Weeks Bay Watershed

Shoreline Assessment & Potential Effects of Climate Change

Presented to Stakeholder Working Group

November 16, 2016

ecology and environment, inc.
Global Environmental Specialists

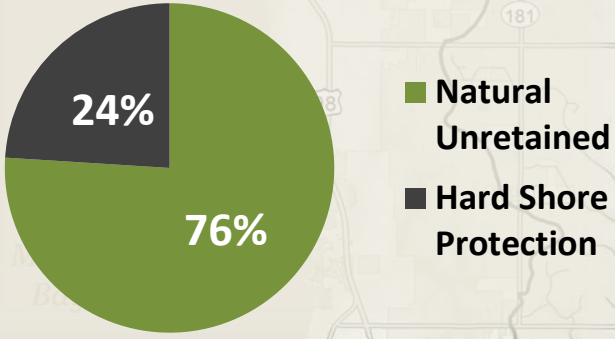
Overview of Assessment

- **Existing Shoreline Protection**
  (from GSA Study)
- **Historical Shoreline Changes**
  (1955 vs. Current aerials photos)
- **Sea Level Rise (SLR) Records and Predictions**
- (Dauphin Island Gauge & USACE/NOAA SLR Curves)
- **Potential Impacts of Future SLR**
  Potential future impacts to habitats and infrastructure (Prediction Models)

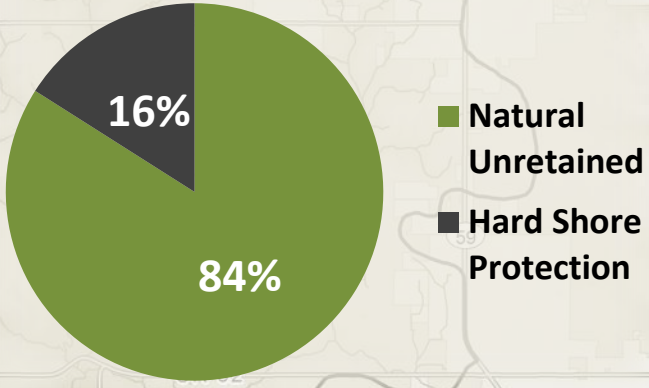
Shoreline Assessment Area

Existing Shoreline Protection

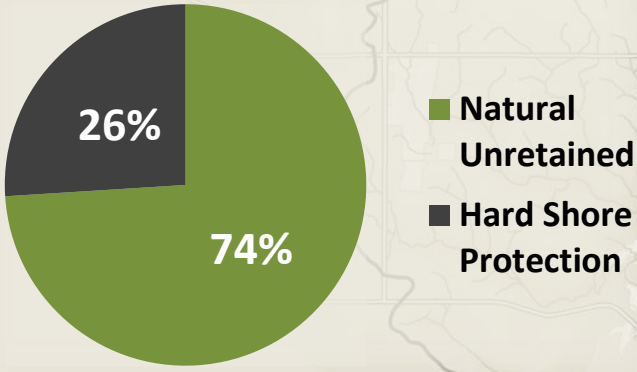
Fish River
(30 mi. of Shoreline)



Magnolia River
(15 mi. of shoreline)



Weeks Bay
(11 mi. of shoreline)



Historic Shoreline Changes

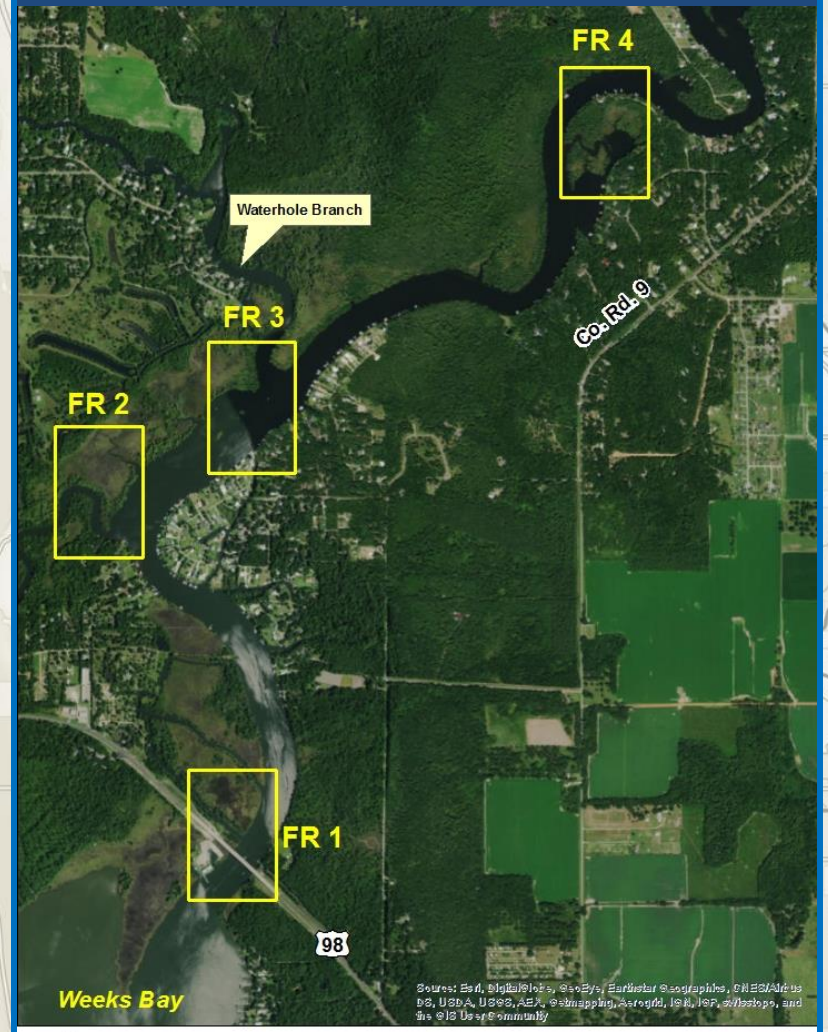
Compared 1955 aerial photos with recent aerial photos

The assessment focused on observable changes to features such as:

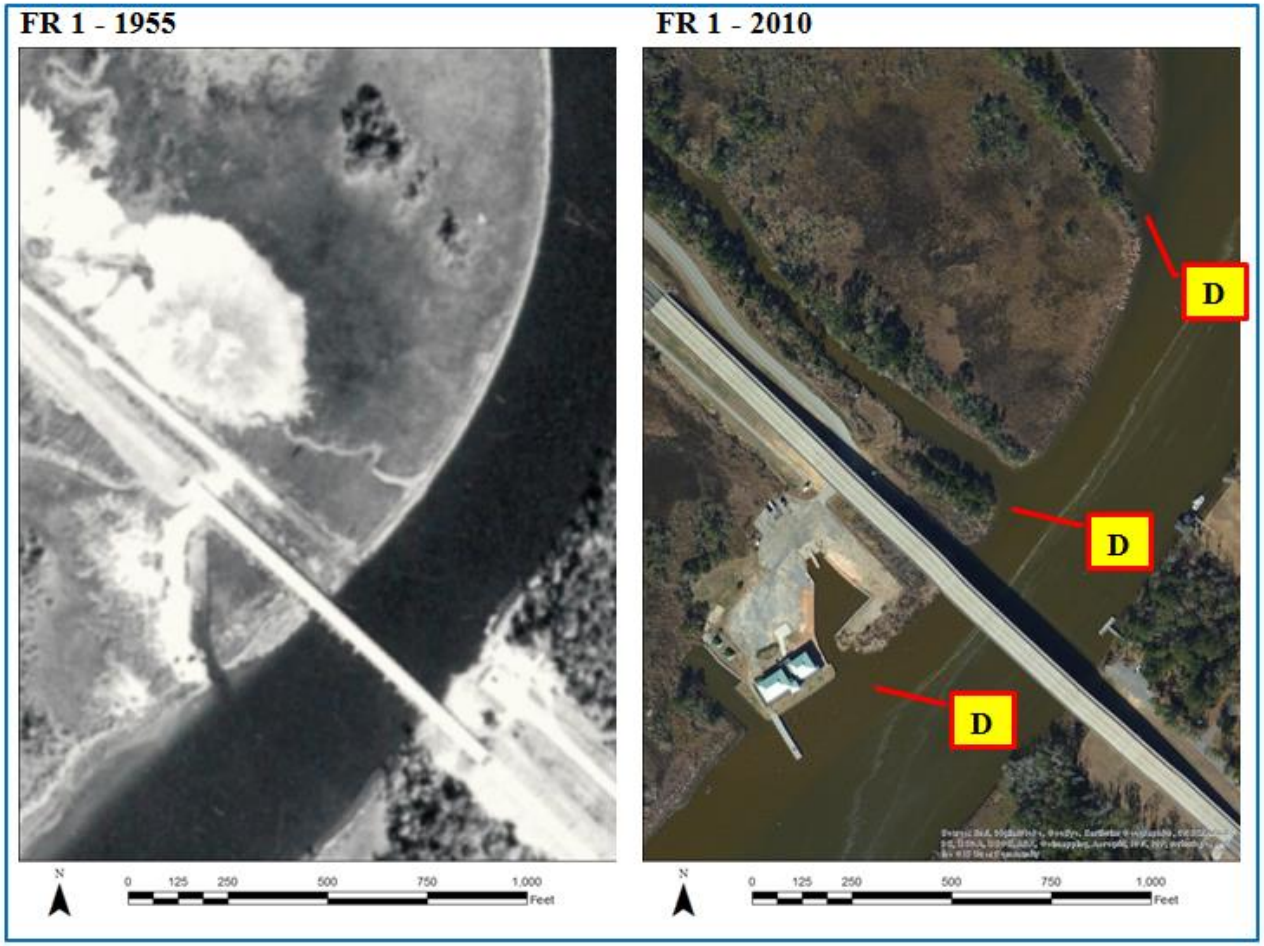
- Shoreline geometry;
- Width and route of the rivers and tributaries;
- Major man-made alterations to the shoreline;
- Size and shape of peninsulas and islands; and
- Location and extent of marshes.

