

MULBERRY PHOSPHATE TRUSTEES ACHIEVE OYSTER REEF RESTORATION IN HILLSBOROUGH BAY, FLORIDA

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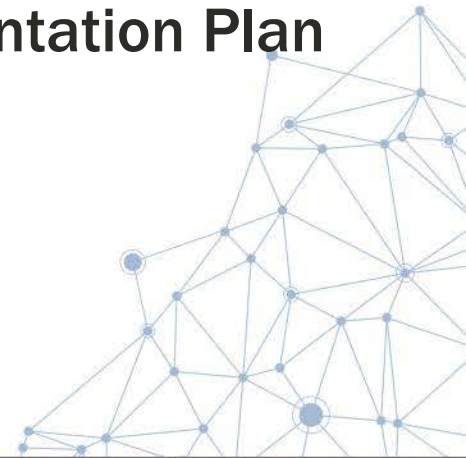
★ Project Location

Tampa Bay

Gulf of Mexico

Background

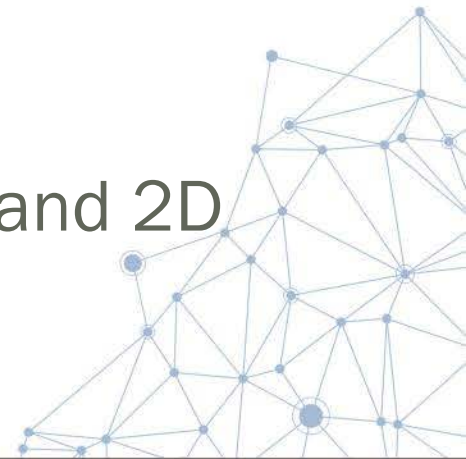
- 1997 → Mulberry Phosphates Phosphogypsum Stack Breached
- 2000 → NOAA and FDEP formed Restoration Council (“Trustees”)
- 2008 → Final Estuarine Restoration Implementation Plan
- 2013 → Tetra Tech Team Selected



