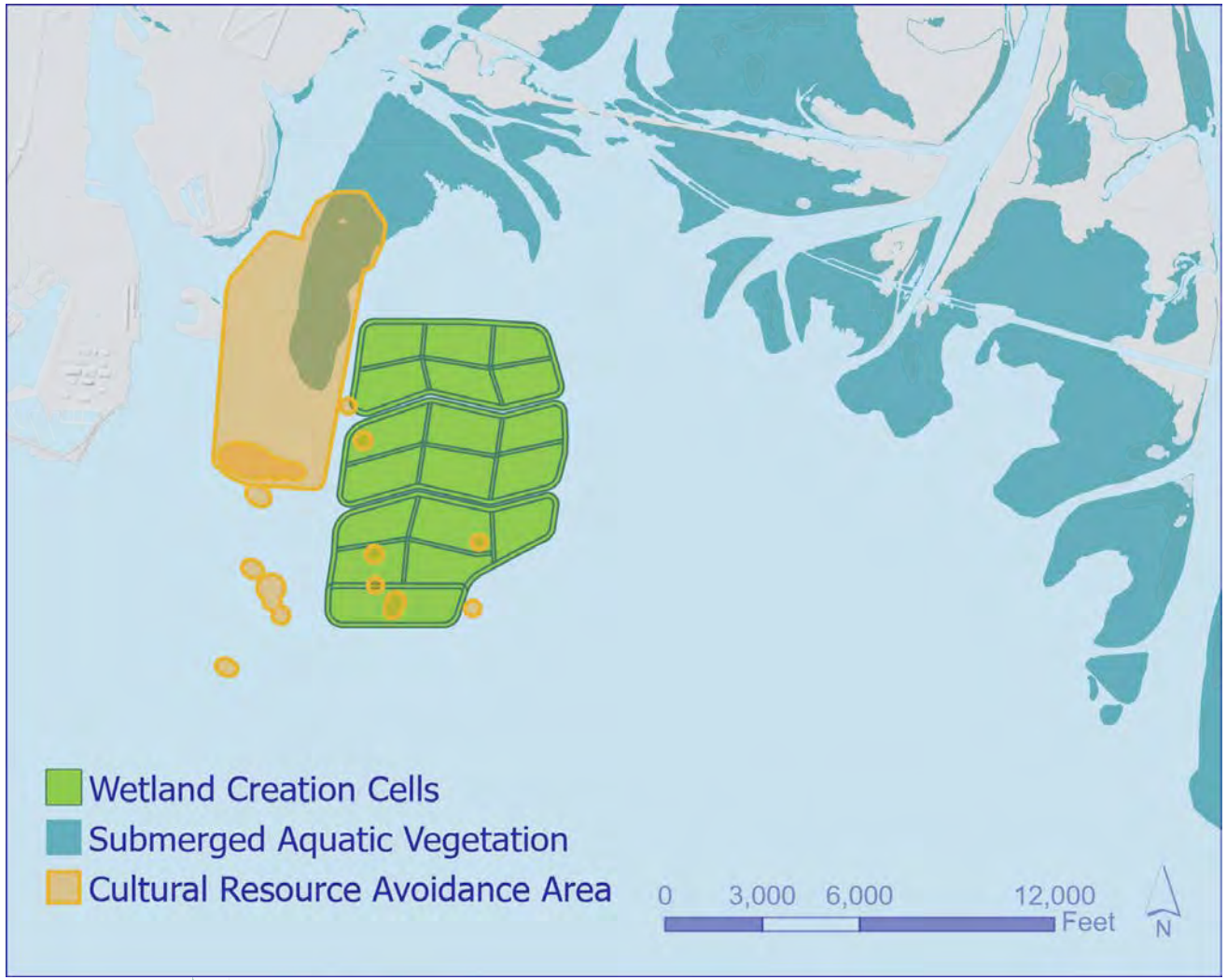
Design Criteria

Environmental Resources criteria:

- Avoid cultural resources
- Avoid submerged aquatic vegetation
- Maximize habitat diversity
- Low-Profile



