

Adaptive Restoration of Bird Island CWA: Stabilizing Shorelines for Long-Term Ecological Resilience



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Florida Shore and Beach Preservation Association

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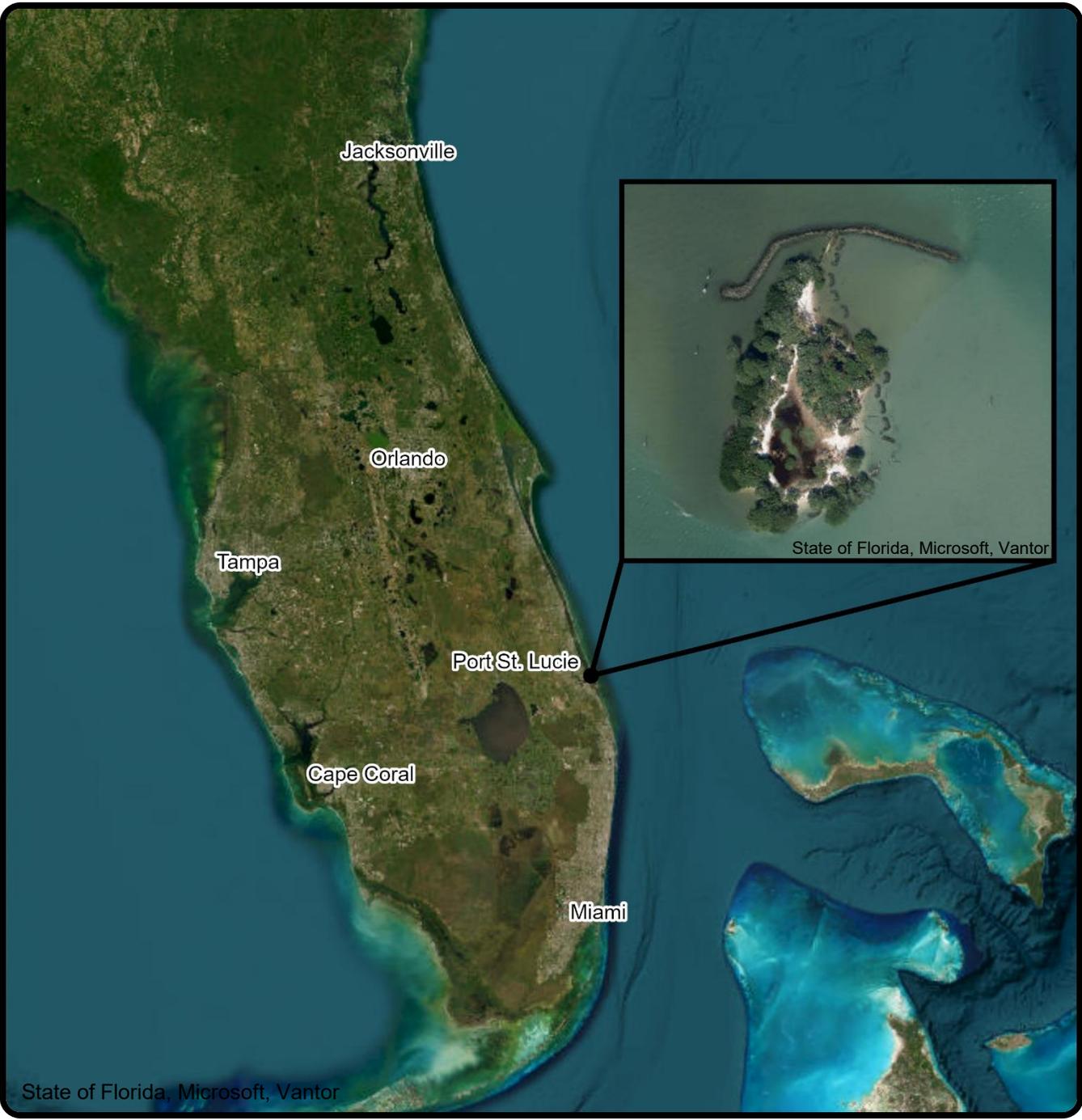


Agenda

1. Background
2. Why Bird Island CWA?
3. Past Restoration & Management Projects
4. Shoreline Analysis
5. Existing Conditions
6. Conceptual Design Alternatives
7. Modeling & Design



Bird Island Critical Wildlife Area (CWA)





History

- Created in the 1940's during the dredging of the Atlantic Intracoastal Waterway
- Adopted for conservation under SIMP in 1990
- Designated as a CWA in 2014



Martin County



Why Bird Island CWA?