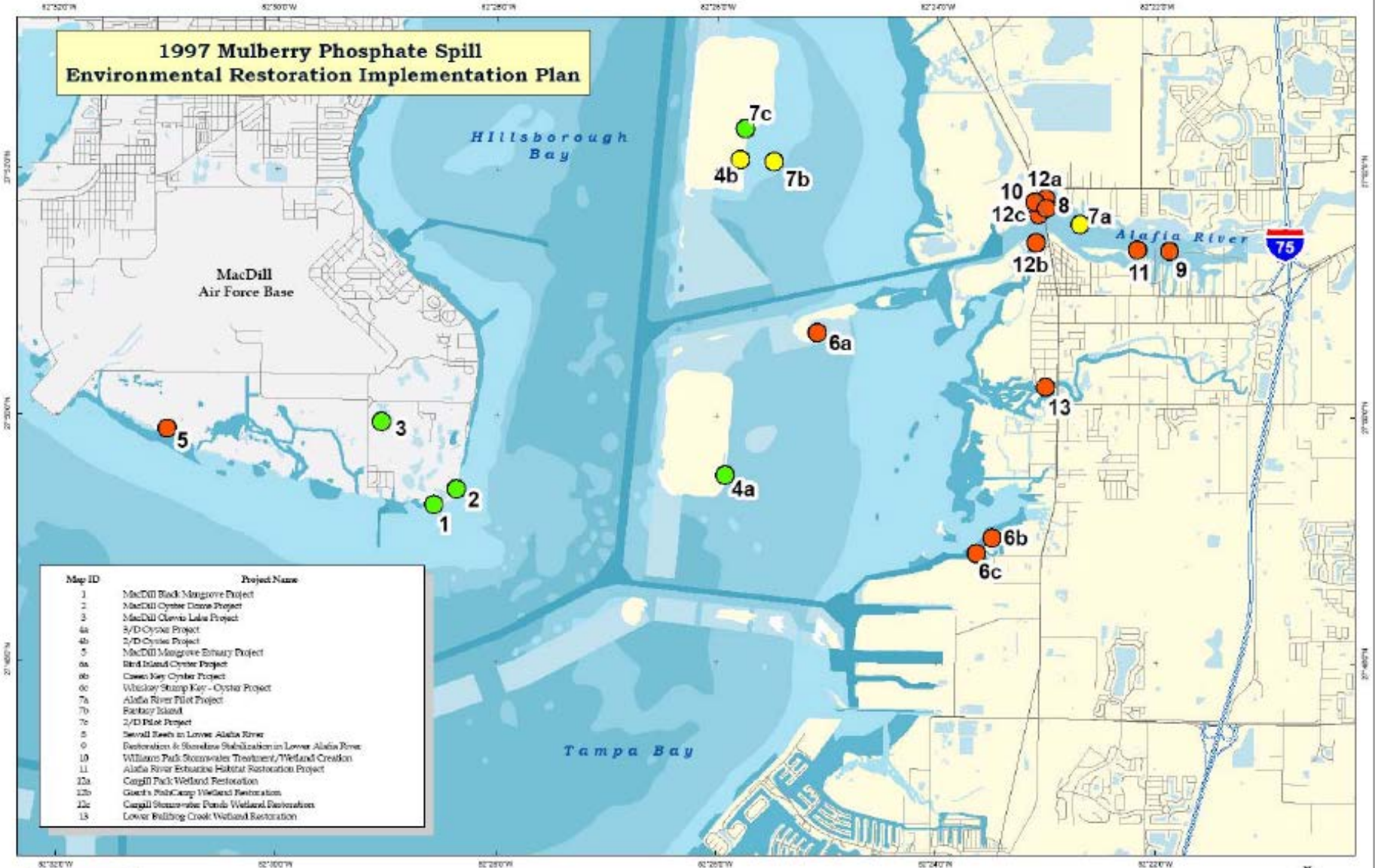
Purpose & Need

Goals of 2008 Final Estuarine Restoration Implementation Plan

- Maximum possible oyster reef habitat area eastern shoreline of Spoil Island 2D
- Avoid disturbing nesting shorebirds during reef installation
- Protect existing resources
- Conserve existing habitats on Spoil Island 2D



1997 Mulberry Phosphate Spill Environmental Restoration Implementation Plan



Map ID	Project Name
1	MacDill Black Mangrove Project
2	MacDill Oyster Dune Project
3	MacDill Clewley Lake Project
4a	3/D Oyster Project
4b	2/D Oyster Project
5	MacDill Mangrove Erosion Project
6a	Bird Island Oyster Project
6b	Cassidy Key Oyster Project
6c	Whiskey Swamp Key - Oyster Project
7a	Alafia River Pilot Project
7b	Bastion Island
7c	2/D Pilot Project
8	Seawall Seals in Lower Alafia River
9	Restoration & Shoreline Stabilization in Lower Alafia River
10	Williams Park Stormwater Treatment/Wetland Creation
11	Alafia River Estuarine Habitat Restoration Project
12a	Coggin Park Wetland Restoration
12b	Cooper's Pond/Camp Wetland Restoration
12c	Coggin Stormwater Ponds Wetland Restoration
13	Lower Bulling Creek Wetland Restoration




 Environmental Protection Commission
 Hillsborough County
 1400 Queens Palms Drive
 Tampa, FL 33607
 (813) 417-2400

1997 Mulberry Phosphate Spill Environmental Restoration Implementation Plan



- Oyster Bar Pilot Study Sites
- Non-Selected Restoration Projects
- Projects Identified for Funding
- Interstates

- Major Roads
- Local Roads
- City of Tampa



Environmental Protection Commission
 1400 Queens Palms Drive
 TAMPA, FL 33607

For Substances Only



Project Area

Spoil Island 2D

Fantasy Island

Siting, Approach & Design – Phasing

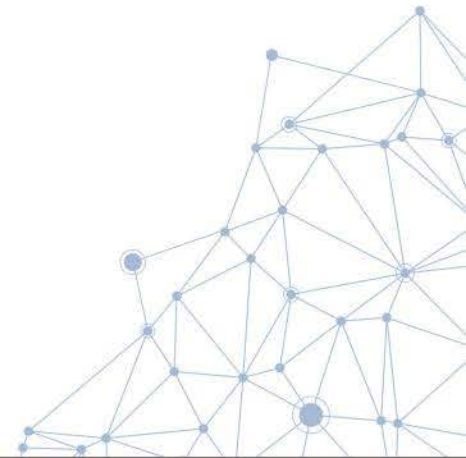
Phase I (June 2013 – June 2014)