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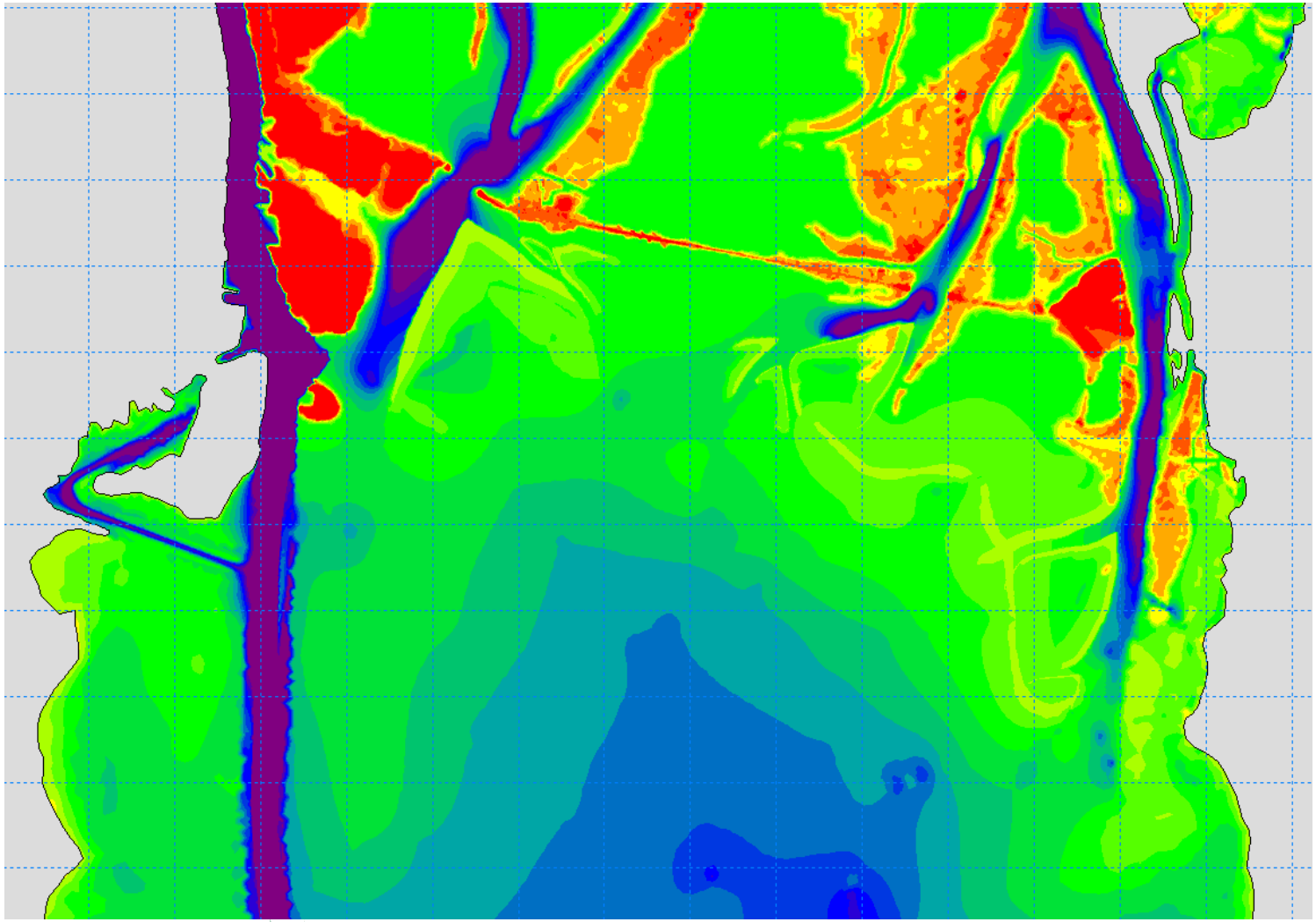
Design Criteria

Physical Criteria:

- Wind and wave climate
- Depth of water
- Elevation of wetland
- Dike slope stability
- Dike settlement
- Dredged fill consolidation



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Ecosystem Services

Habitat Category	Production Level	Unit	Baseline Credit	Restored Credit	Credit Value	BASELINE Natural Resource Value - 30 years of production	CREATED Natural Resource Value - 30 years of production	NET BENEFIT Natural Resource Value - 30 years of production
High Marsh		DSAYs	-	10,796	$ 39,000	-	$ 421,038,888	$ 421,038,888
Vegetated Marsh Edge	Primary	Dkg	-	137,920,304	$ 1.20	-	$ 165,504,365	$ 165,504,365
	Secondary	Dkg	-	9,559,537	$ 12.00	-	$ 114,714,447	$ 114,714,447
	Tertiary	Dkg	-	1,652,480	$ 120.00	-	$ 198,297,606	$ 198,297,606
Enhanced Soft Bottom	Primary	Dkg	-	129,197,702	$ 1.20	-	$ 155,037,243	$ 155,037,243
	Secondary	Dkg	-	8,954,956	$ 12.00	-	$ 107,459,472	$ 107,459,472
	Tertiary	Dkg	-	1,547,971	$ 120.00	-	$ 185,756,516	$ 185,756,516
Shallow Soft Bottom	Primary	Dkg	(343,770,992)	-	$ 1.20	$ 412,525,191	-	$ (412,525,191)
	Secondary	Dkg	(13,443,962)	-	$ 12.00	$ 161,327,546	-	$ (161,327,546)
	Tertiary	Dkg	(2,741,669)	-	$ 120.00	$ 329,000,278	-	$ (329,000,278)
TOTAL						$ 902,853,015	$ 1,347,808,535	**$ 444,955,520**