- Lack of predators
- Seagrass
- Federally listed birds
- No public access





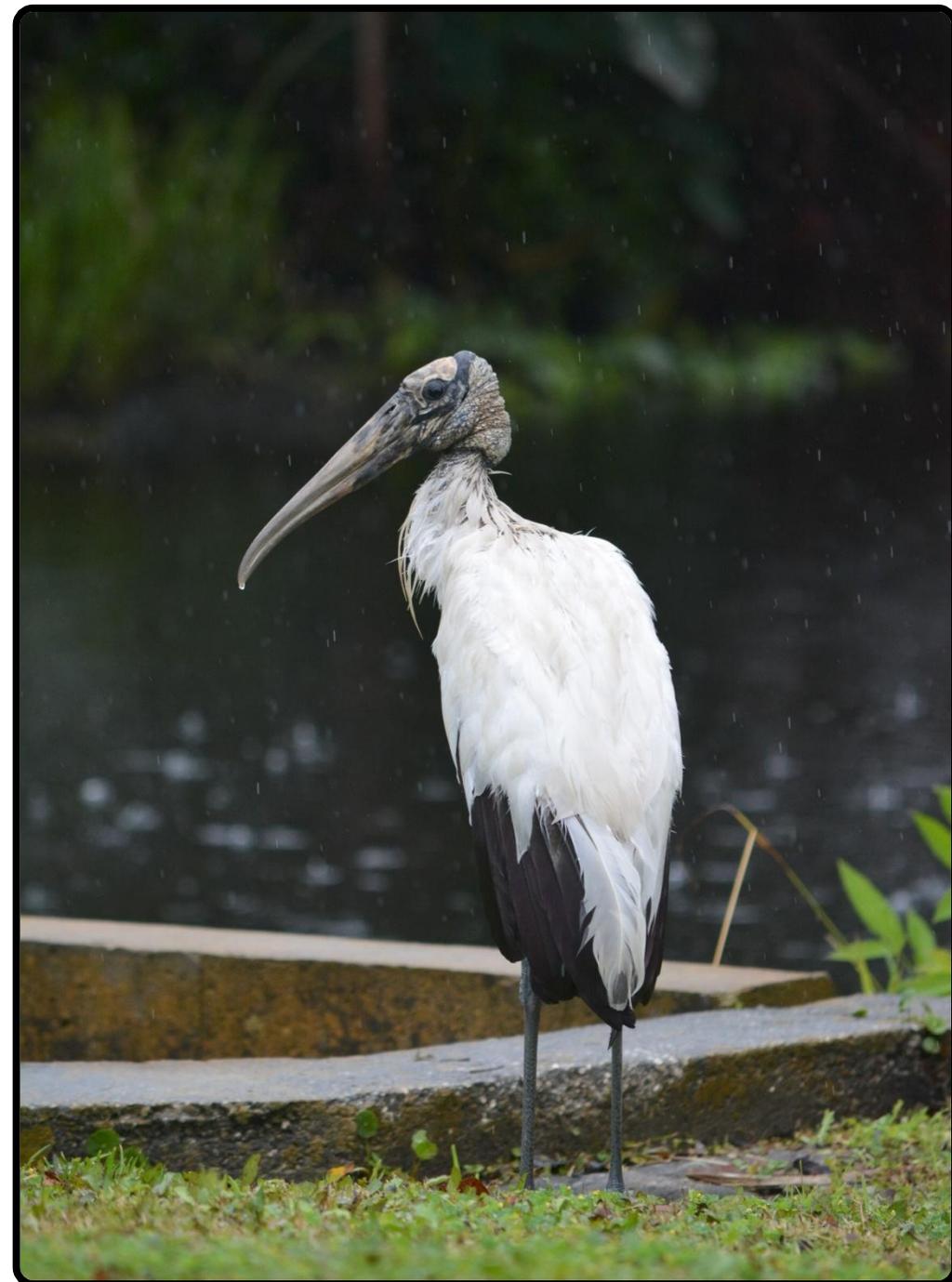
Critical Wildlife Area

Federally Listed Birds

- Wood Stork
- Roseate Spoonbill

Aquatic Resources

- Shoalgrass
- Johnson's Seagrass
- Mangroves





Past Restoration & Management Projects

- 31% area lost to erosion (2010, Ecological Associates)
- Modeling shows vulnerable north side of the island (2010, Adams Design)
- 416 linear-ft breakwater constructed with weir (2011, LES and Adams Design)
- Small scale living shoreline (2012-2021, BluStem)