- Review Existing Information
- Preliminary Site Investigations
- Project Initiation & Scoping Meeting
- Stakeholder and Trustee Coordination
- Final Design
- Permitting & Regulatory Approval



Phase II (June 2014 – June 2015)

- Project Implementation – Reef Creation
- Reporting



Siting, Approach & Design - Constraints

Migratory Bird Management

- Port Tampa Bay Migratory Bird Interagency Protection Committee (MBIPC)
- AMOY nesting season protection
- Audubon project liaison to MBIPC and daily bird monitoring

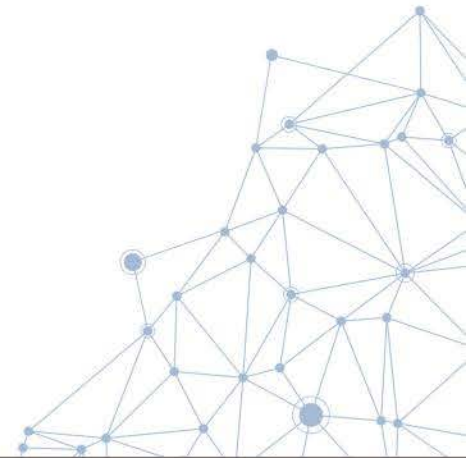


AMOY territories occupied at least once on Spoil Island 2D and Fantasy Island between 1990 - 2007 (Hodgson et al. 2008)

Siting Approach & Design

Baseline Investigations

- Nearly continuous, sparse shoalgrass cover (<10%)
- Established mangrove fringe community
- Narrow oyster reef bar
- Shallow, intertidal shoreline platform



Siting, Design & Approach – Wave Analysis & Rock Stability

Design Criteria

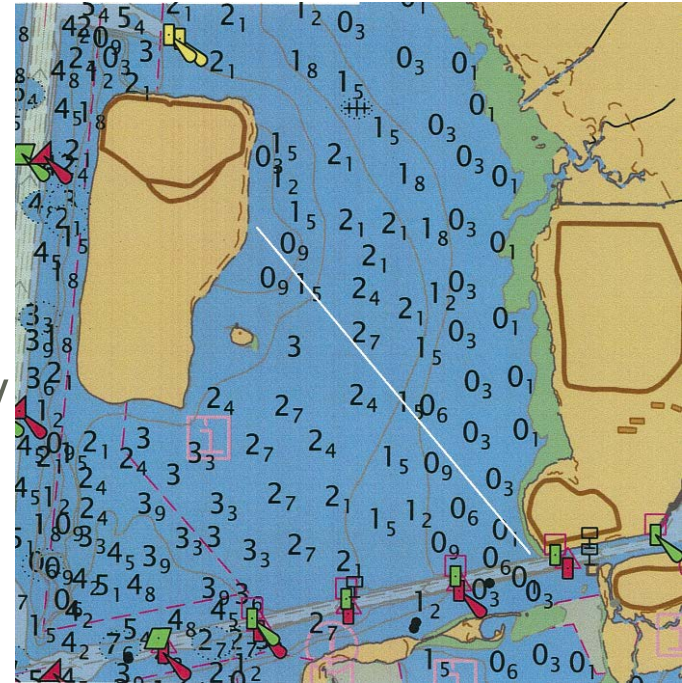
- 25-year wave conditions
- Periodic exposure for foraging AMOY