Historic Shoreline Changes

Aerial Photo Comparison Sites on Fish River



Historic Shoreline Changes



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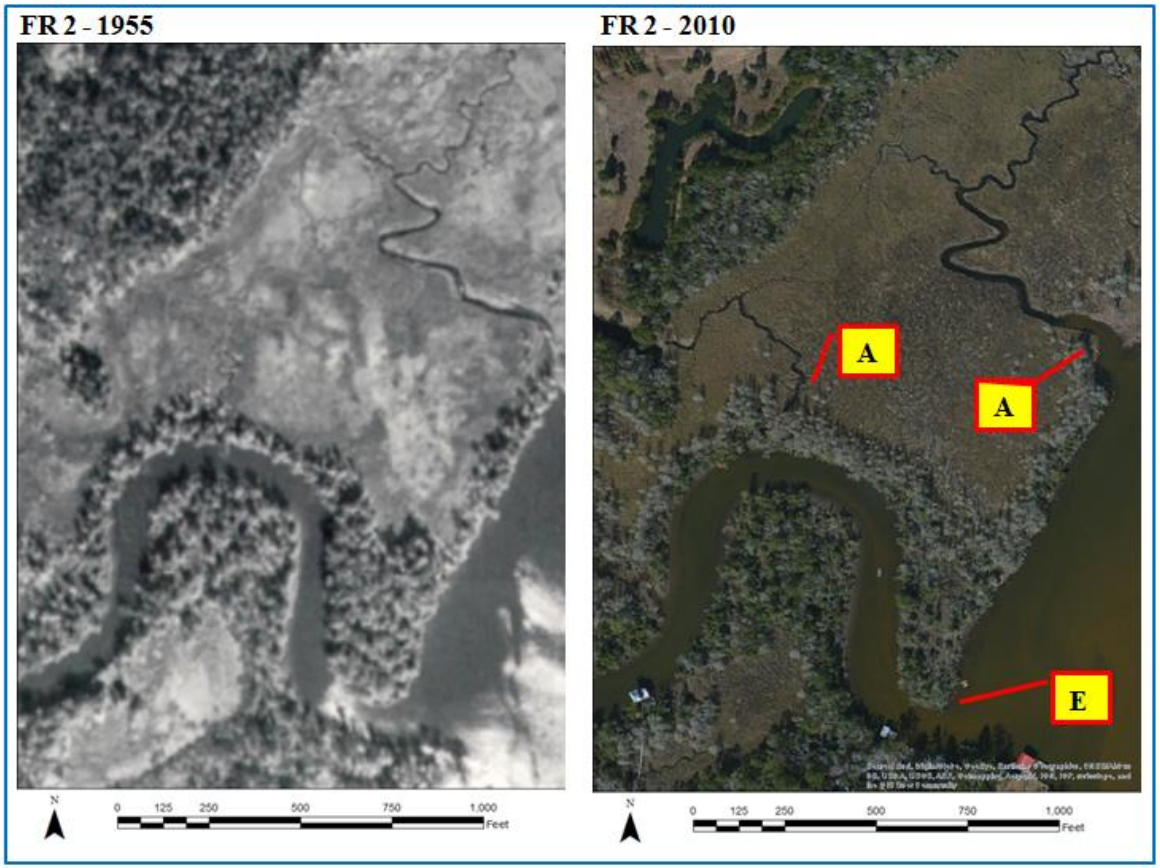
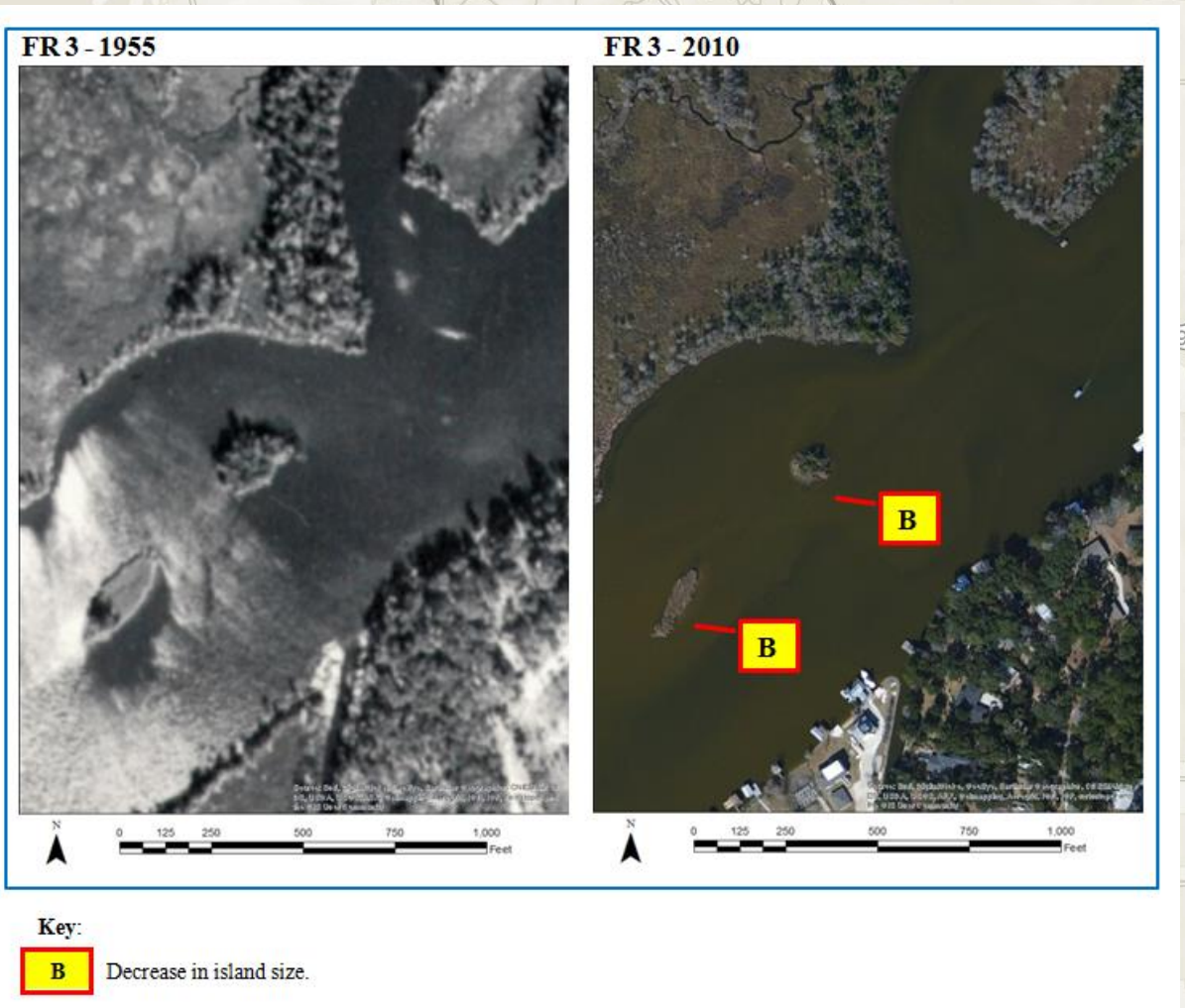


Key:

A Increase in stream width.