Implemented Projects

416 linear-ft Breakwater

- Riprap
- Protects north point

Small scale living shorelines

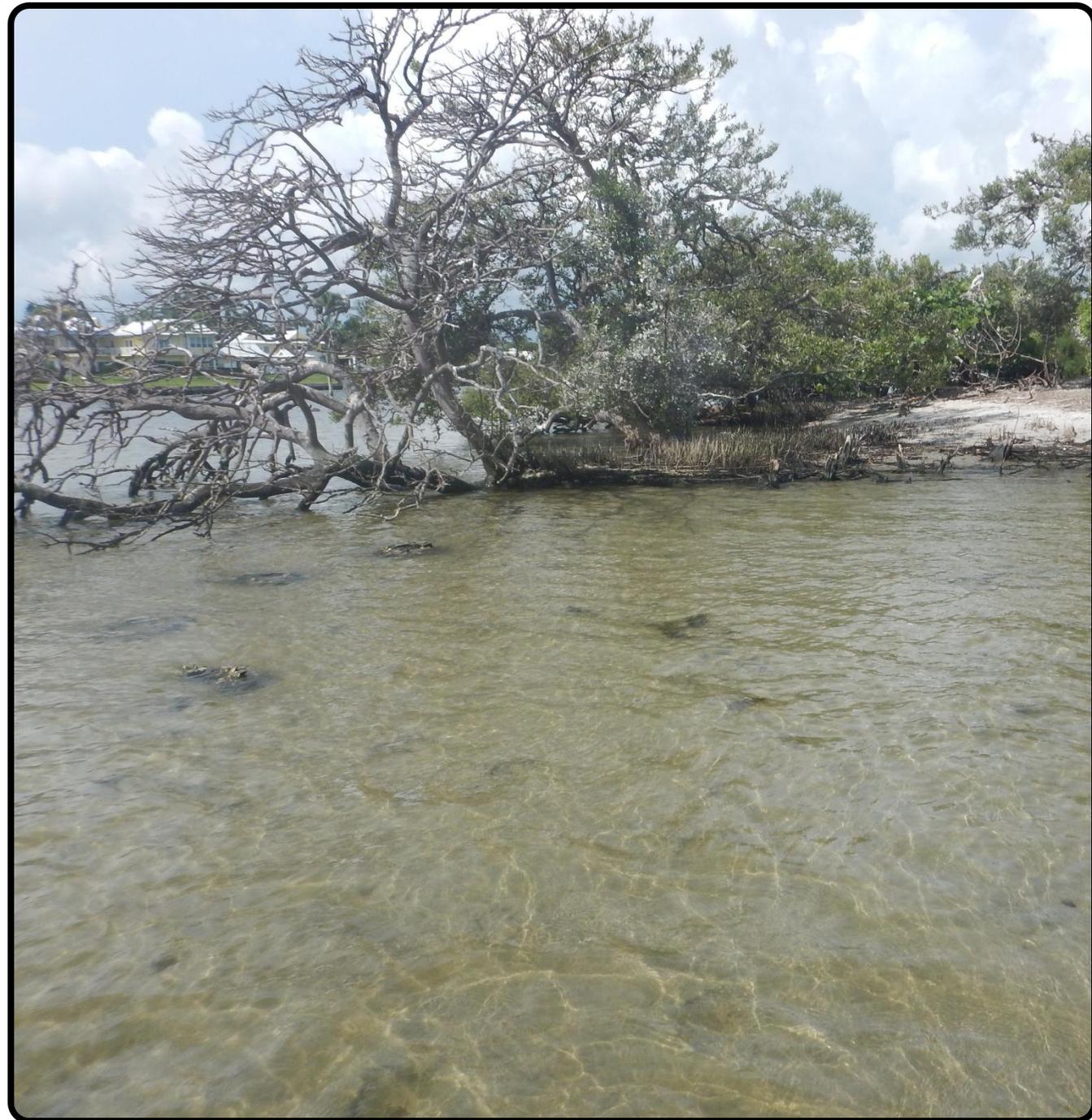
- Oyster Clutch
- Reef modules
- Riprap mangrove planters
- Planting efforts





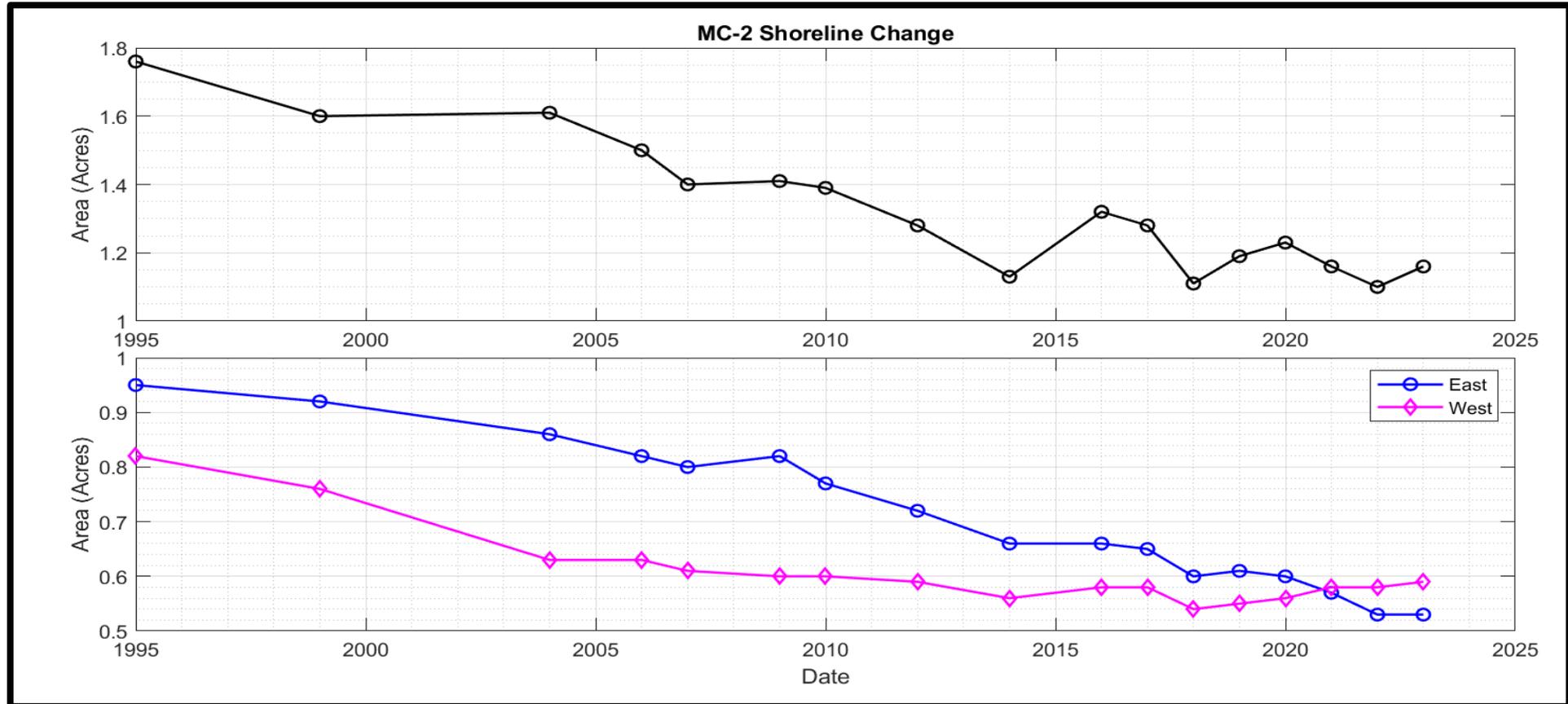
Post-Construction

- Additional 10% loss of land mass since breakwater installation
- Significant loss of mangrove trees
- Stantec to complete site evaluation and design alternatives





Shoreline Change Trends



Shoreline change of Bird Island CWA (MC-2) from 1995 to 2023 (top), and a comparison of the shoreline change of the east vs. west shorelines of the island (bottom).