Design Conditions

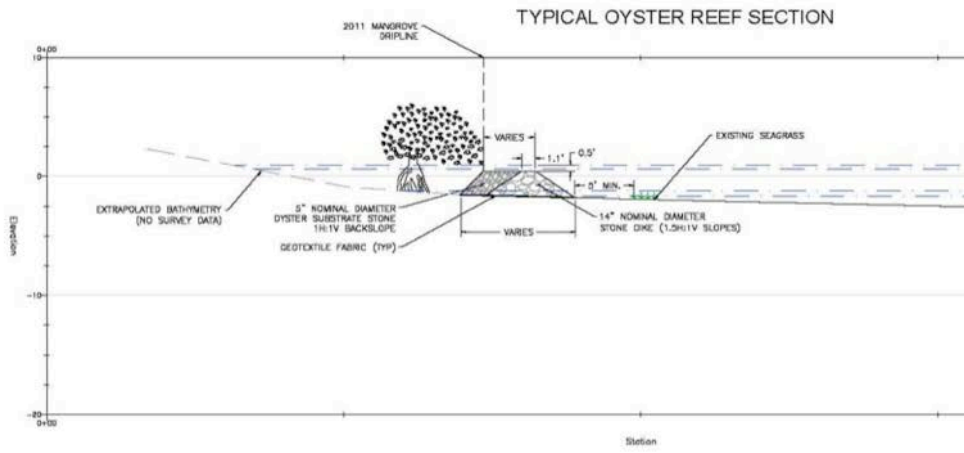
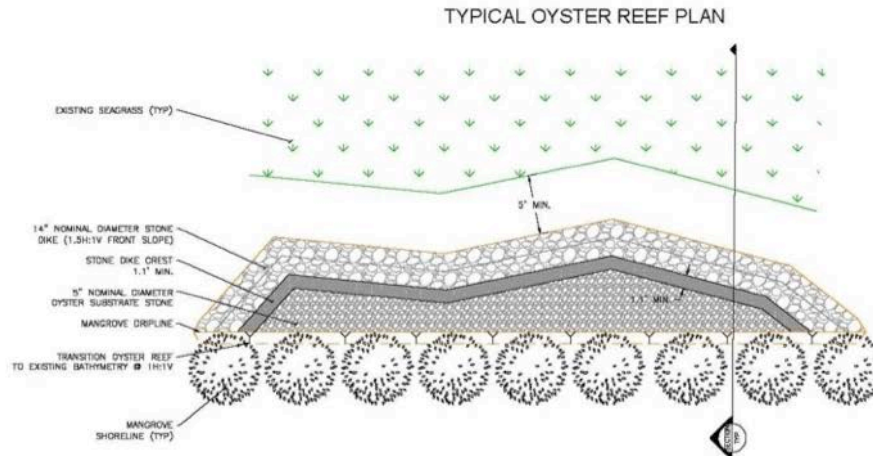
- Wind speeds, water levels, bathymetry
 - **Wave Conditions - depth-limited**

Reef Design

- Rock size for stability and oyster reef growth
- Filter layer to prevent settlement
- FDOT Standard Production Grade – economic and available



Siting, Approach & Design



CONCEPTUAL DESIGN - NOT FOR CONSTRUCTION

Siting, Approach & Design – Adaptive Management

Permitted Design & Footprint

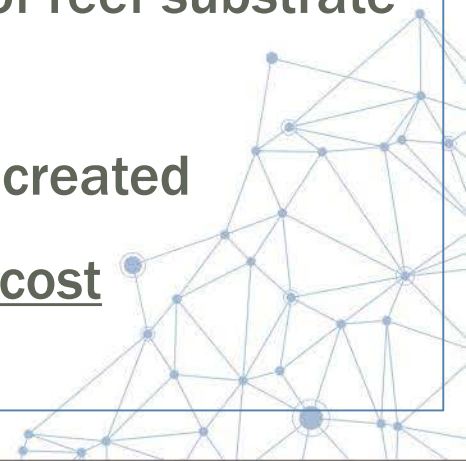
- 16 oyster reefs segments
- 28,350 sf (0.65 acre) of reef substrate

