

US EPA ARCHIVE DOCUMENT

Changes along the Texas Barrier-Island Coast

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Texas Coast
looking NE

Shoreline Length:

Gulf = 600 km

Bays = 9,400 km



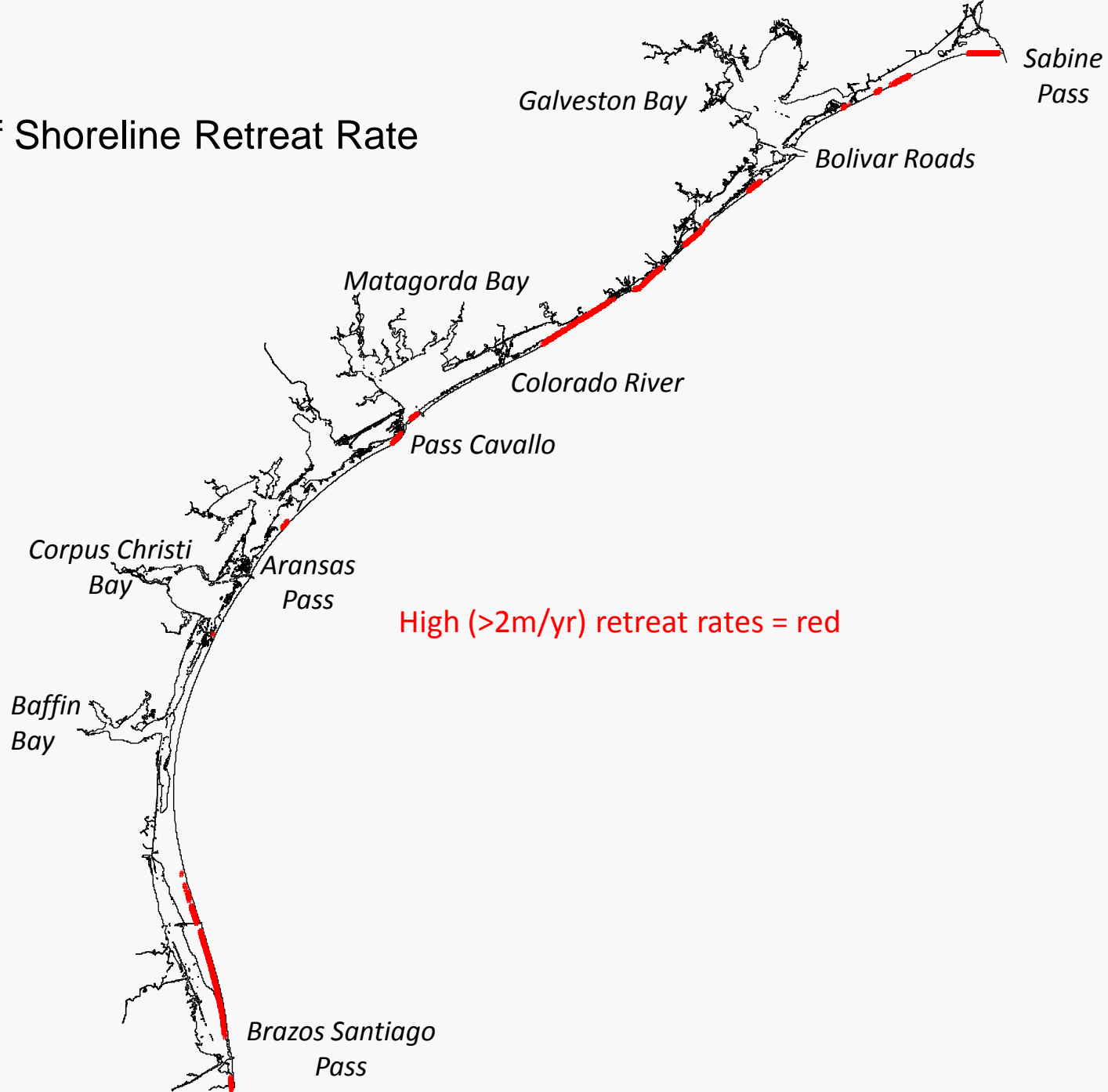


Mustang Island

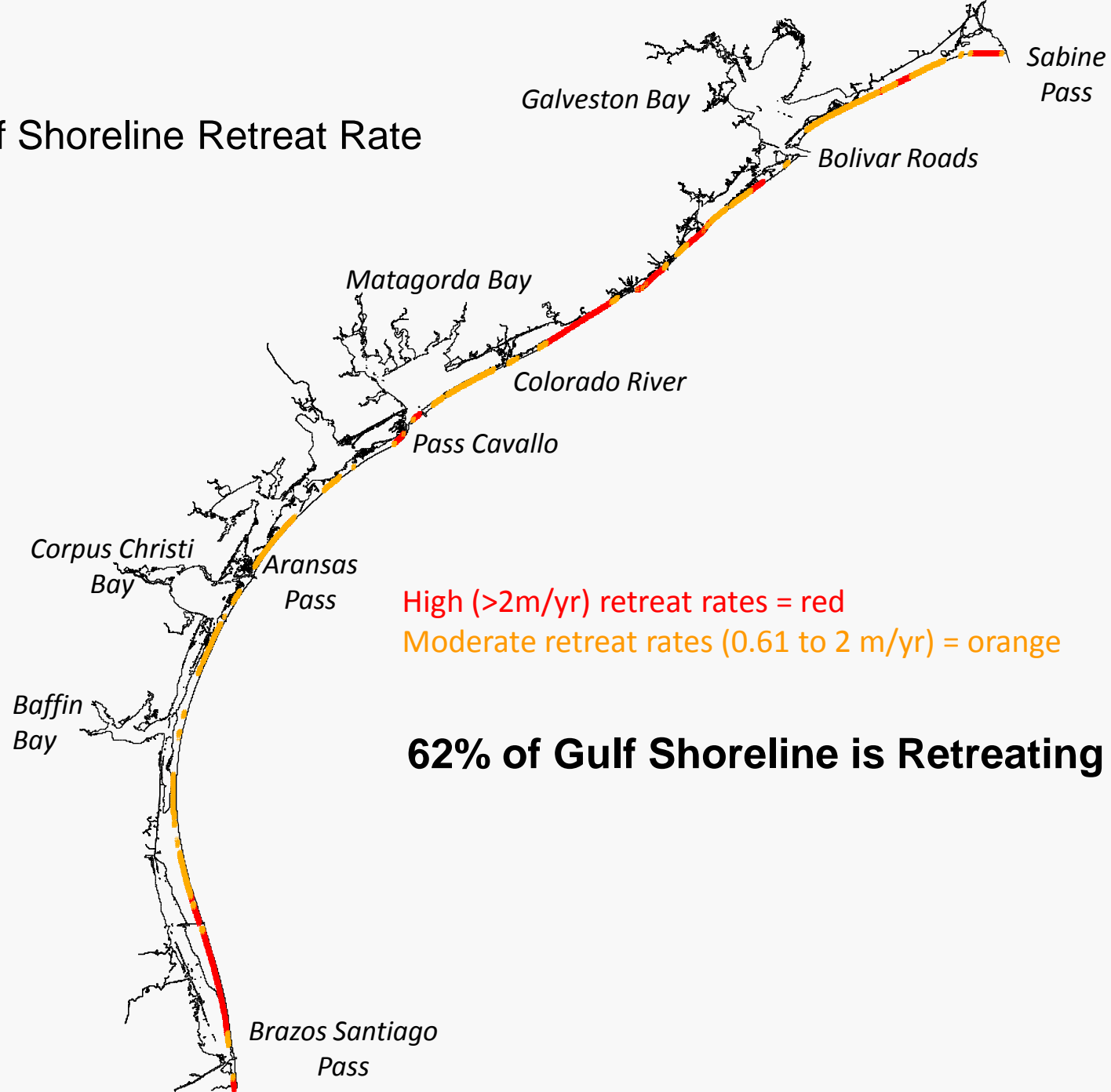


Matagorda Peninsula

Gulf Shoreline Retreat Rate