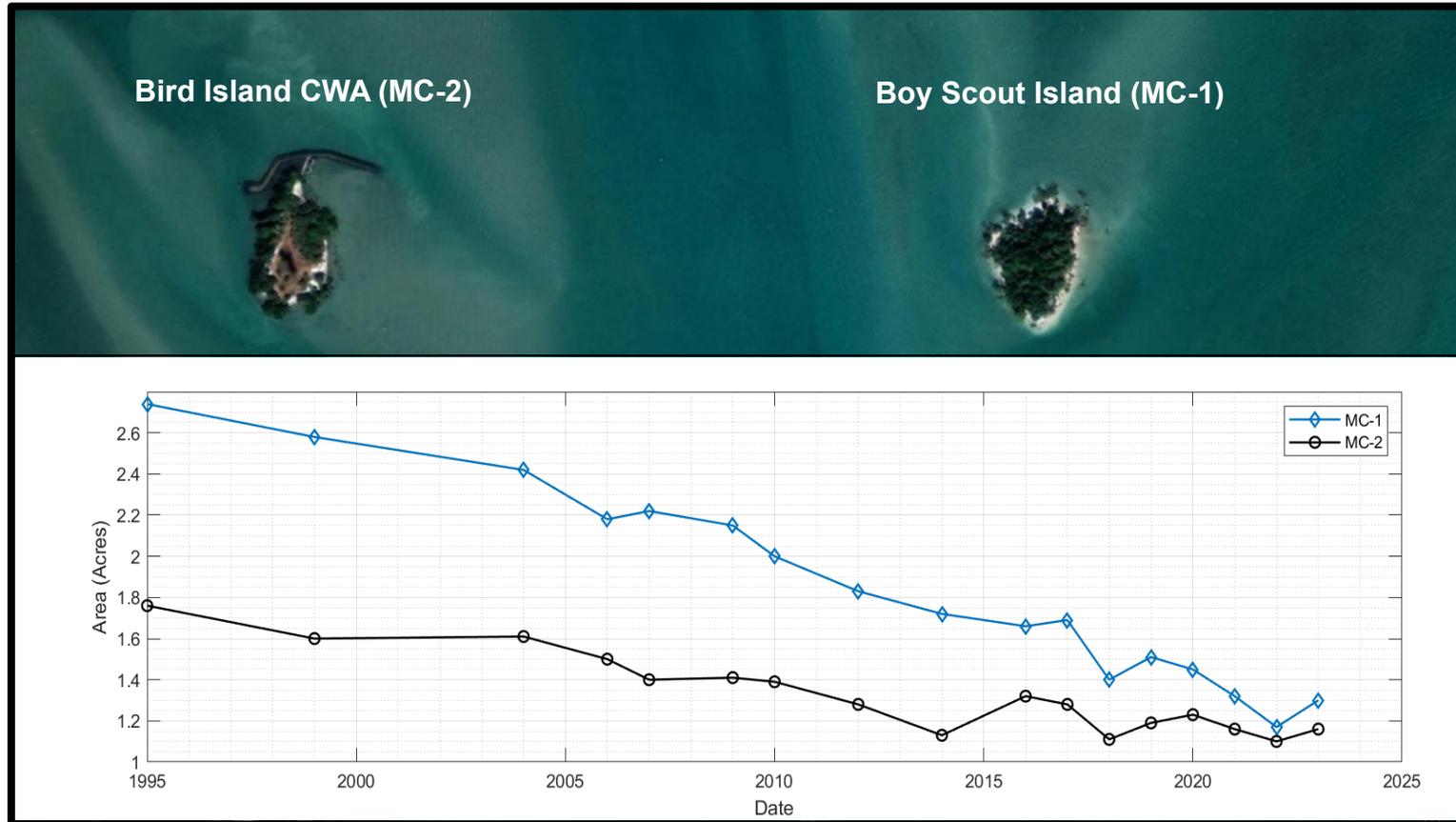
Shoreline Change Trends



Aerial comparison of shoreline change between the years 2012 (blue), 2018 (red), and 2023 (yellow).