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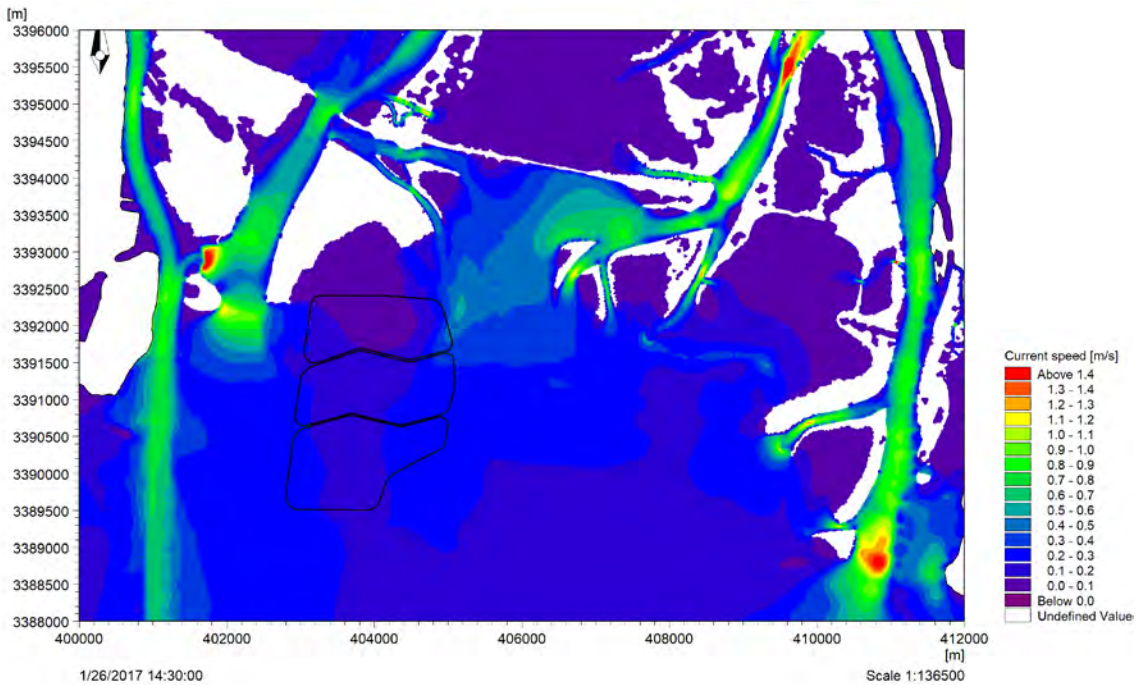
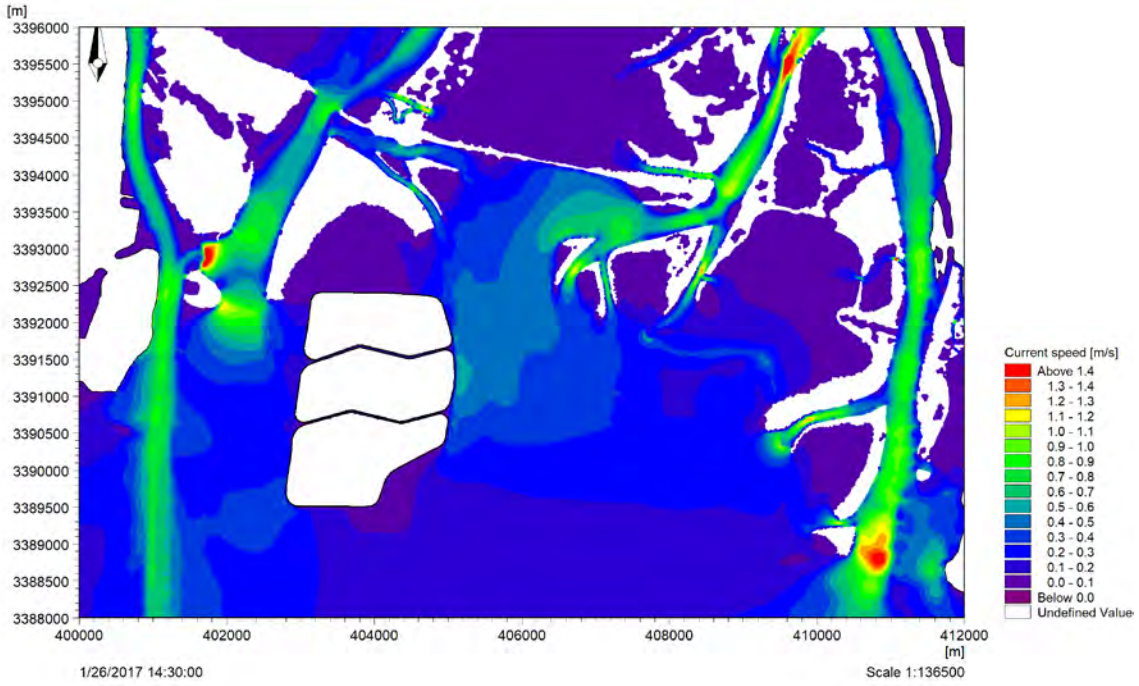
Hydrodynamic Modeling



WITHOUT Project



WITH Project

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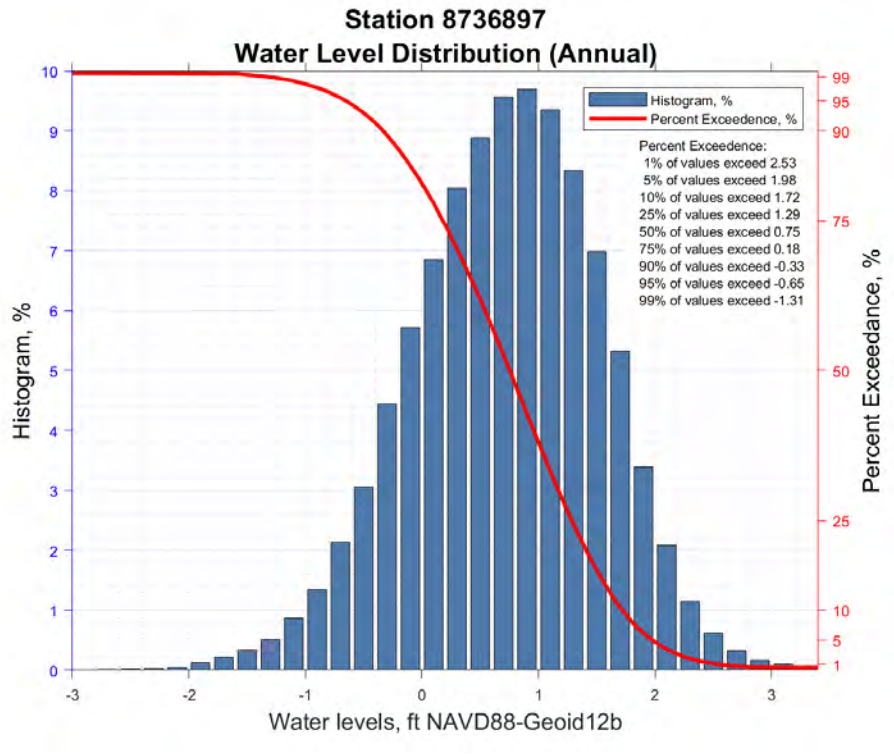
Water Levels