Gulf Shoreline Retreat Rate





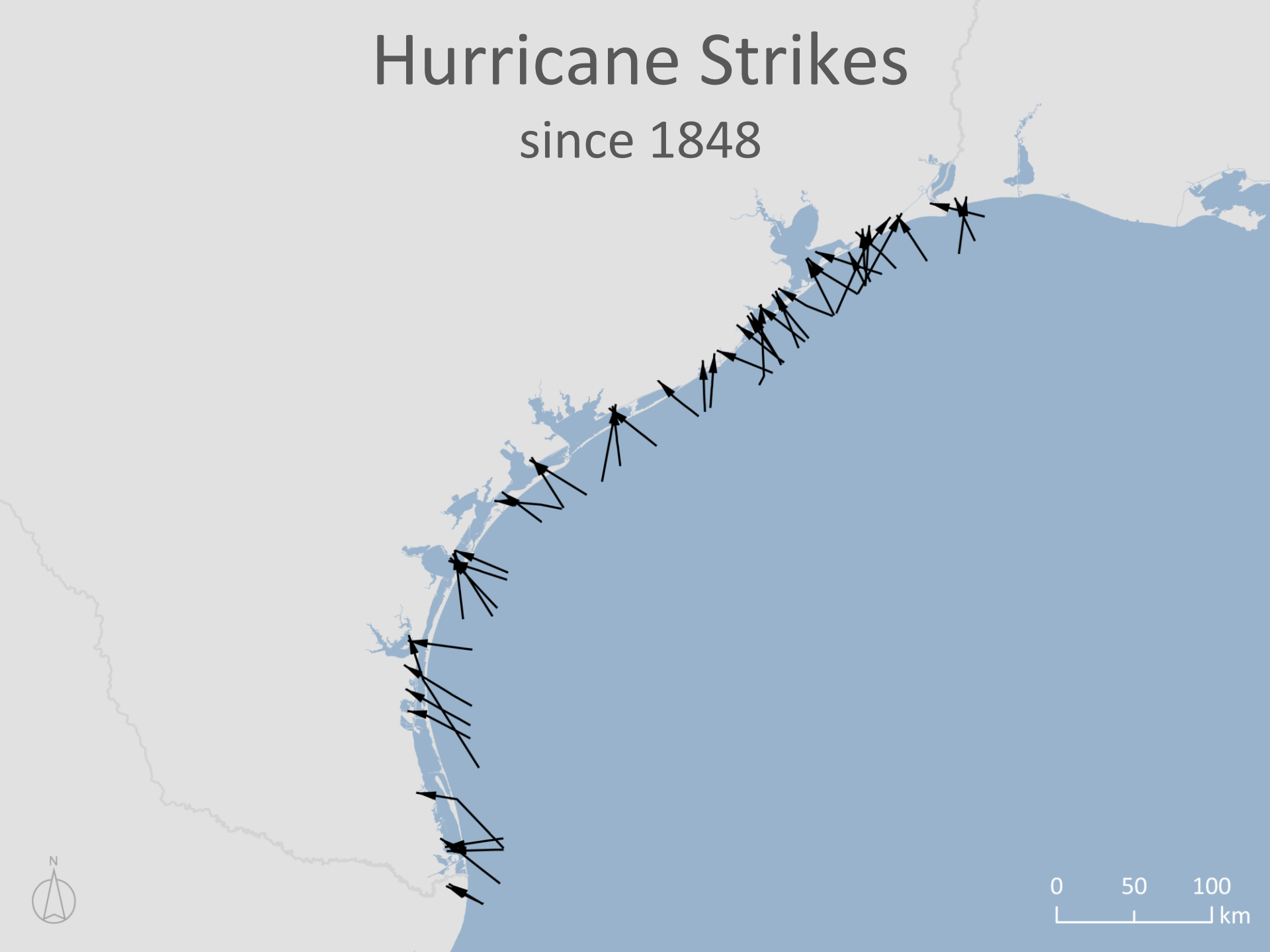
2005/09/29



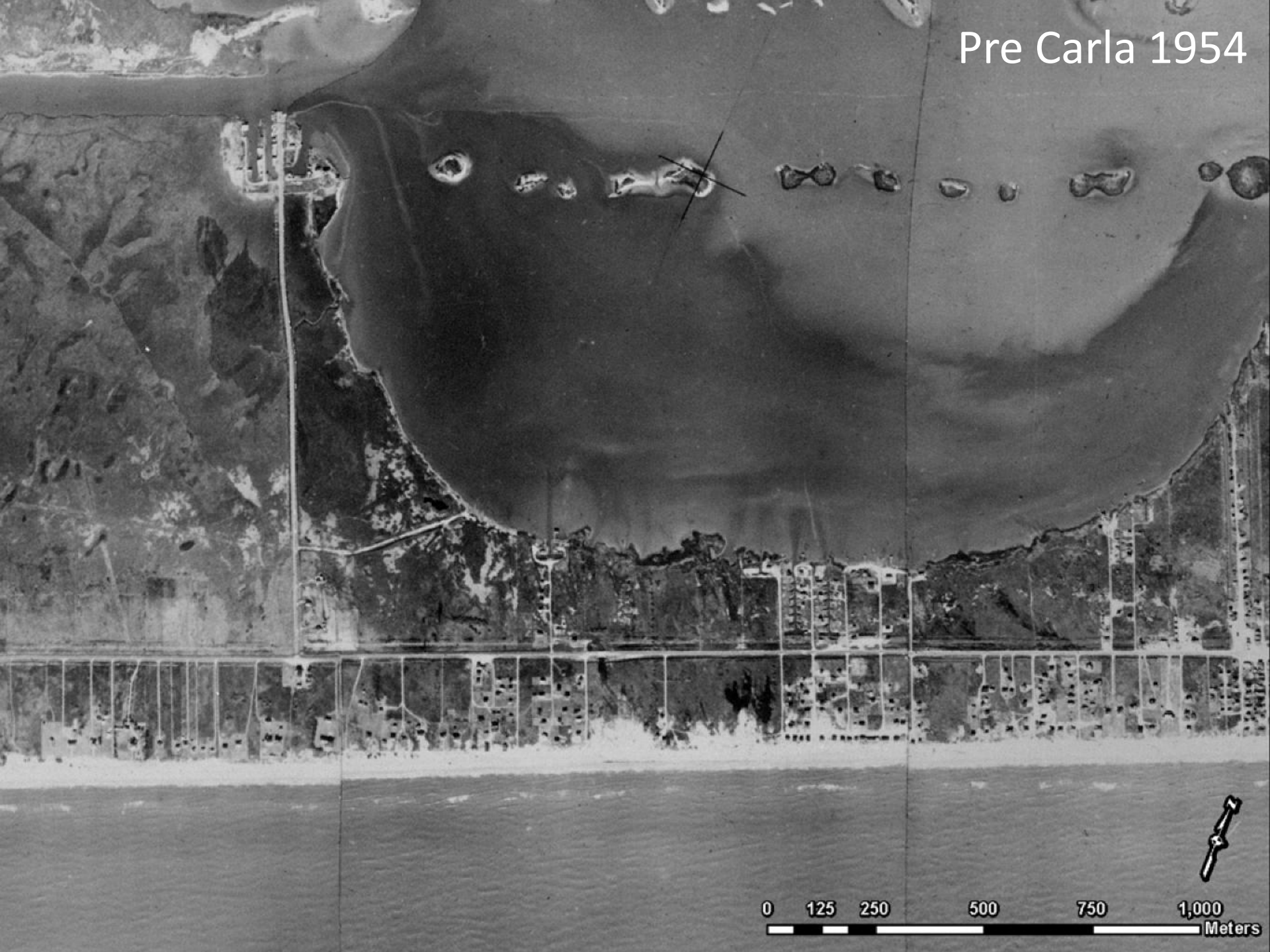
Sand Trapped by Jetty, Southwest end of Bolivar Peninsula (08/07/98)