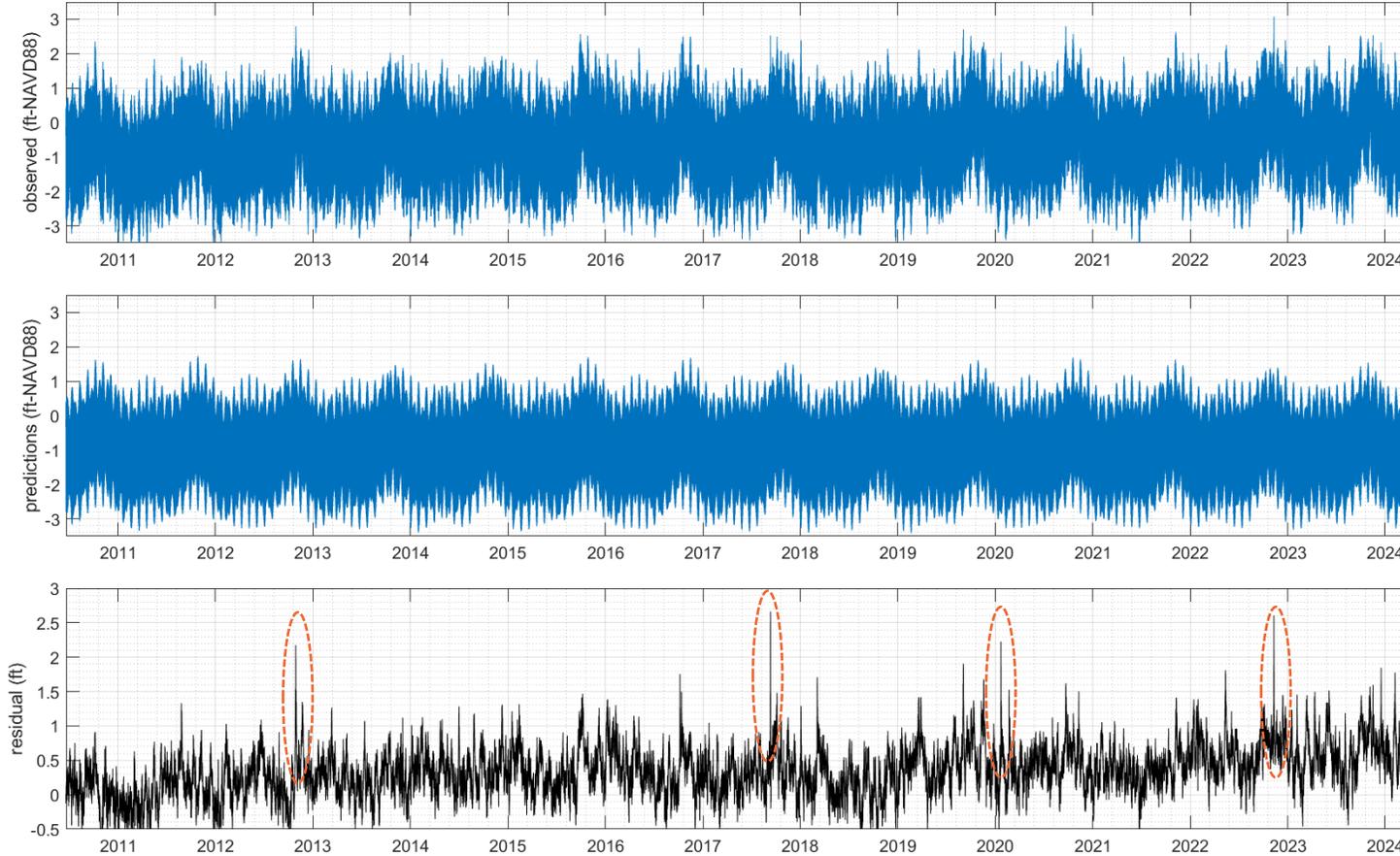
Shoreline Change Trends



Comparison of shoreline change rates for Boy Scout Island (MC-1) and Bird Island (MC-2) from 1995 to 2023. The Island areas, displayed in acres, are approximate and based on Google Earth Aerial Imagery.