E Narrowing of peninsulas.

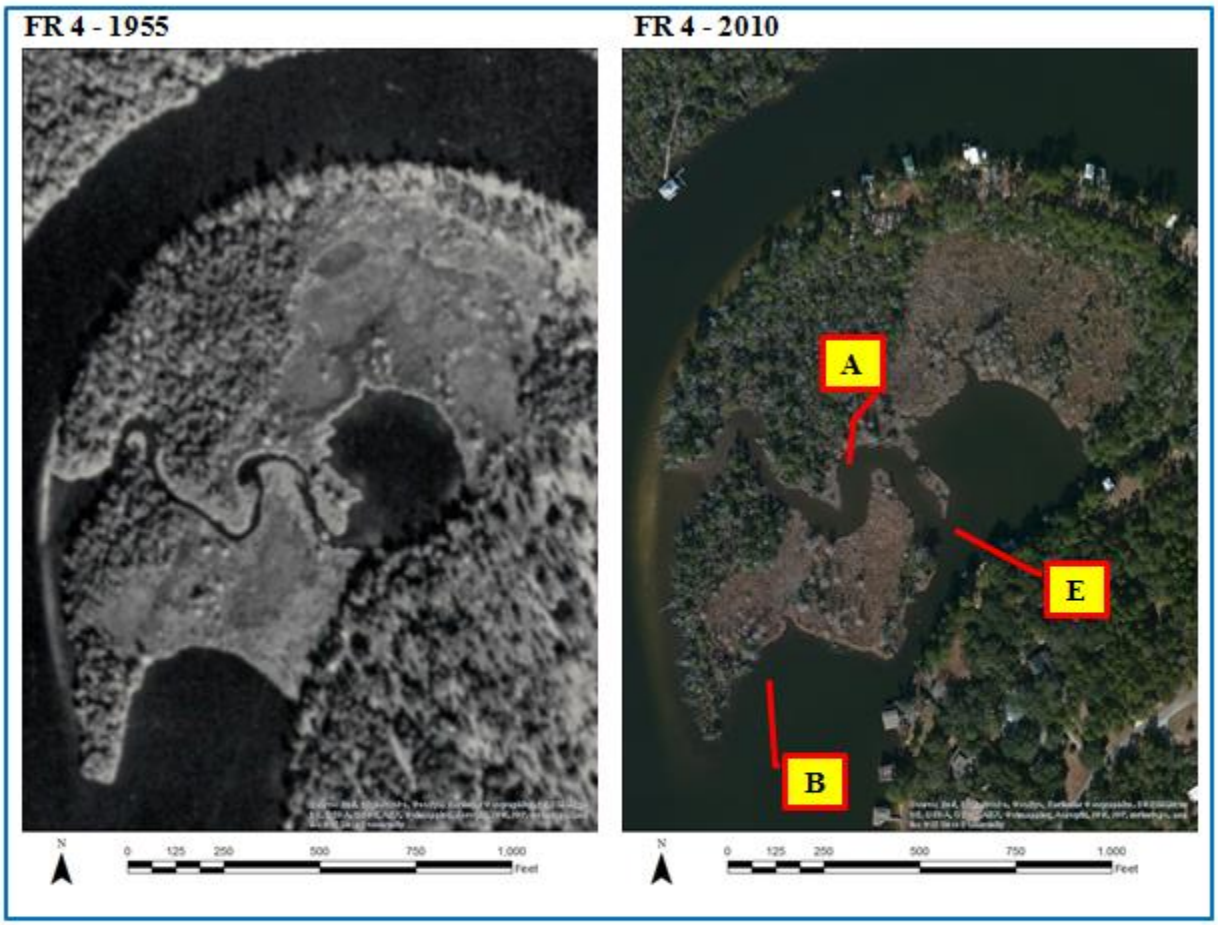
Historic Shoreline Changes



Key:

B Decrease in island size.

Historic Shoreline Changes

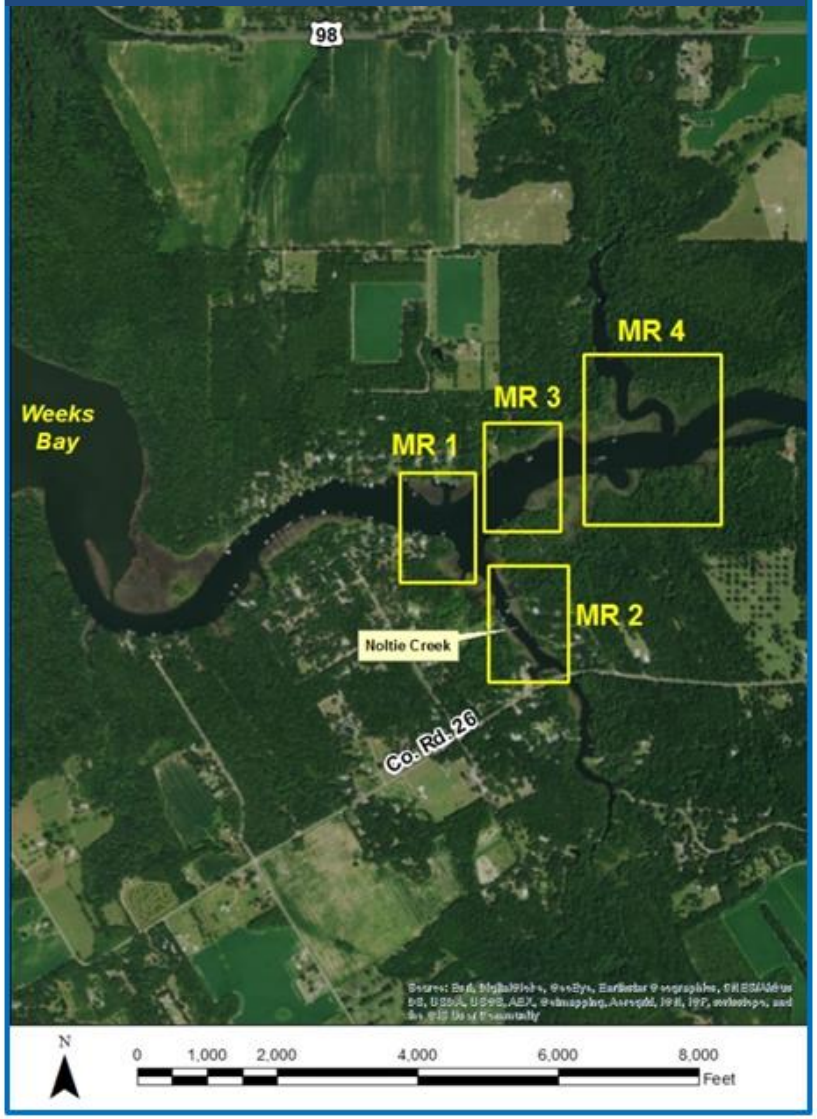


Key:

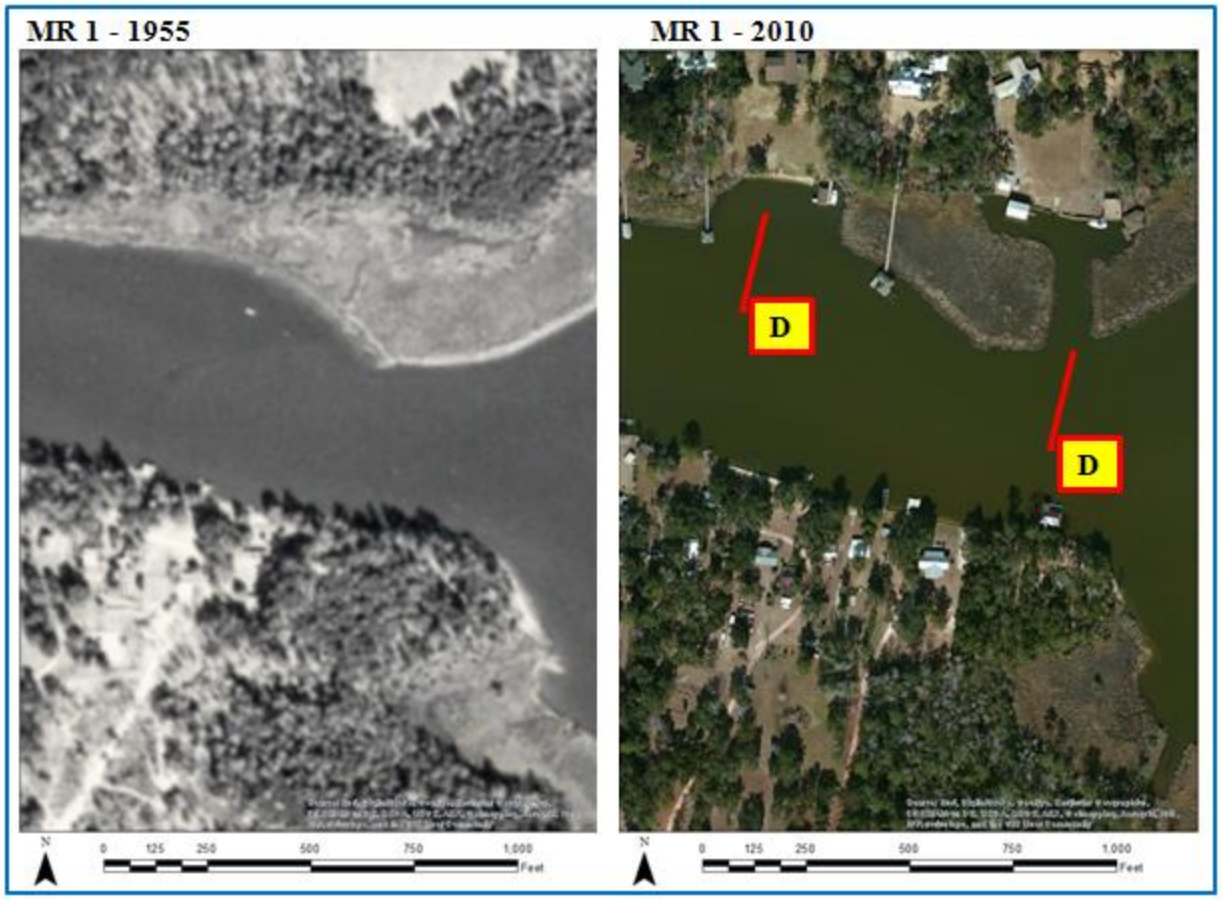
A	Increase in stream width.
B	Decrease in island size.
E	Narrowing of peninsulas.

Historic Shoreline Changes

Aerial Photo Comparison Sites on Magnolia River



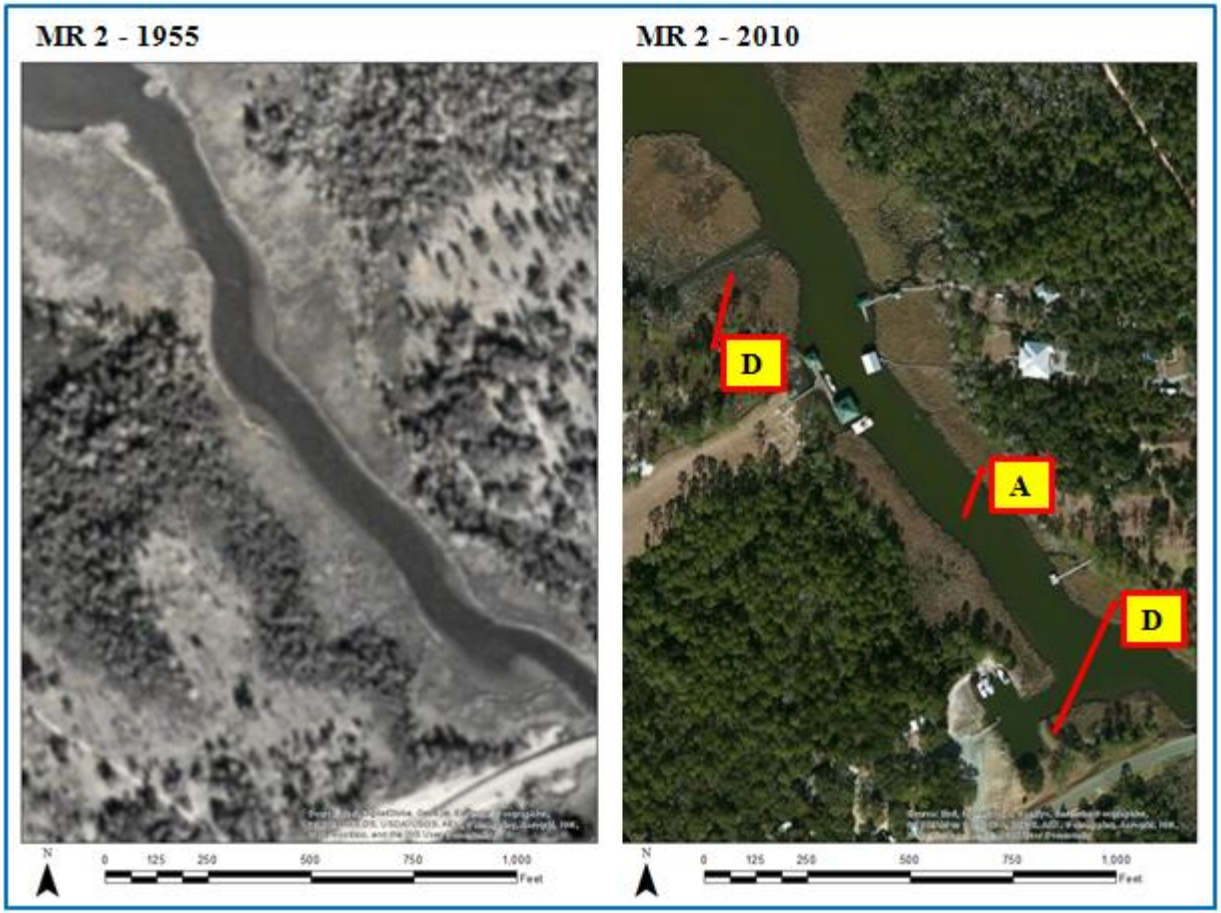
Historic Shoreline Changes



Key:

D — Man-made shoreline alteration (excavation).

Historic Shoreline Changes



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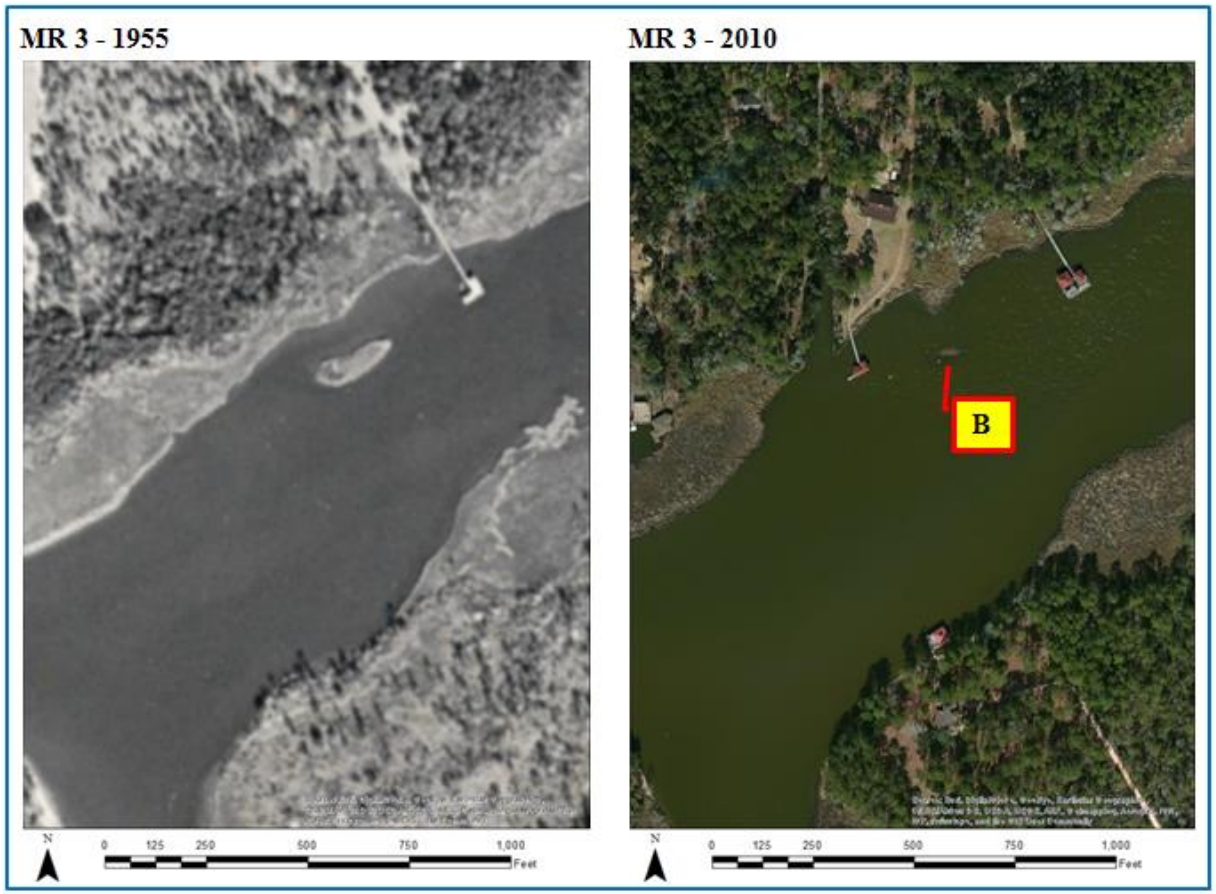
Historic Shoreline Changes