Hurricane Strikes

since 1848

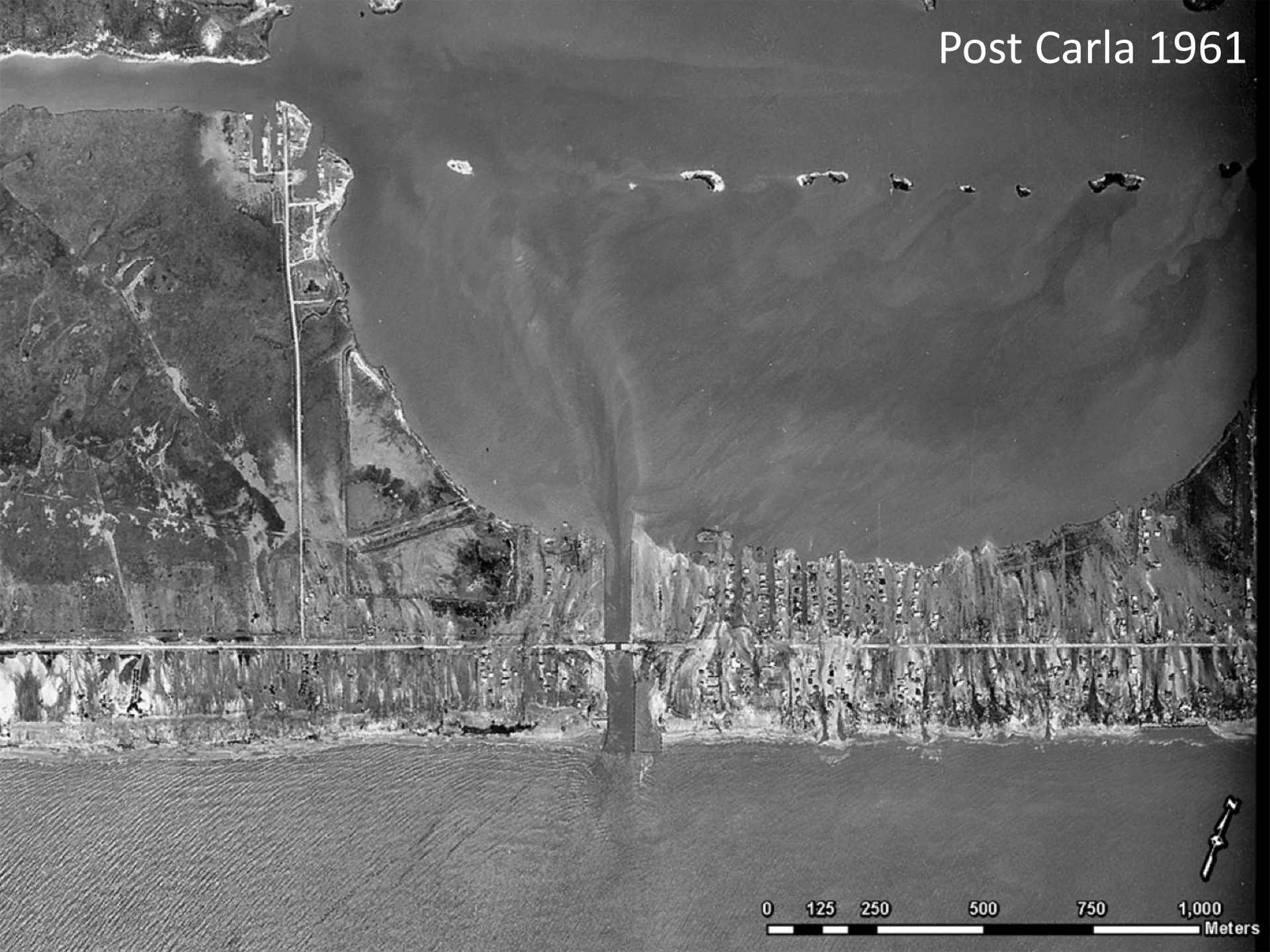


Pre Carla 1954



0 125 250 500 750 1,000
Meters

Post Carla 1961

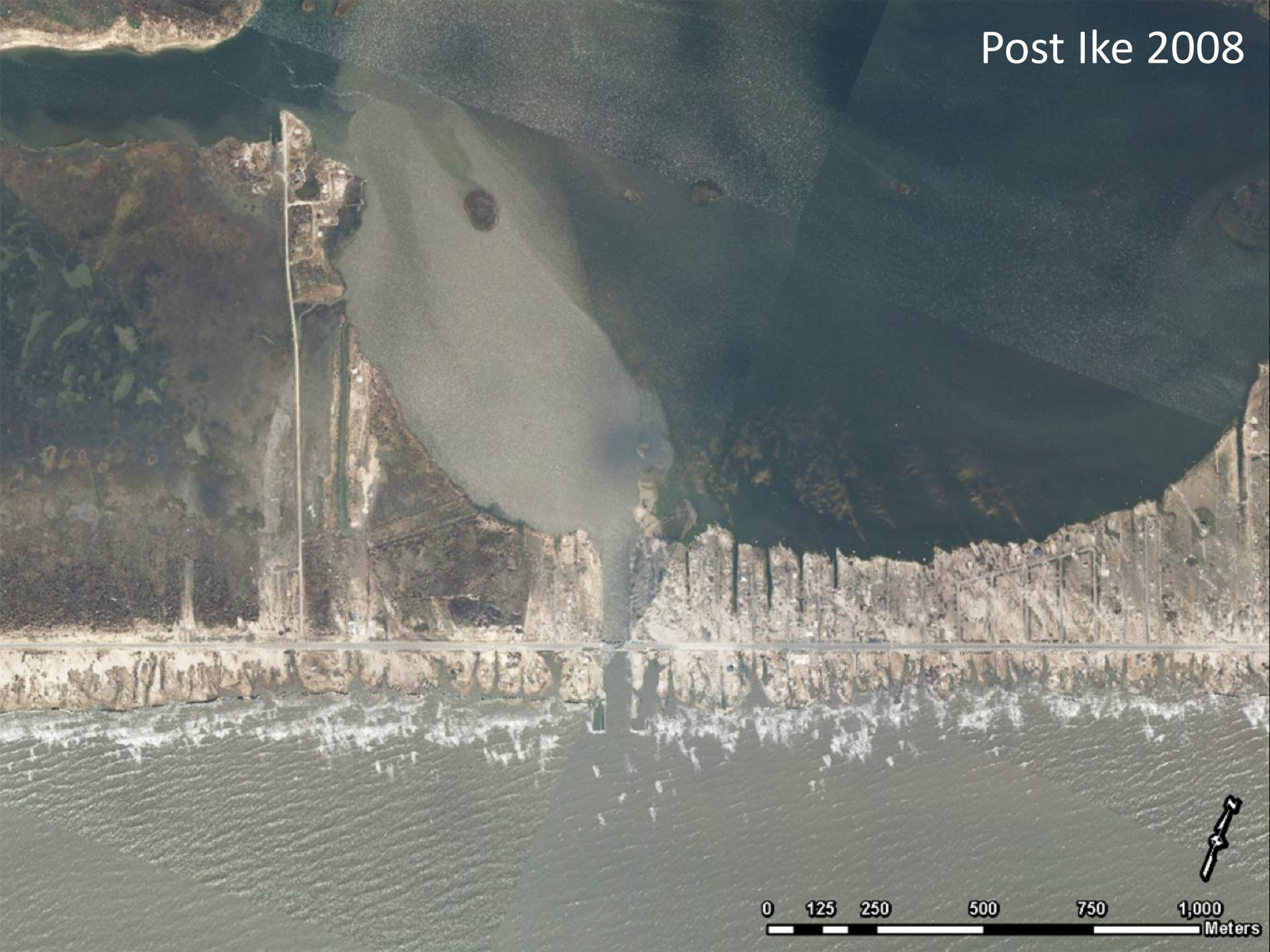


Pre Ike 2008



0 125 250 500 750 1,000 Meters

Post Ike 2008



Bay shoreline change rate (m/yr)