Contracted Design & Footprint

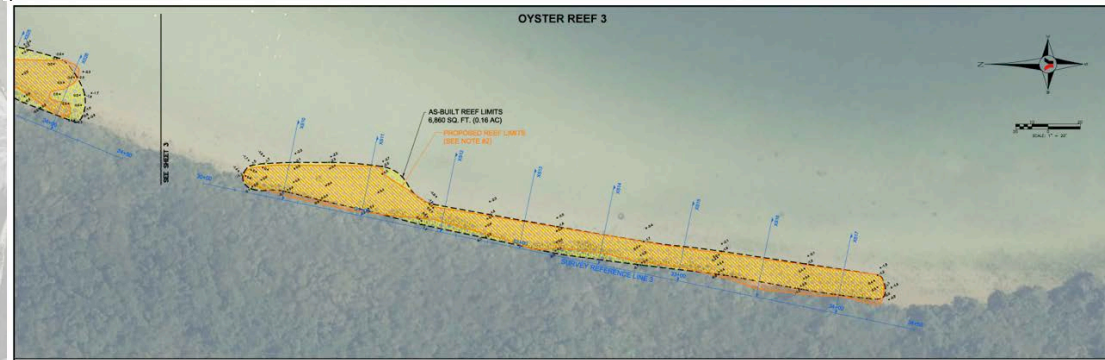
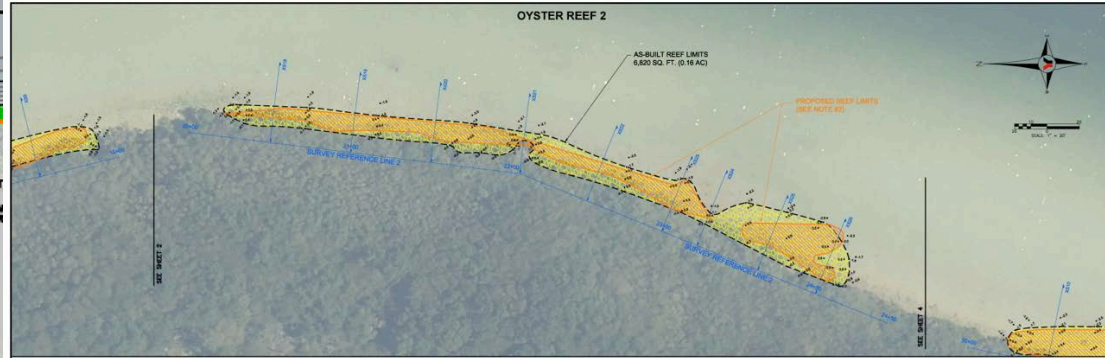
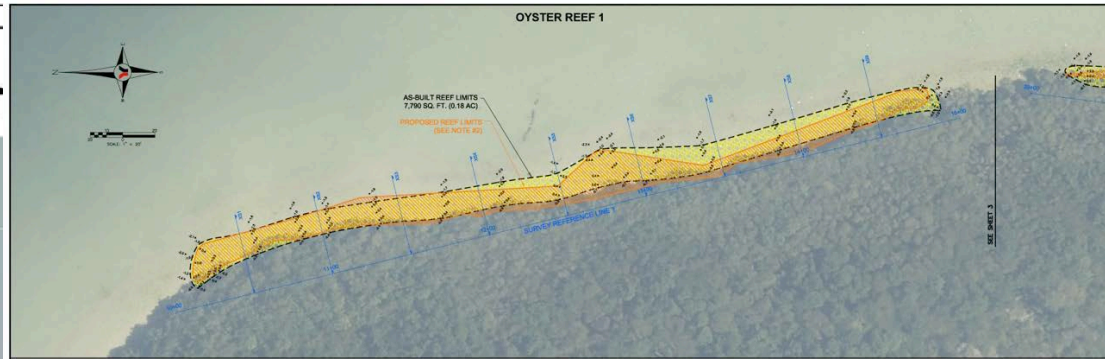
- 2 oyster reef segments
- 1,200 cy of limestone
- 12,975 sf (0.29 acre) of reef substrate

Implemented Design & Footprint

- Changed site conditions
- 3 oyster reef segments
- Single, unified installation
- 1,100 cy of limestone
- 21,470 sf (0.49 acre) of reef substrate created
- 76% of permitted reef created
- No increase in Project cost



Siting, Approach & Design



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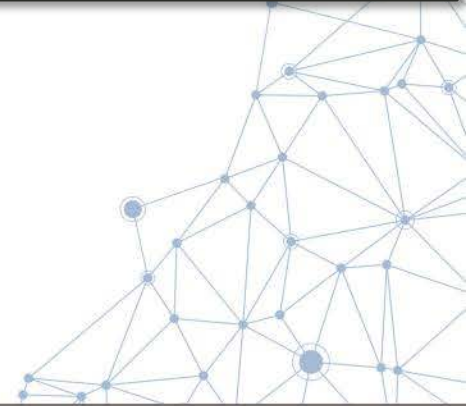
CONCEPTUAL DESIGN - NOT FOR CONSTRUCTION