Percent Exceedance	Elevation [ft NAVD 88-Geoid12b]
99%	-1.31
95%	-0.65
MLLW	-0.49
MLW	-0.40
90%	-0.33
75%	0.18
50%	0.75
MHW	1.20
MHHW	1.13
25%	1.29
10%	1.72
5%	1.98
1%	2.53



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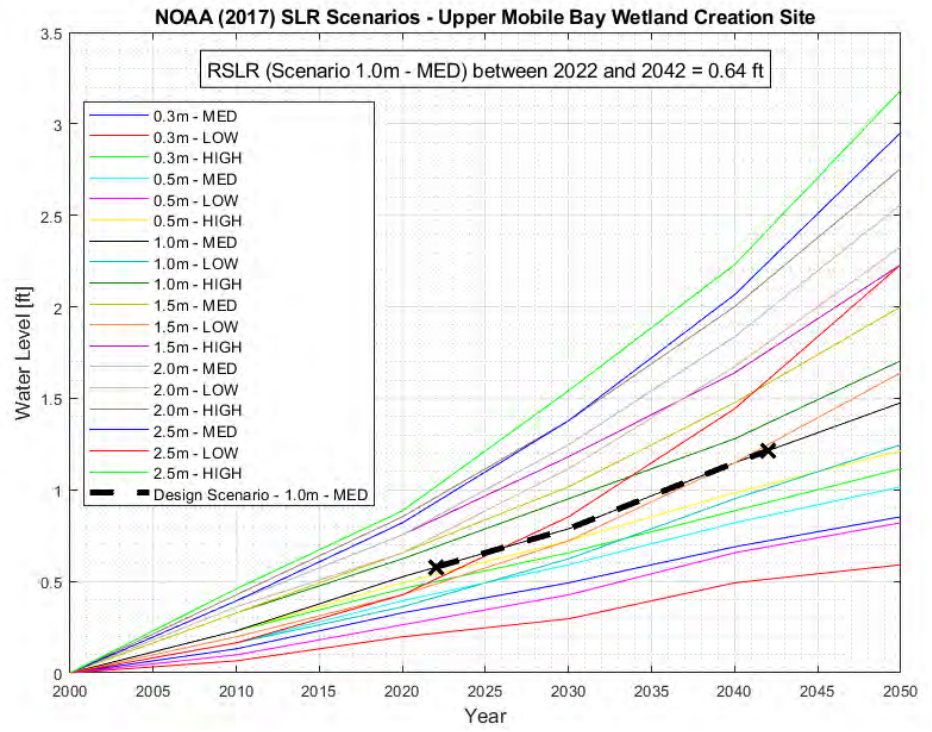
Sea Level Rise

- SLR informs long-term planning, not initial design
  - Future maintenance lift
  - Future wave forcing
    - Ensure stone stability at 20 years
- Maximum dike crest elevation set through coordination with stakeholders