Key:

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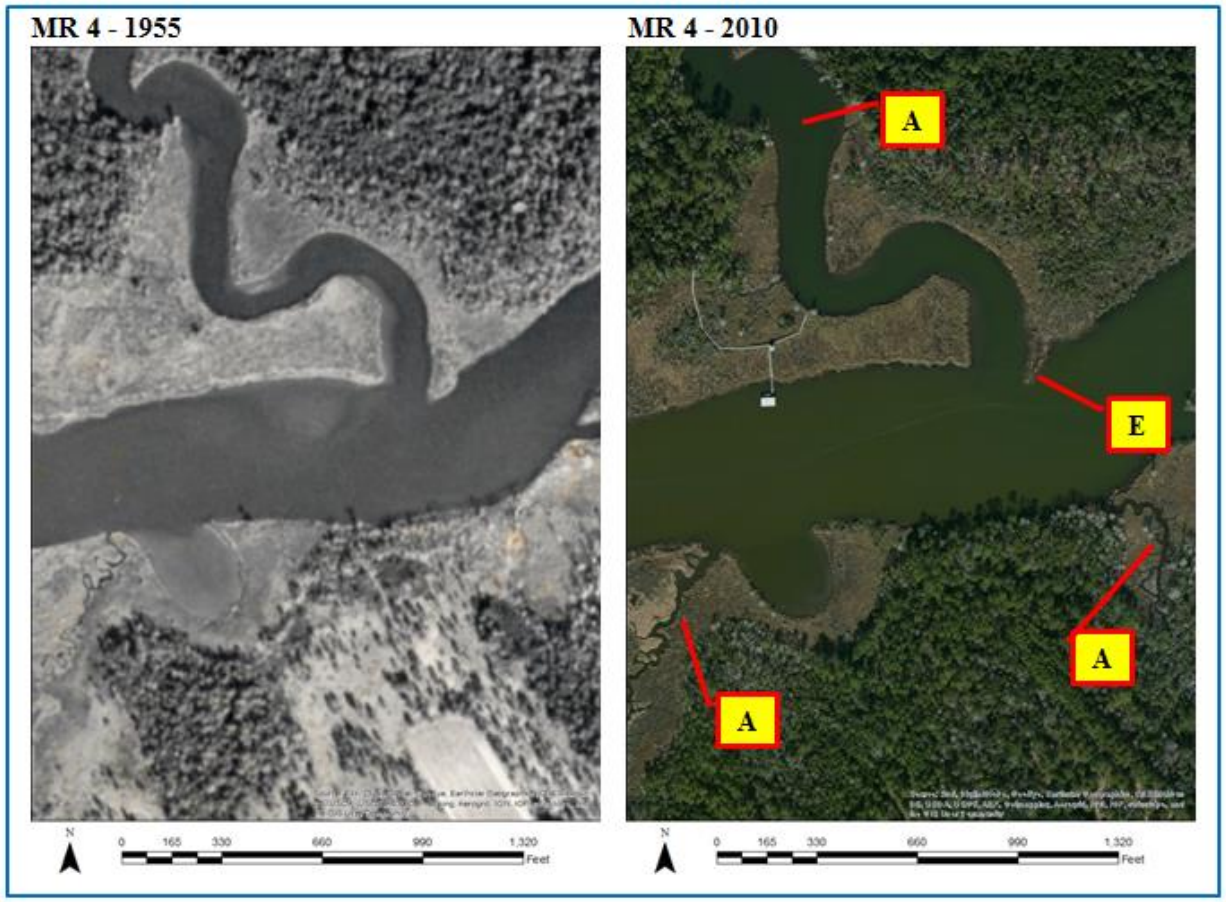
Historic Shoreline Changes

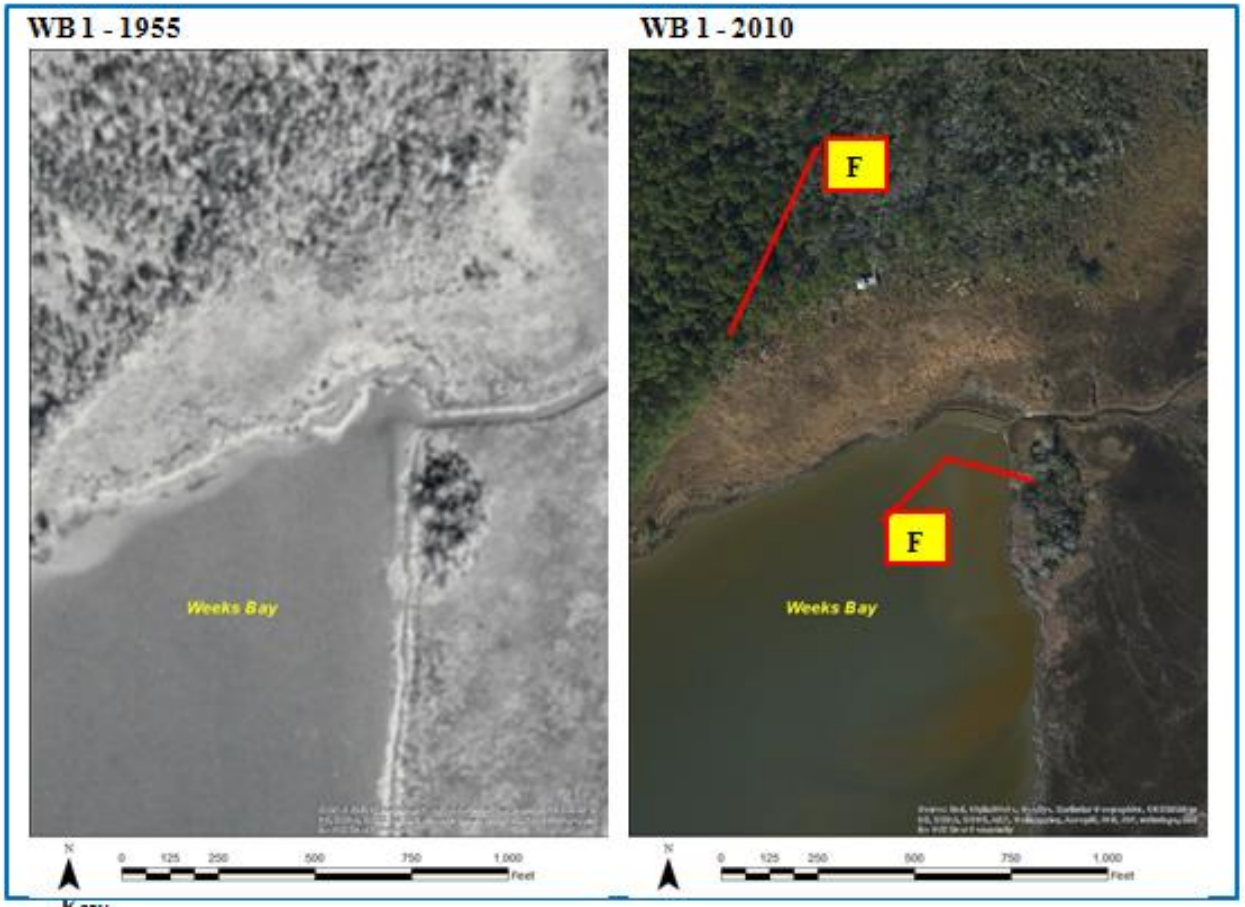


Key:

A	Increase in stream width.
E	Narrowing of peninsulas.