★ UPLAND ACCESS COORDINATES (PROVIDED BY TPA, AUGUST 2004)

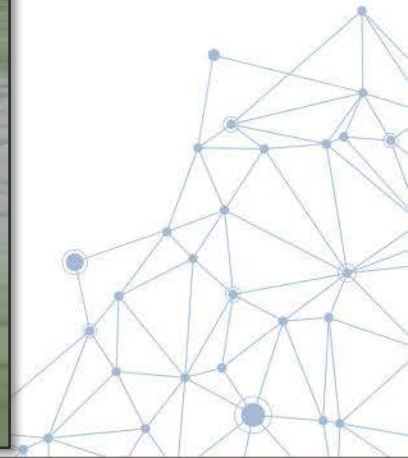
FIG-1
Sheet 1 of 7



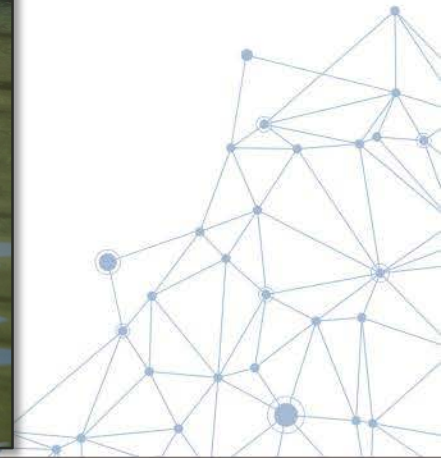
Implementation – Vessel Access



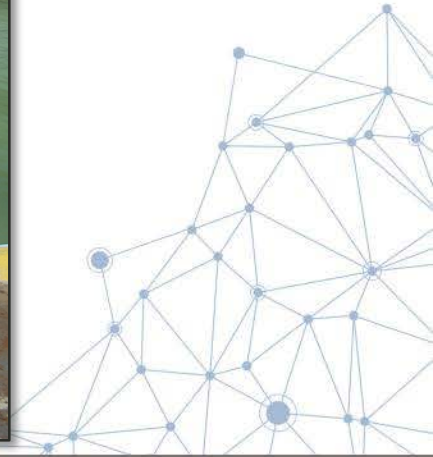
Implementation - Reef Creation



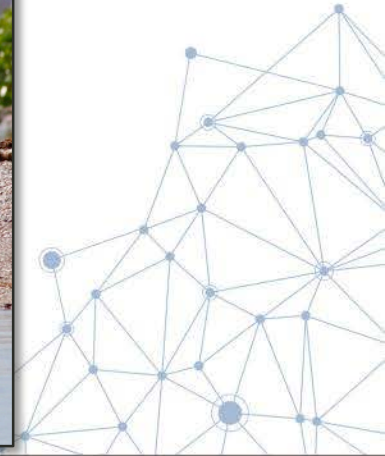
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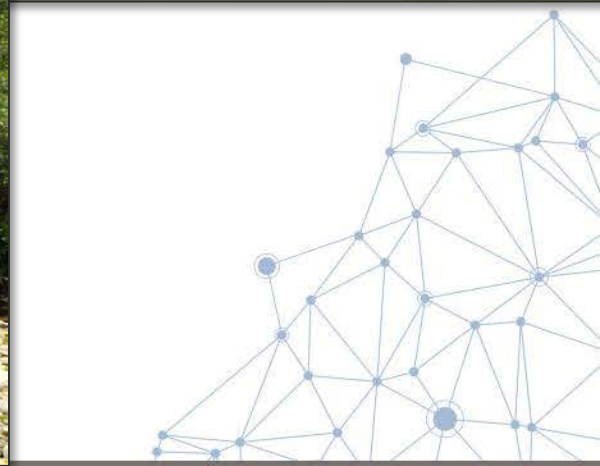
Implementation - Reef Creation