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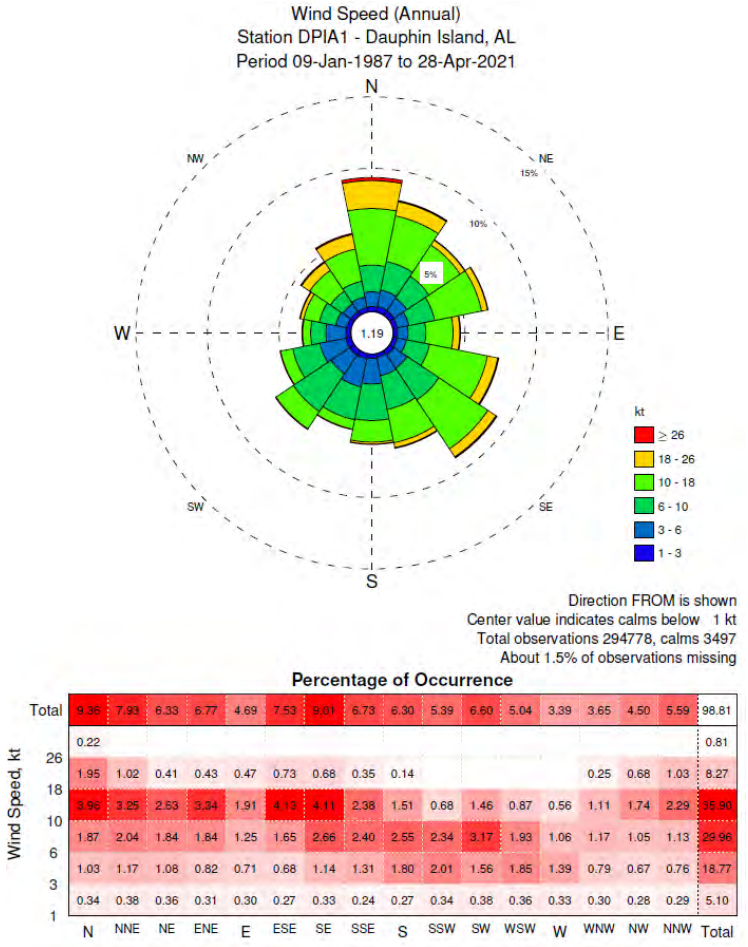
Spectral Wave Modeling



	Percent Exceedance						
Wave Parameter	**25**	**50**	**75**	**90**	**95**	**99**	**Max**
Significant Wave Height, Hs [feet]	0.87	1.07	1.39	1.81	2.12	2.81	4.04
Maximum Wave Height, Hmax [feet]	1.8	2.21	2.85	3.72	4.33	5.71	6.93
Peak Wave Period, Tp [sec]	2.74	2.91	2.94	3.04	3.15	3.31	3.93

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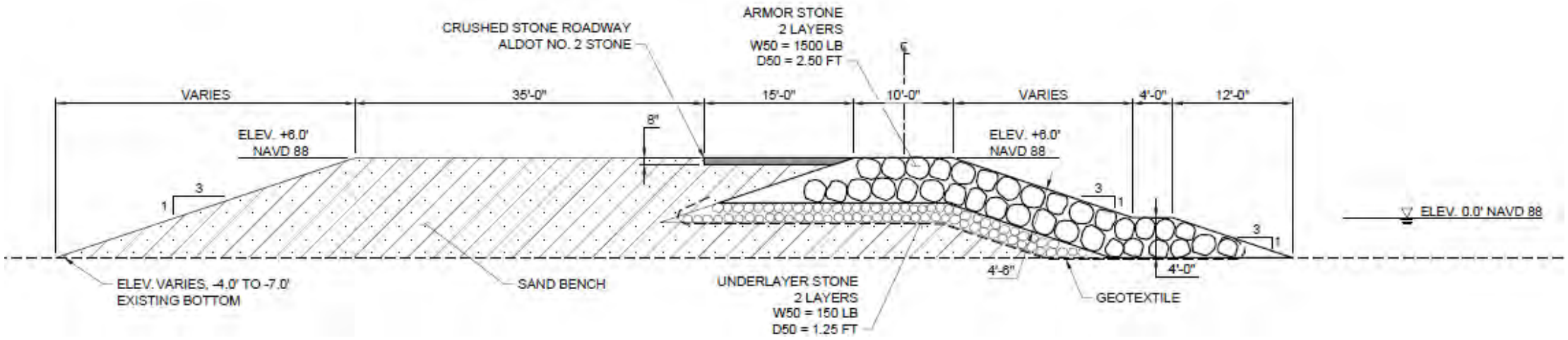
External Containment Dike Cross-Section