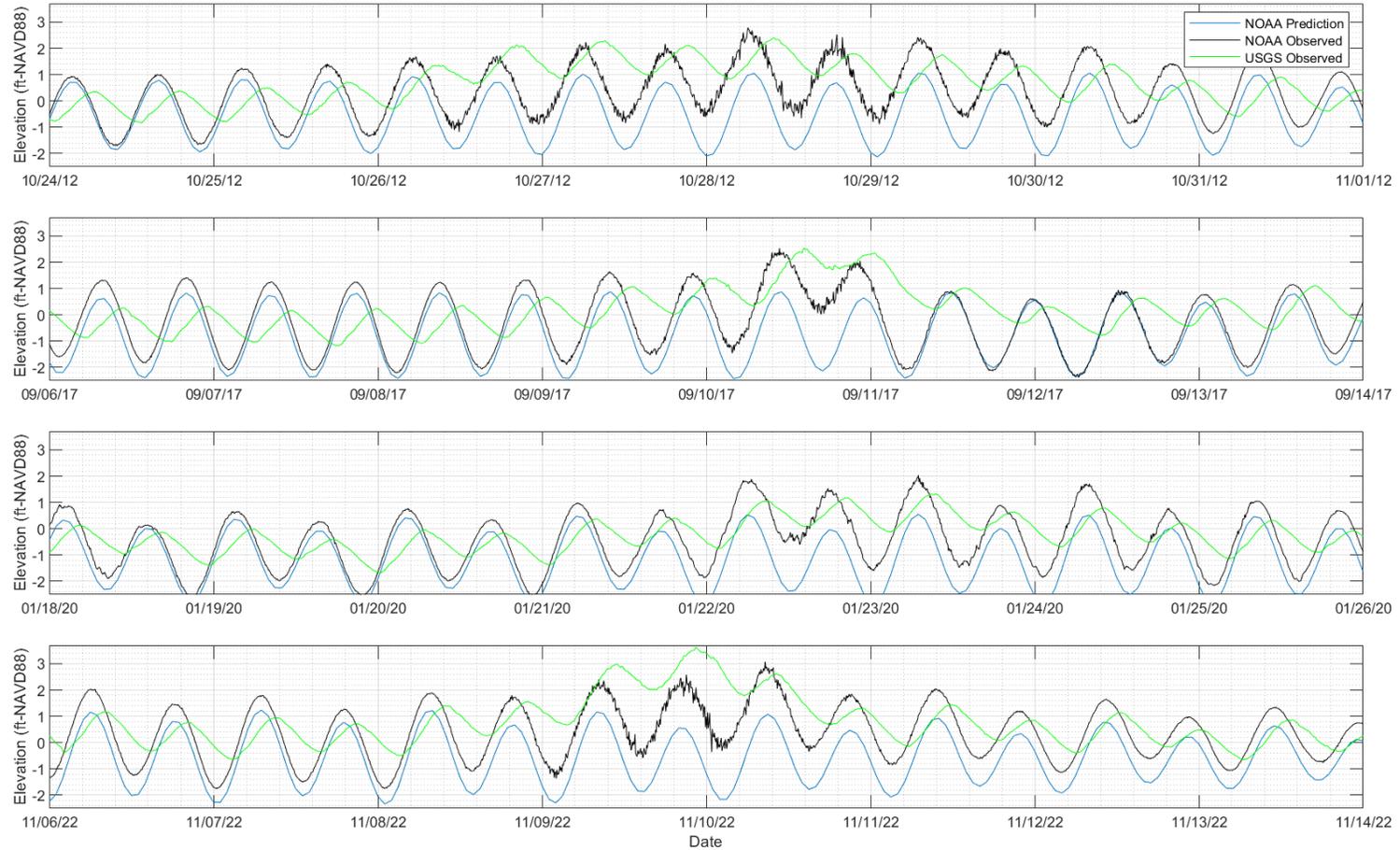
Extreme Water Levels



Comparison of observed tides (top) predicted (middle) and the tidal residual (bottom) for all records at the Lake Worth Pier Tide gauge (8722670). Storm events with tidal residual greater than 2 feet are circled in orange.



Extreme Water Levels



Comparison of water level observations (blue) and predictions (black) at Lake Worth Pier, to observations in St. Lucie River (green) during the four events identified.



Proposed Design Alternatives

Component 1:

Increase Center Island Elevation

Component 2:

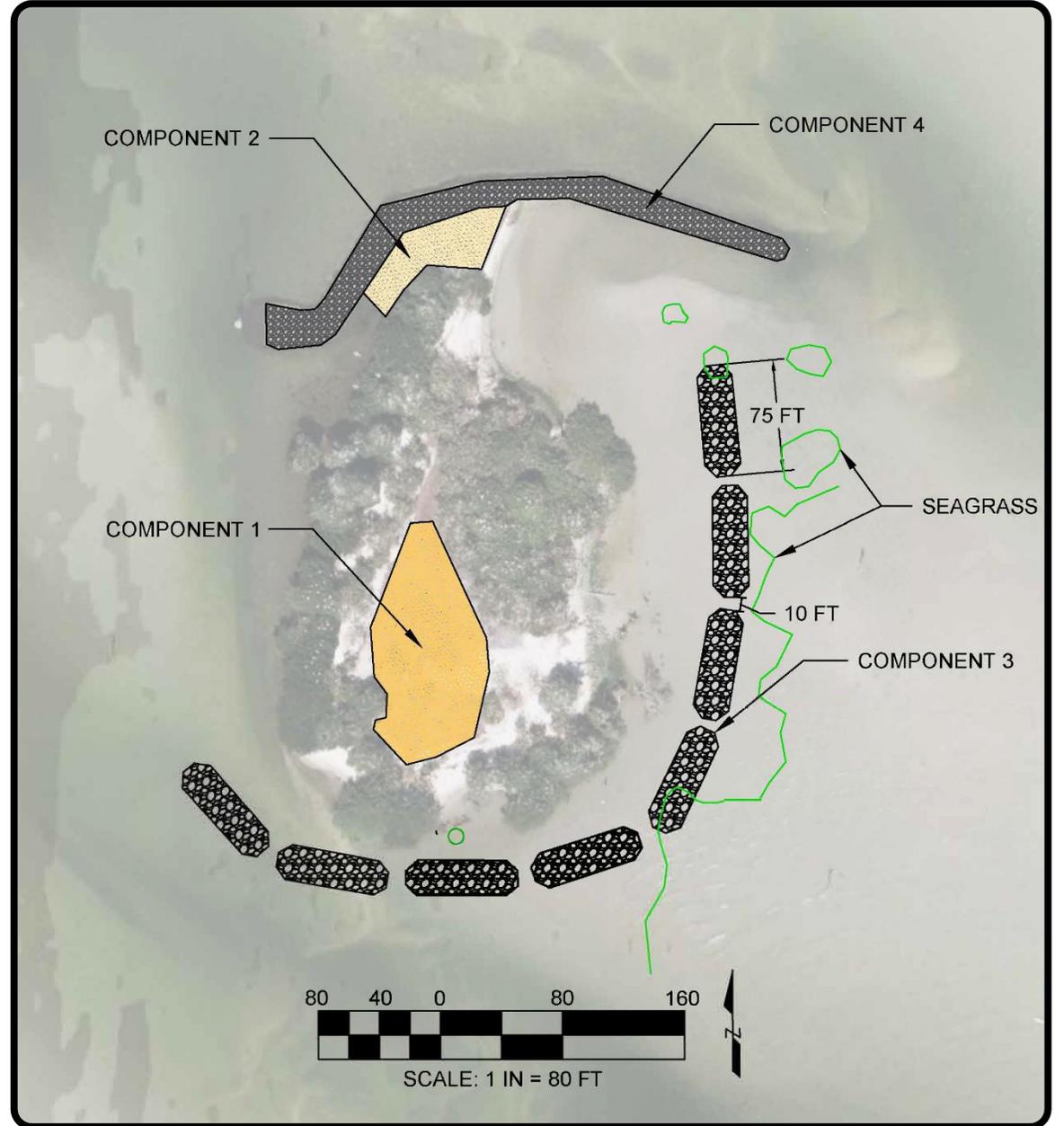
Restore North Point

Component 3:

Segmented Breakwaters

Component 4:

Increasing Elevation of Existing Breakwater





Component 1: Increase Center Island Elevation

- Raise center of island with beneficial dredge material
- Combat sea level rise
- Restore mangrove nesting habitat





Component 2: Restore North Point

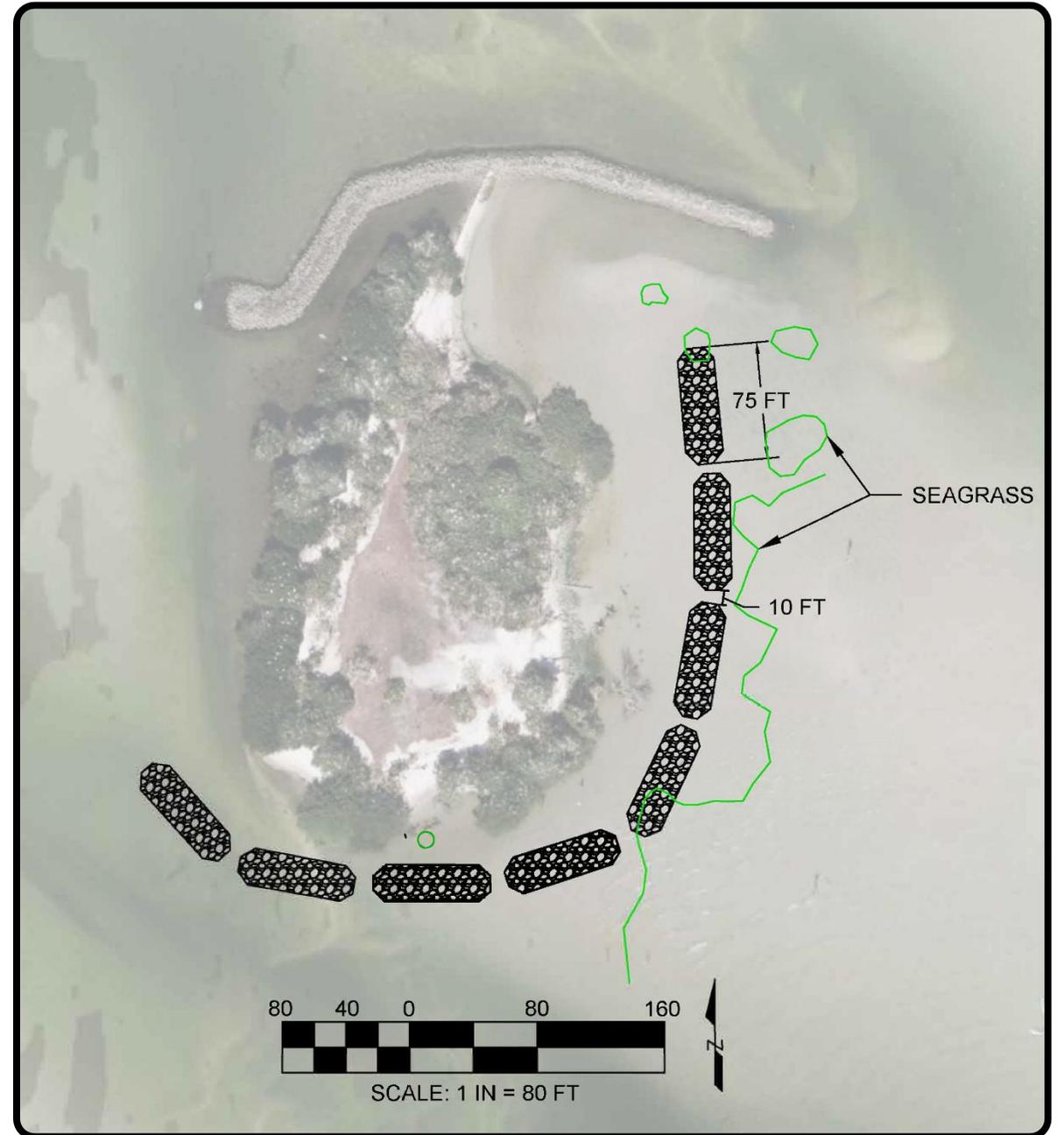
- Deep water area developed behind breakwater post-construction
- Lack of aquatic resources due to poor circulation and silty sediment
- Fill with beneficial dredged material to restore ecological function