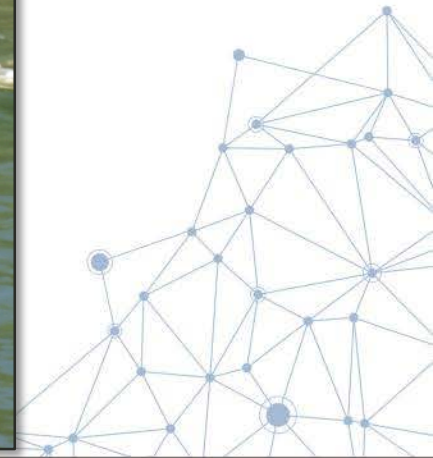
Implementation - Migratory Bird Protection



Inter-agency Site Inspection – June 25, 2015



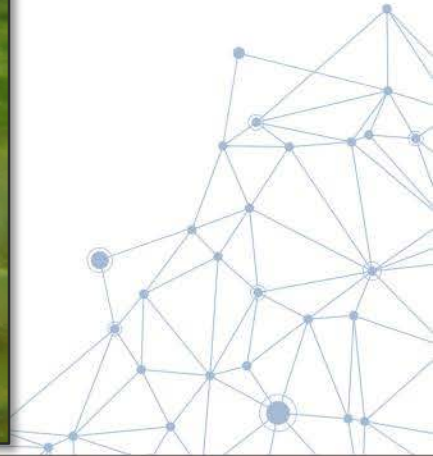
Success! – Recruitment & Colonization



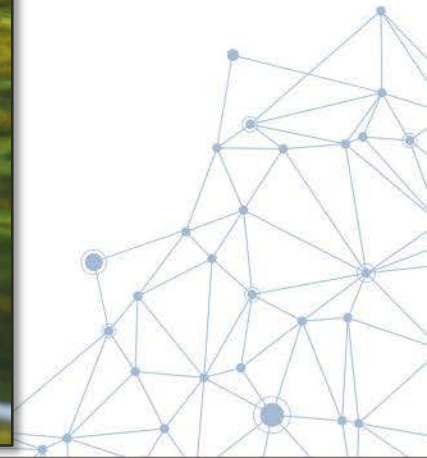
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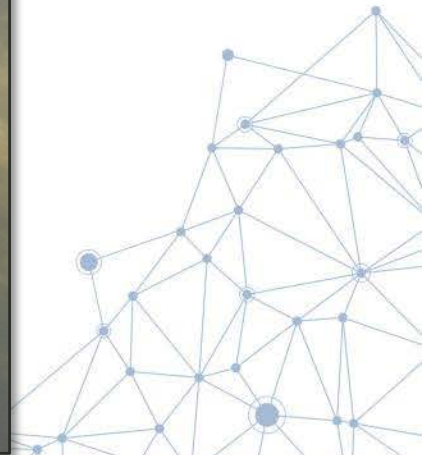
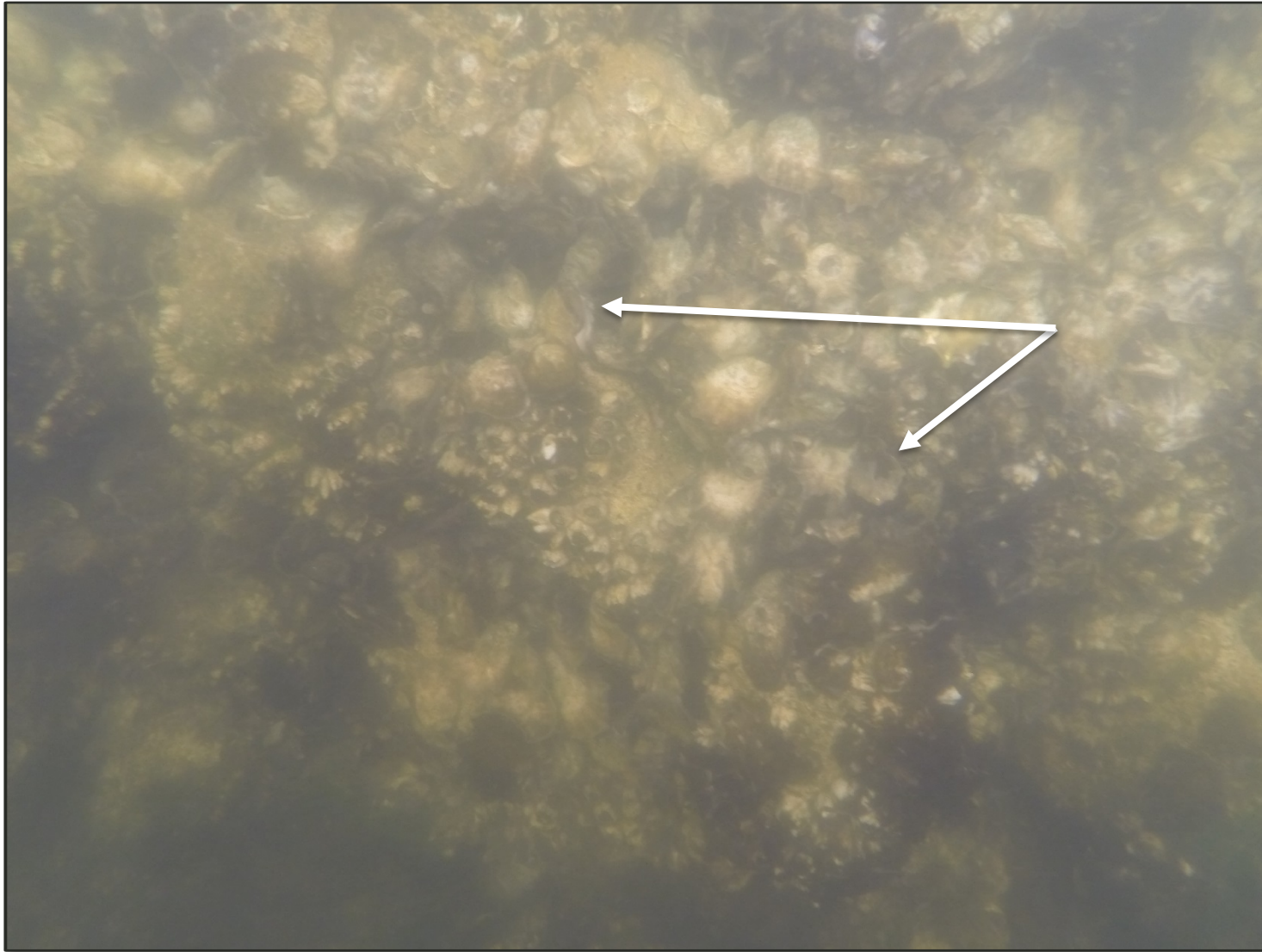
Jackie Julien
June 25, 2015