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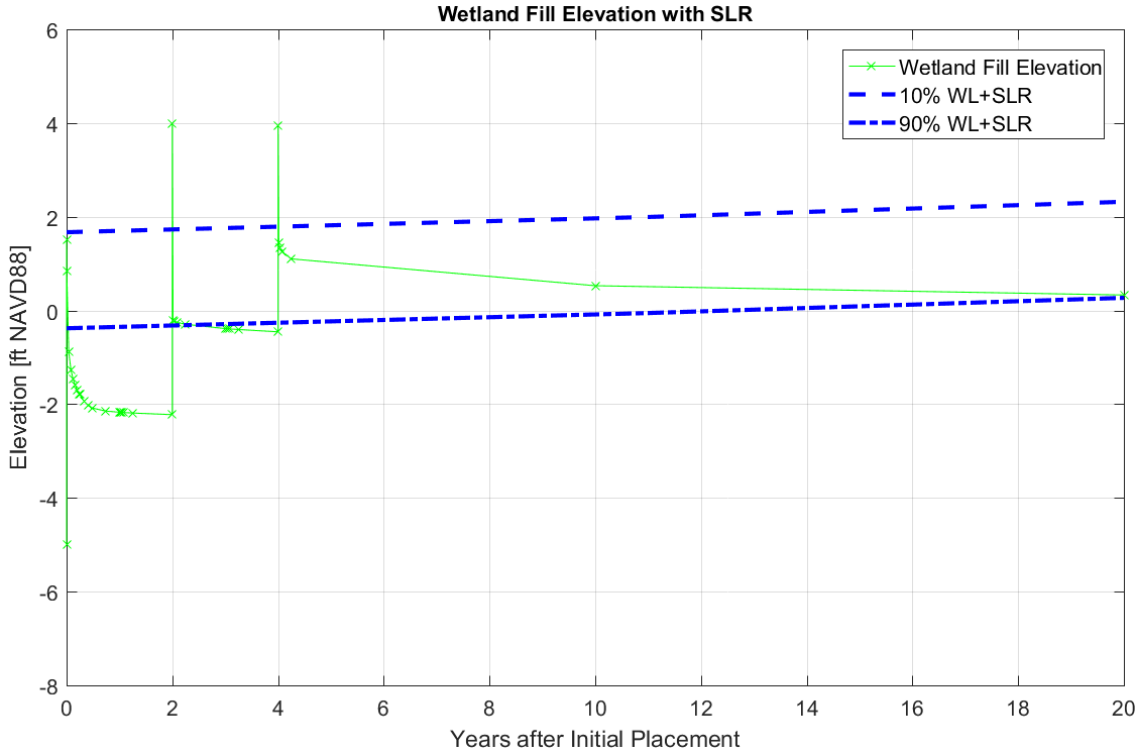
Long-Term Dredged Fill Consolidation

- Assumed 210,000 cy annual dredging
- Two, 50-acre cells
- Alternate fill between 2 cells
- 6.5-ft lifts



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Conceptual Design

Conceptual designs that satisfy environmental and physical conditions in Upper Mobile Bay to maximize habitat value.