Historic Shoreline Changes

Historic Shoreline Changes



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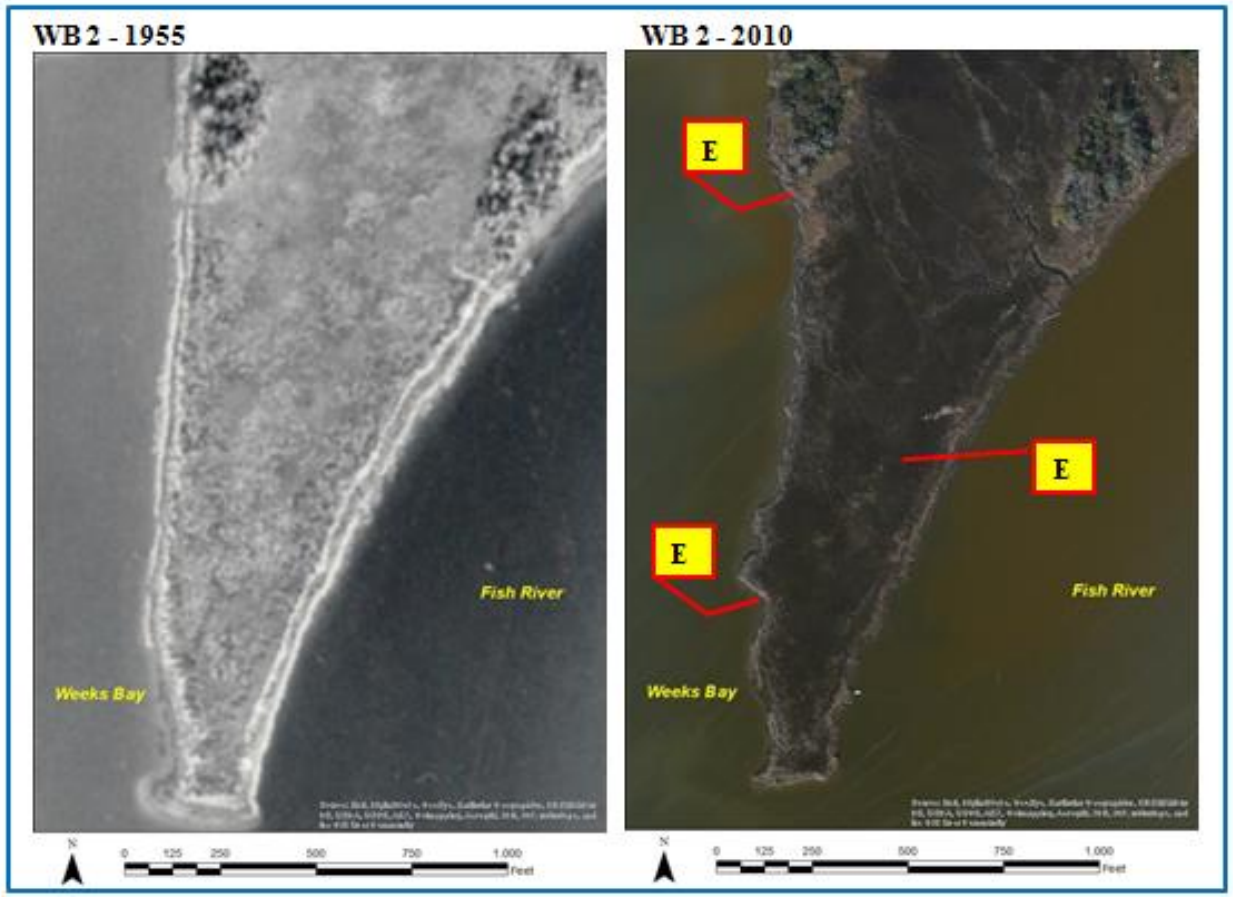

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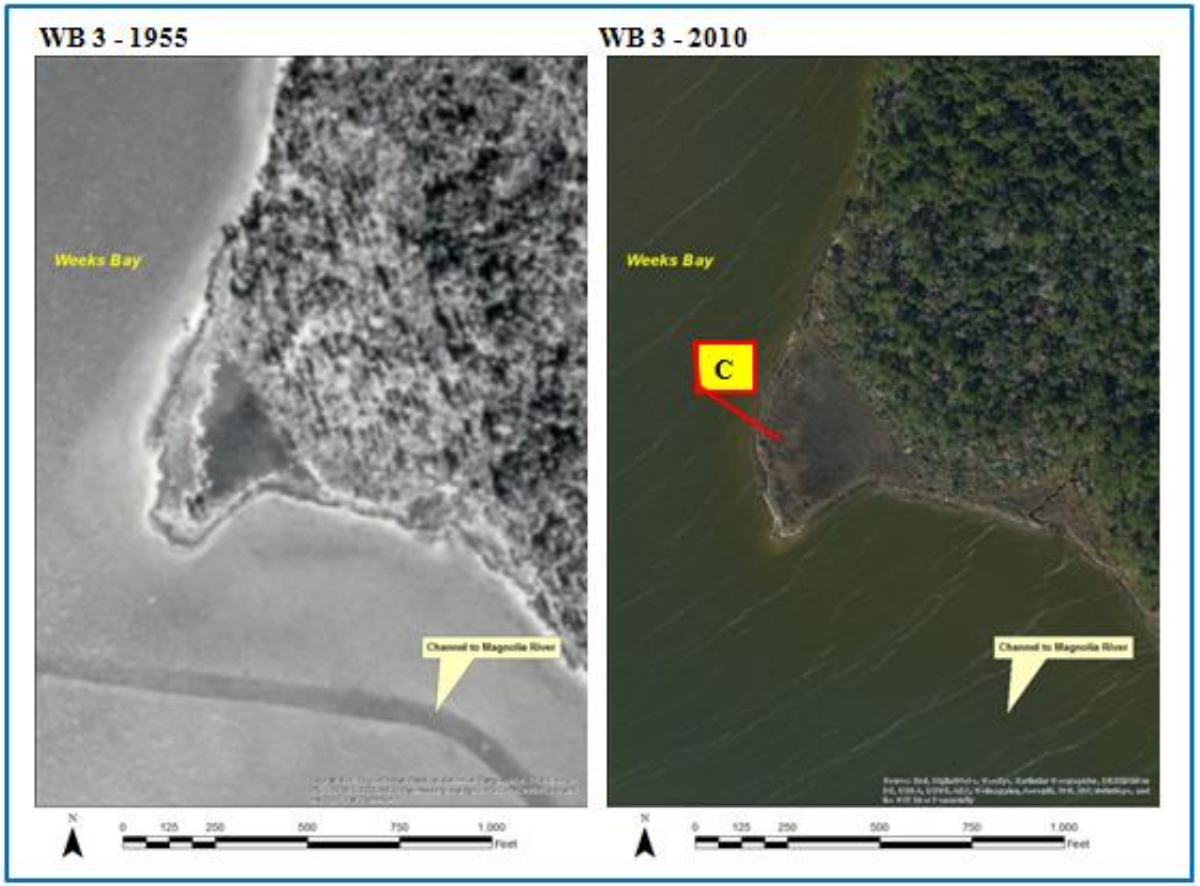
Historic Shoreline Changes