Success! – Recruitment & Colonization



Success! – Recruitment & Colonization



Co-authors

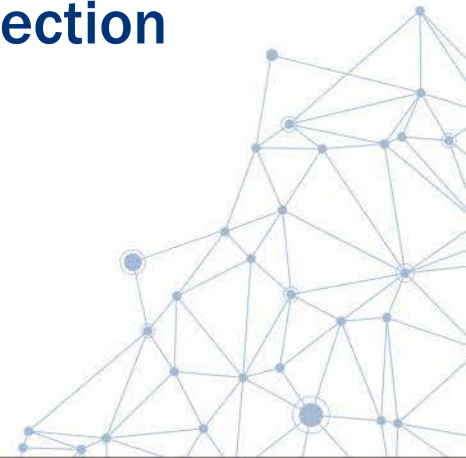
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Acknowledgments

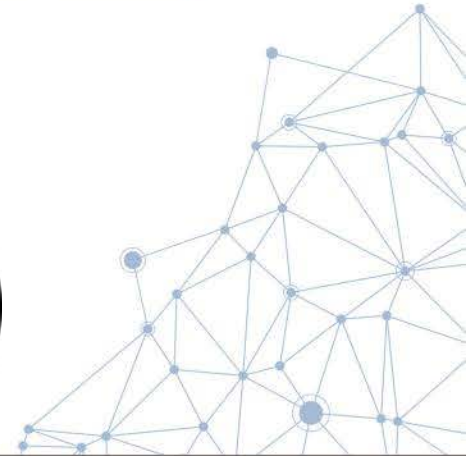
Funding provided by NOAA



Resource Designs, Inc.



PORT TAMPA BAY.



Questions?



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