Component 3: Segmented Breakwaters

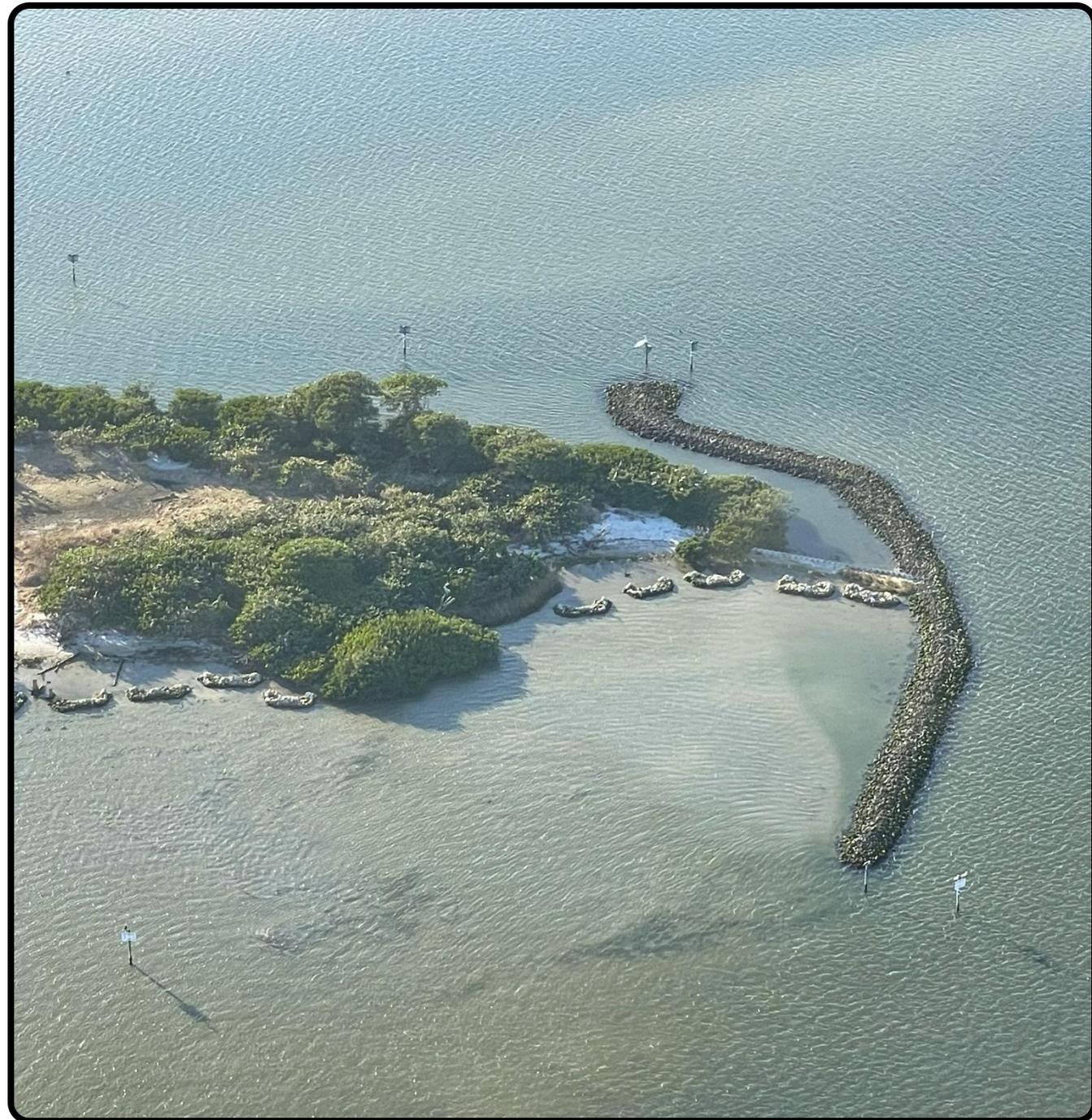
- Series of 8 Breakwaters
- Approximately 75 ft long
- 10 ft gaps for water circulation





Component 4: Increasing Elevation of Existing Breakwater

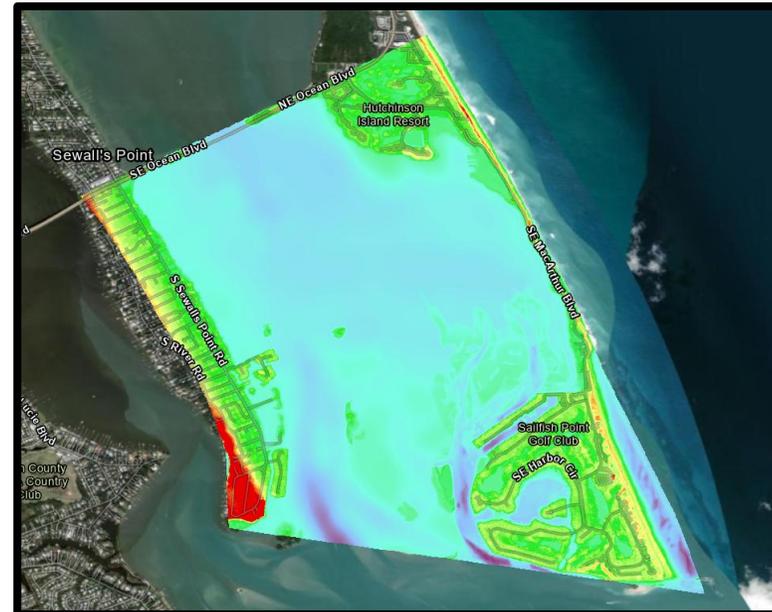
- Use present storm data to plan proper elevation for future resilience





Moving Forward with Modeling and Design

- Modeling proposed alternatives for selection of one or more alternatives
- Implementing each alternative into a Delft3D-FM model
- Compare alternatives in both present day and future sea level rise conditions
- Use model to inform decisions in the design phase





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Thank you