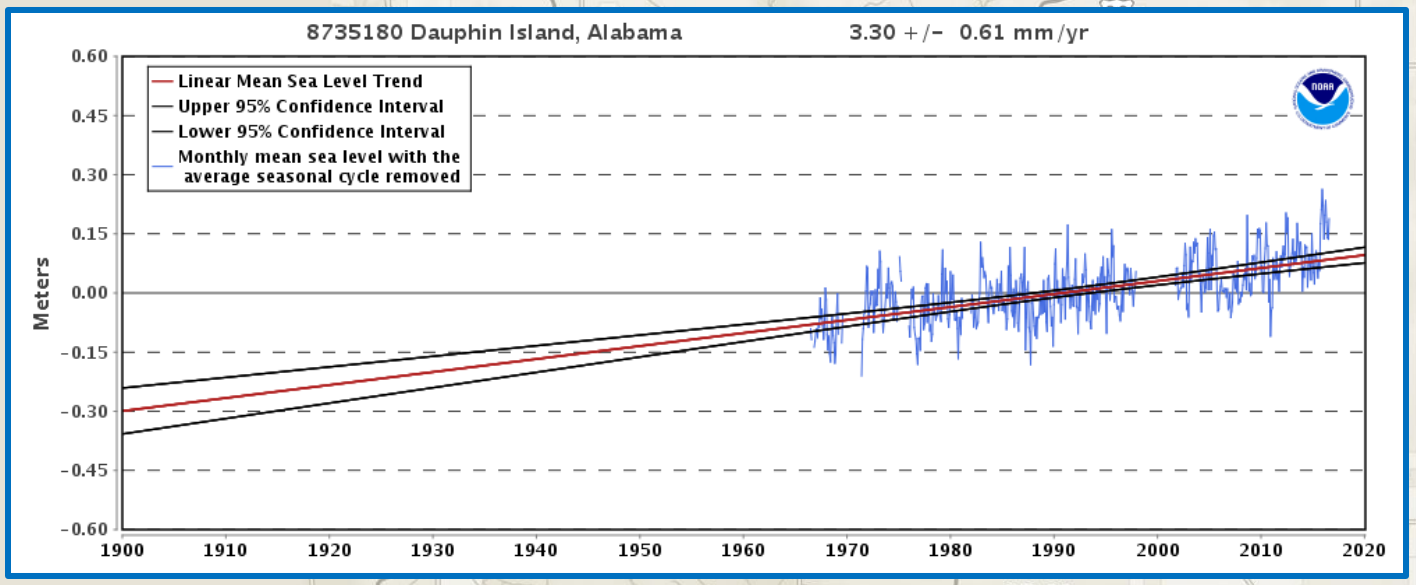
Key:

C Conversion to wetter habitat (i.e., from wooded wetland to marsh).