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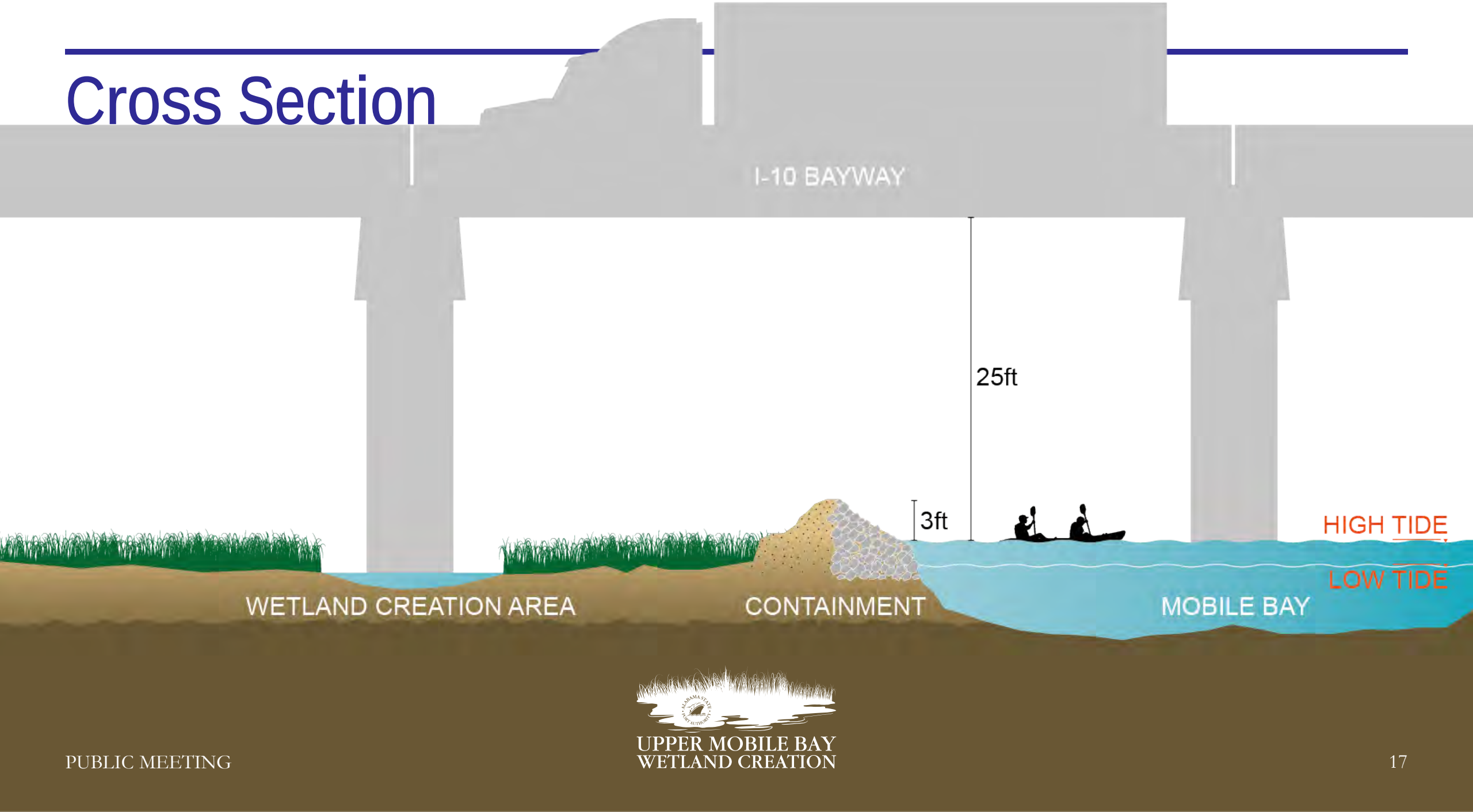
Cross Section



Timeline


PHASE I
PLANNING
Activities:
• Plan 1,200 acres
• Permit 1,200 acres
• Design 100 acres
PHASE II
INITIAL CONSTRUCTION
Activities:
• Construct wetland containment
• Construct 100 acres
FUTURE PHASE
FUTURE EXPANSION
Activities:
• Design and construct incremental expansions to build remaining 1,100 acres
2021
NEXT 5 YEARS
NEXT 20 YEARS

Thank you

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