retreat

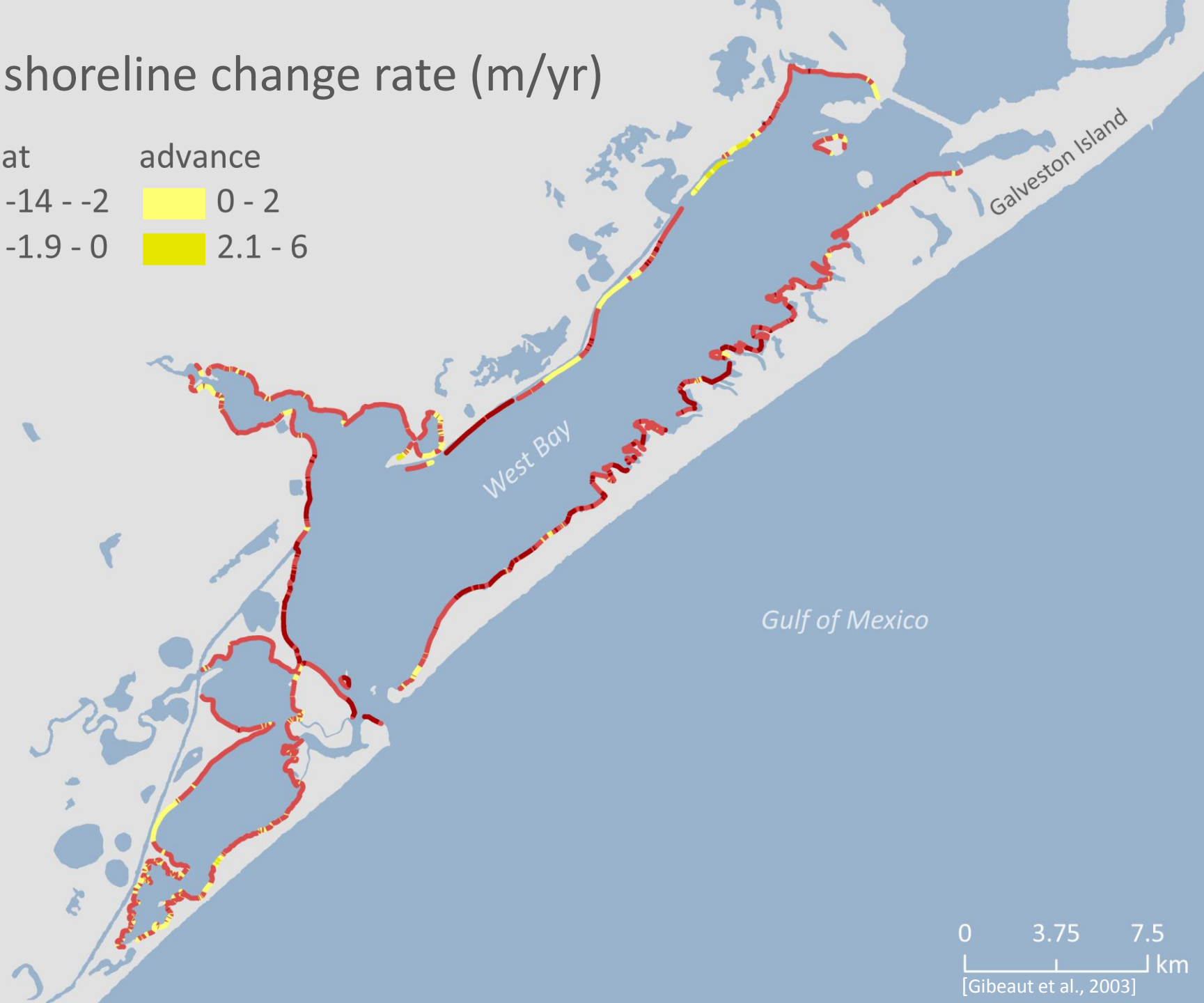
 -14 - -2

 -1.9 - 0

advance

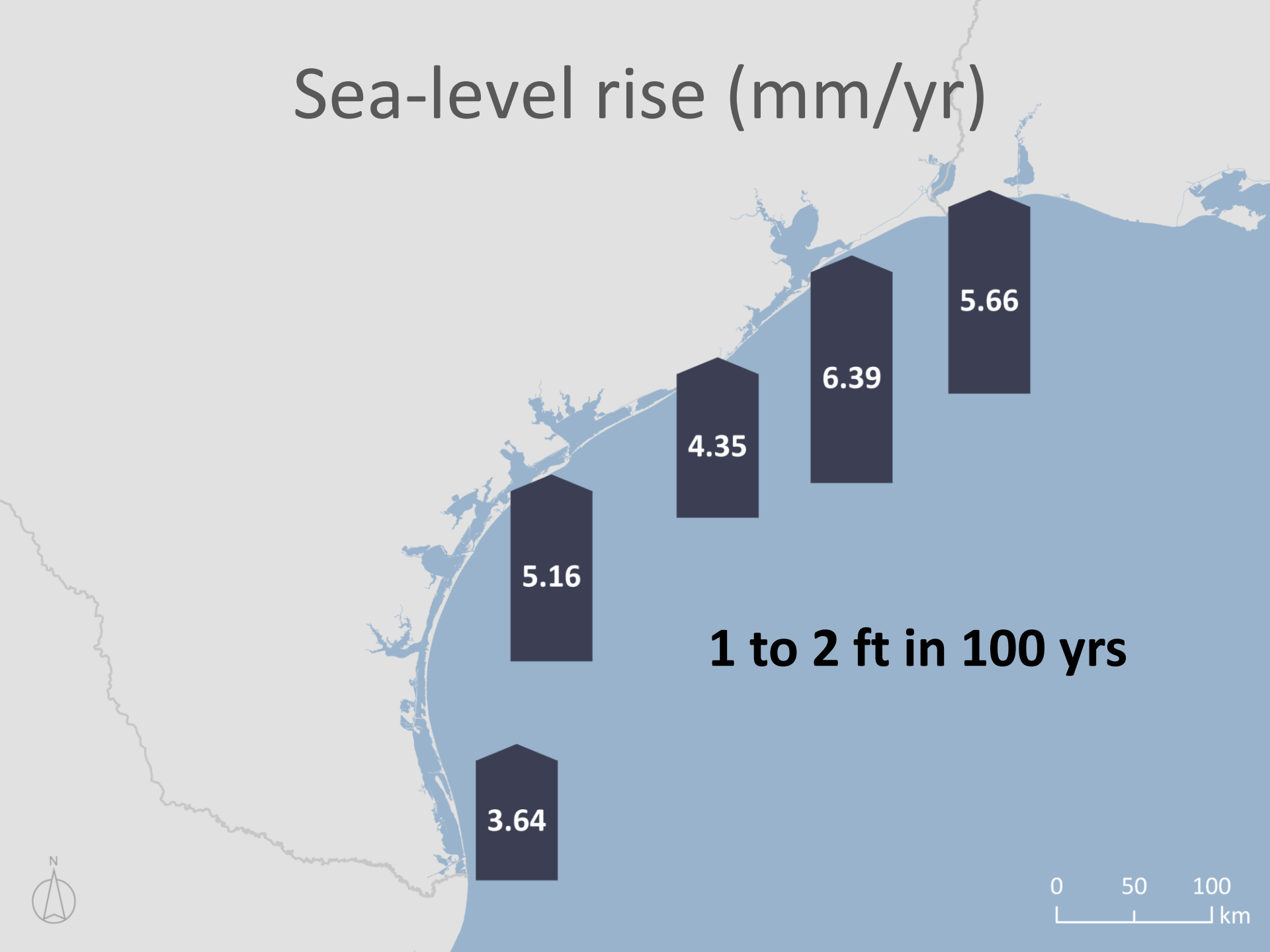
 0 - 2

 2.1 - 6



0 3.75 7.5 km
[Gibeaut et al., 2003]

Sea-level rise (mm/yr)