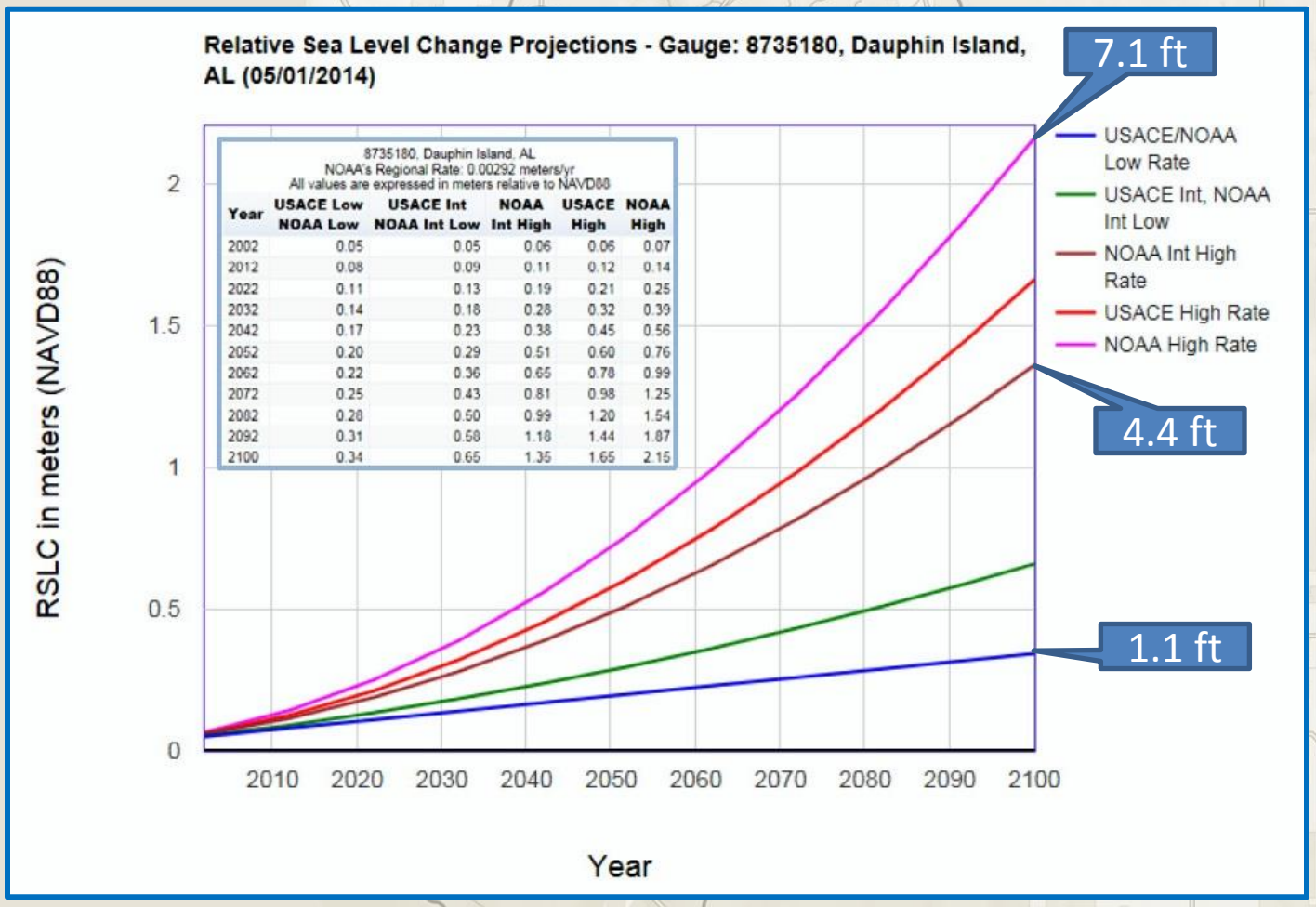
Historic Shoreline Changes

Sea Level Rise (SLR) Records

- Mean Relative Sea Level has risen 6.5 inches in the Mobile Bay Area since 1966

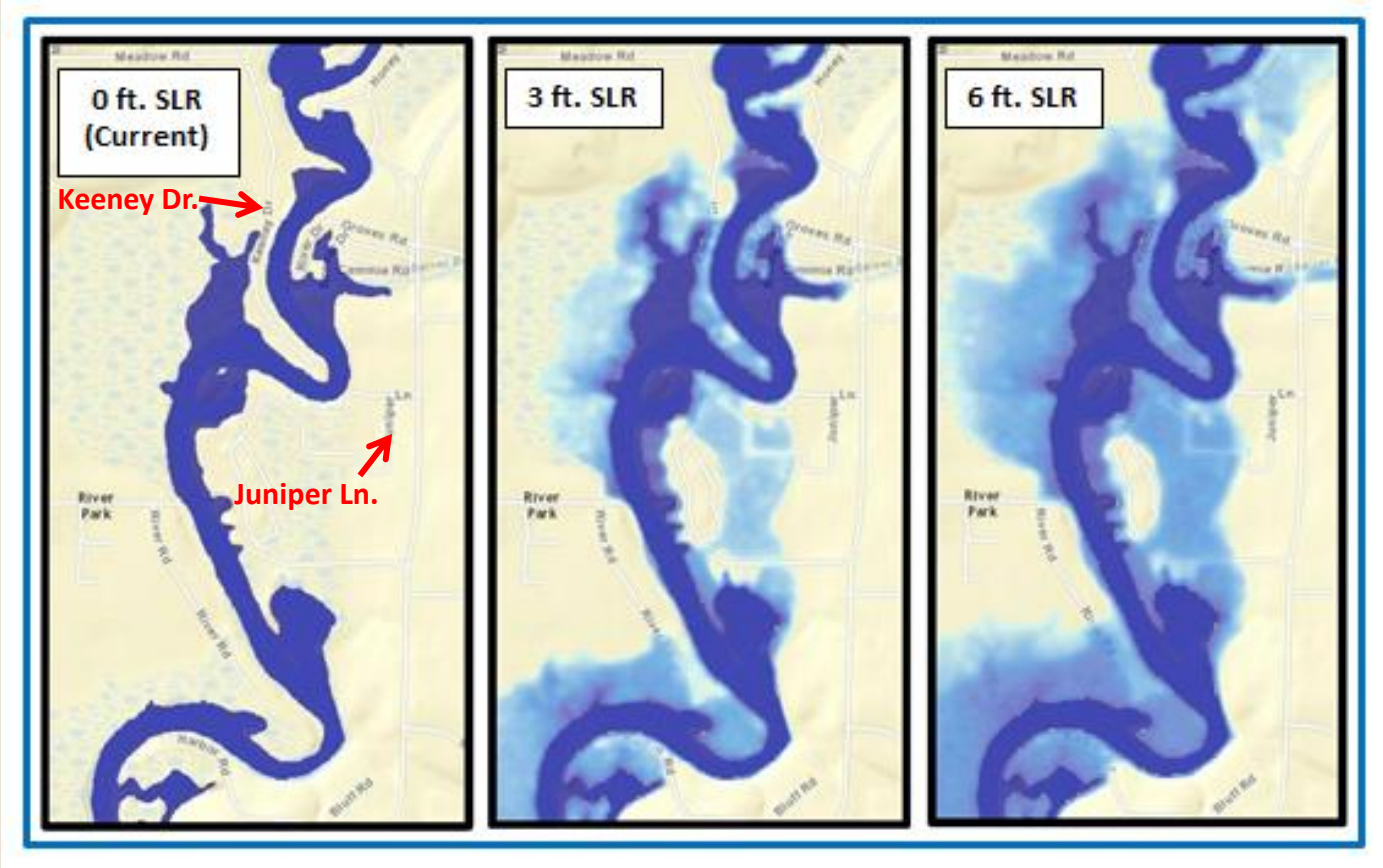


Sea Level Rise (SLR) Projections in Mobile Bay Area (by National Oceanic & Atmospheric Administration (NOAA) and U.S. Army Corps of Engineers (USACE)



Potential Effects of SLR

Inundation Models

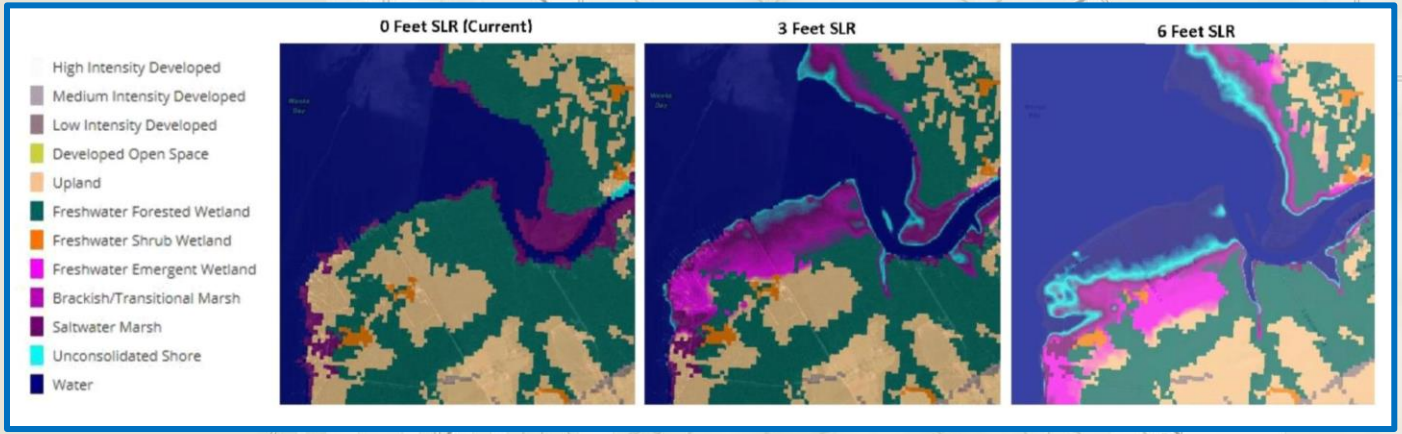


Predicted inundation along a portion of Fish River (as an example) under 3 SLR scenarios using NOAA's Online SLR Viewer

Potential Effects of SLR

Habitat Change Models

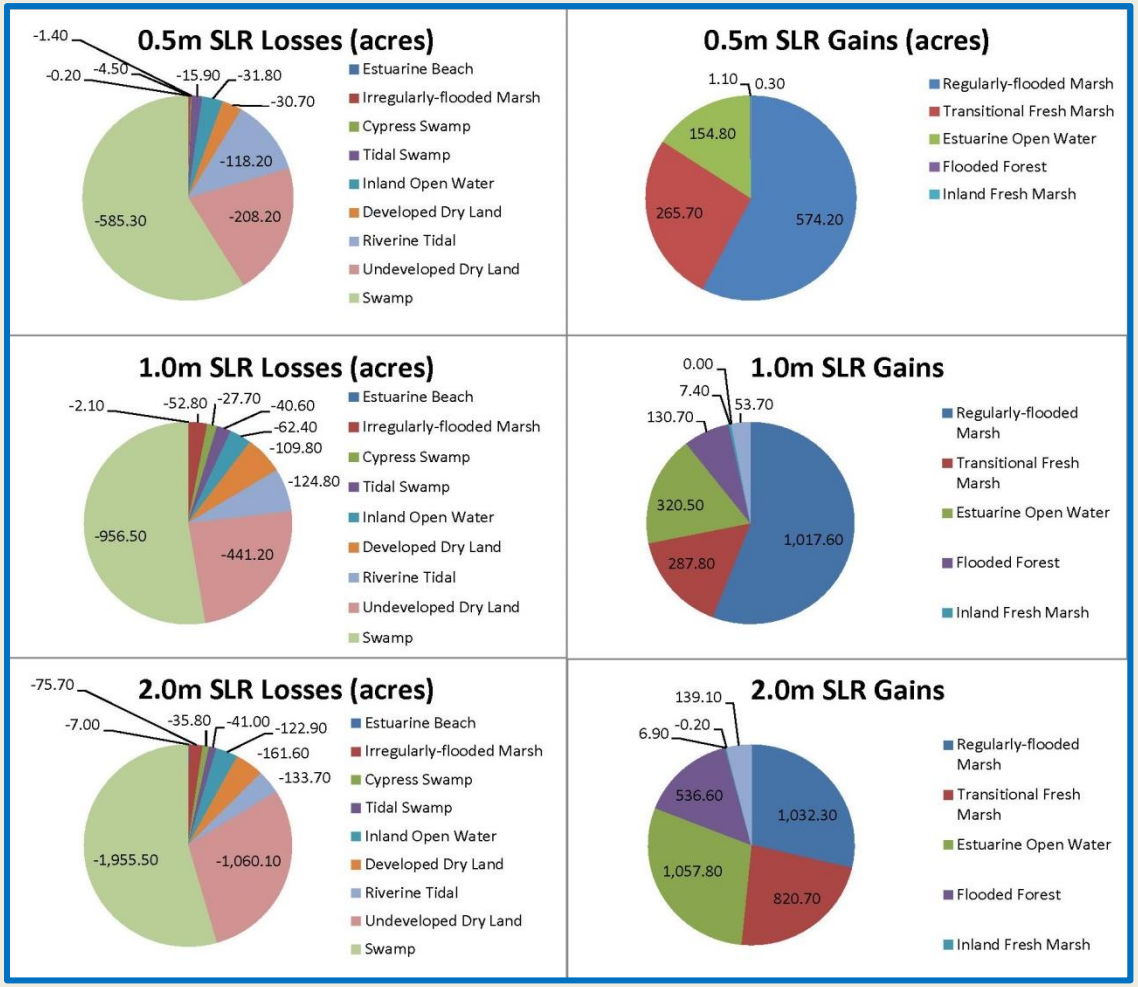
Sea Levels Affecting Marshes Model (SLAMM)



Predicted habitat conversion (showing uphill migration of wetlands) at mouth of Magnolia River (as an example) Under 3 SLR Scenarios

Potential Effects of SLR

Predicted Habitat Changes



Predicted Habitat Losses and Gains in Entire Weeks Bay Watershed from 2002 to 2100 under the 3 SLR Scenarios (Using SLAMM prediction model)

LOSERS

- All SLR scenarios = Largest Net Loss was "Swamp" acreage
- 2nd highest Net Loss = "Undeveloped Dry Land"

WINNERS**

- All SLR scenarios = Largest Net Gain was "Regularly Flooded Marsh"
- 2nd highest Net Gain at 1 & 2m scenarios = "Estuarine Open Water" followed by "Transitional Fresh Marsh" and "Flooded Forest"

** .....BUT,

- If SLR occurs too quickly, habitats don't have time to convert properly (and drown in place)
- If not enough "Swamp" and "Undeveloped Dry Land" is preserved, then the "Winners" above won't see the predicted gains


THANK YOU FOR PLANNING!!
(for our future generations)
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