0 50 100
km

Galveston Island

Low marsh

Area raised for housing development

2005/09/29



1958

19S-23E-1

MUSTANG

ISLAND

MUSTANG

0 0.5 1 km
GULF



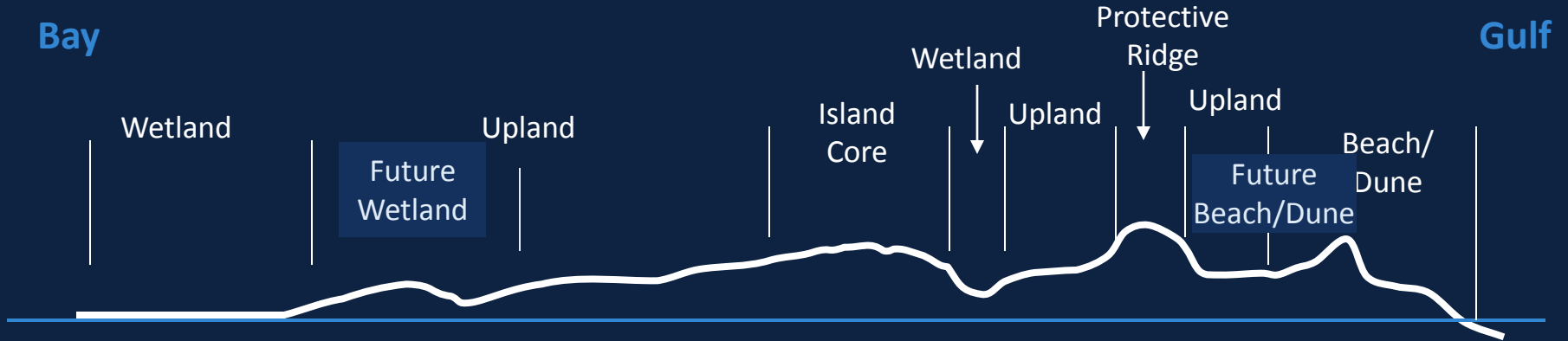
2009



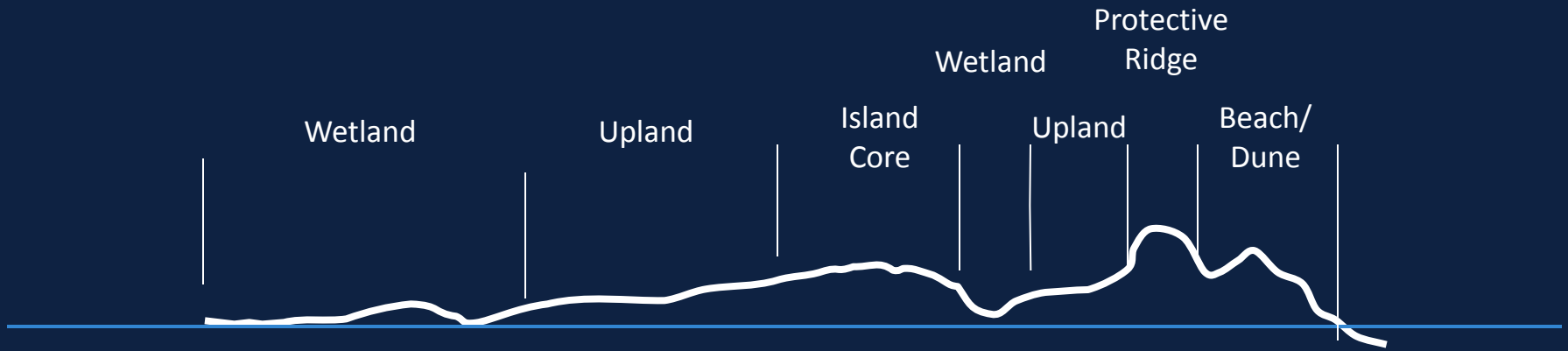
0 0.5 1 km

Barrier-Island Profile

Today



After 60 Years of Sea-Level Rise and Erosion



Texas Coast looking NE

Shoreline change

Storm impacts

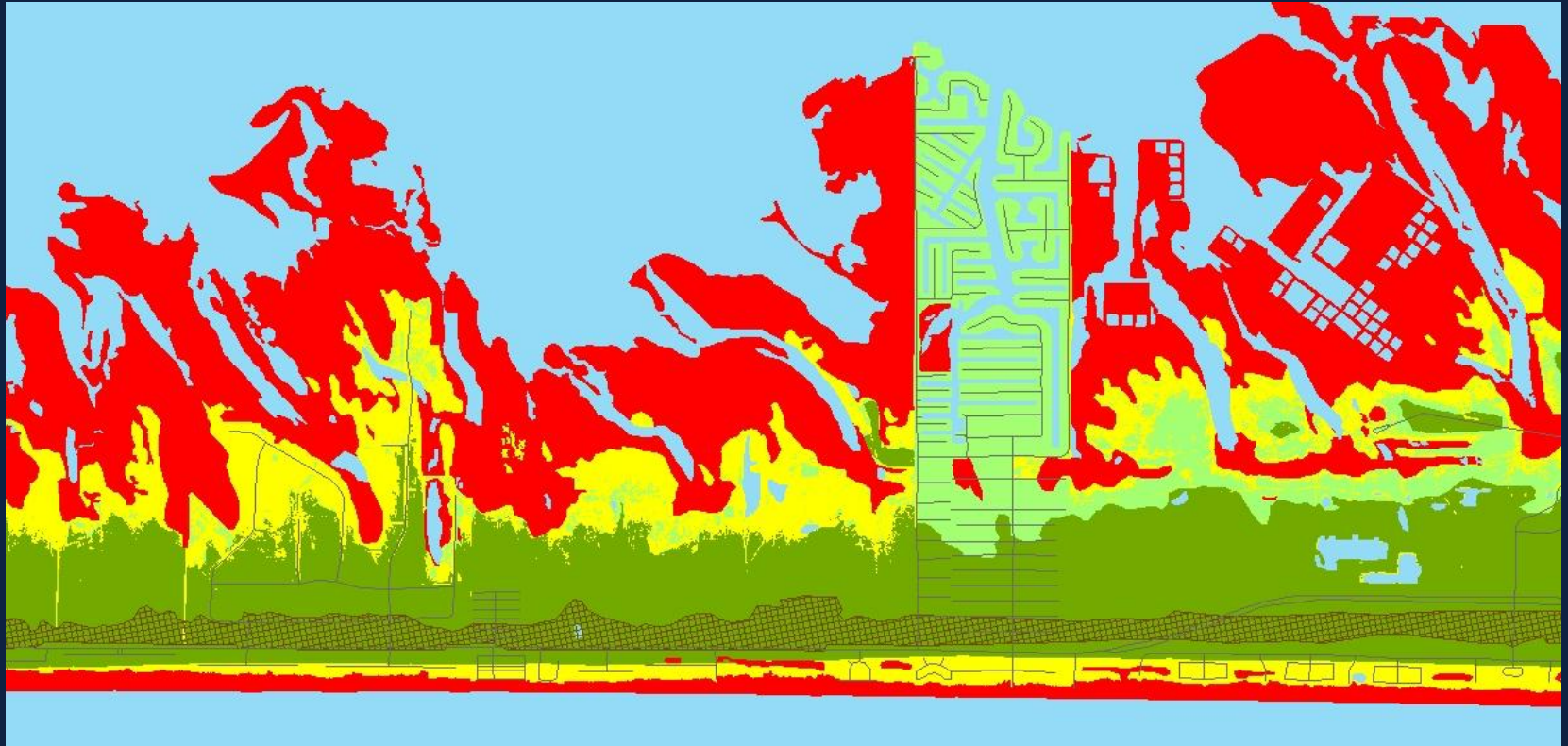
Sea-level rise

Climate change

Human intersections

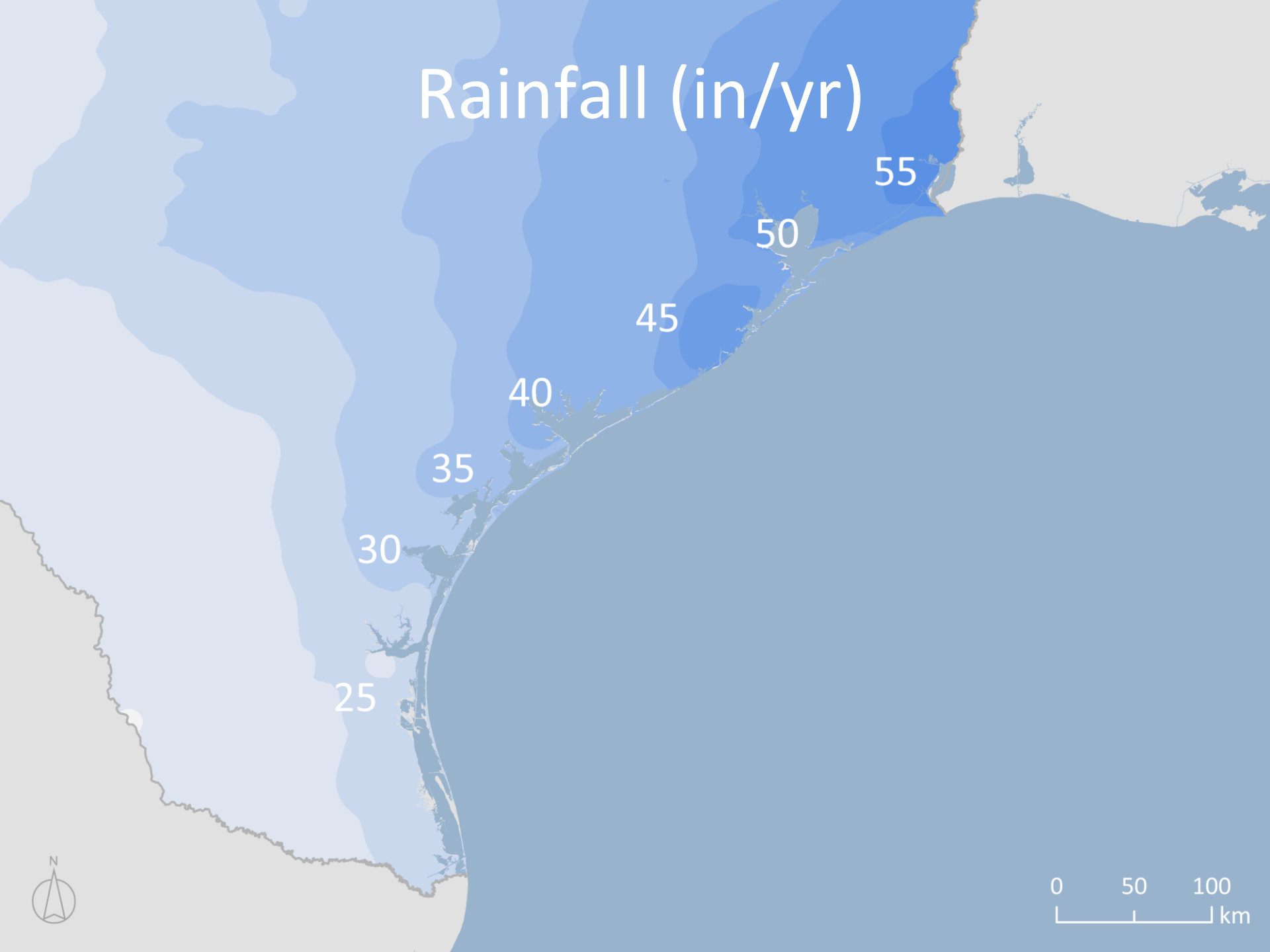


Geohazards Map – Galveston Island



- Imminent Geohazard Potential**
Today's critical environments: wetlands, beaches, and dunes
- High Geohazard Potential**
Future critical environments: Areas expected to become critical environments in 60 years' time (2062)
- Moderate Geohazard Potential**
Low upland areas not expected to become critical environments but are inundated by low-intensity storms
- Low Geohazard Potential**
Island core upland: Centrally located upland areas generally more than 5 feet above sea level
- Open Water**

Rainfall (in/yr)



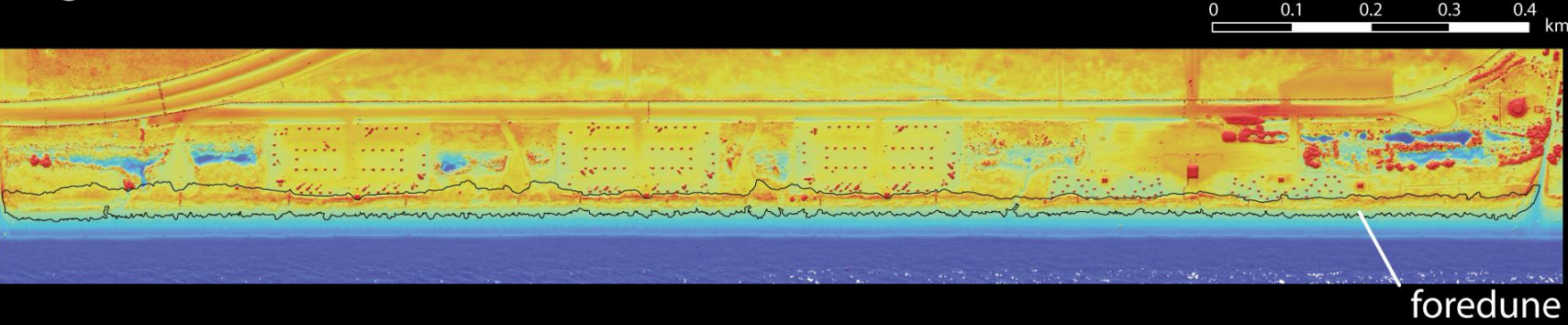


AP Photo/David J. Phillip



Hurricane Ike Landfall
September 2008

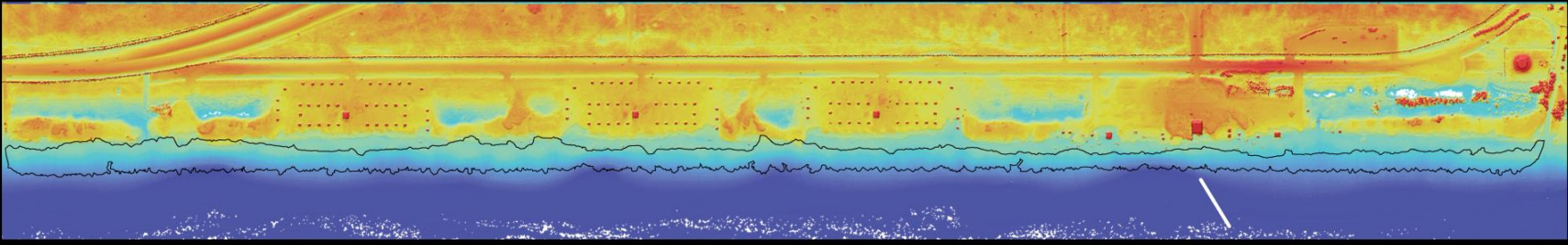
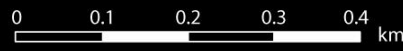
Pre-storm Elevation
August 2002



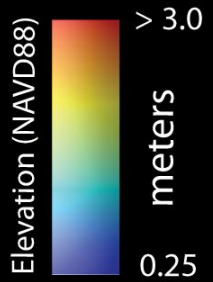


Hurricane Ike Landfall
September 2008

Post-storm Elevation
December 2008



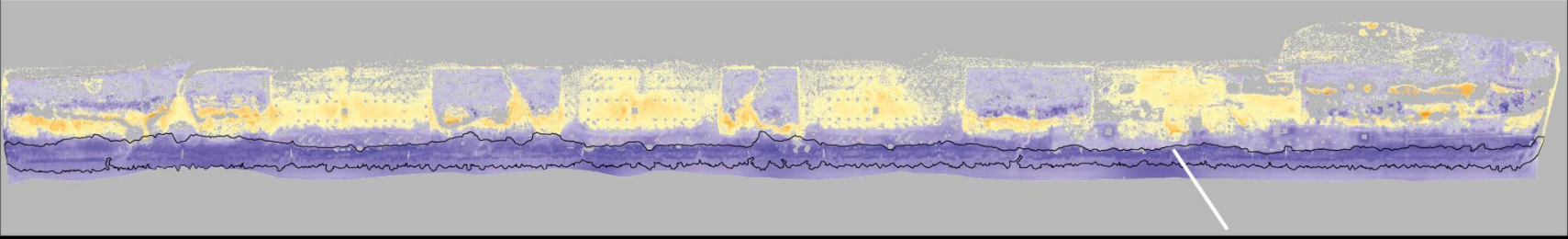
pre-storm foredune





Hurricane Ike Landfall
September 2008

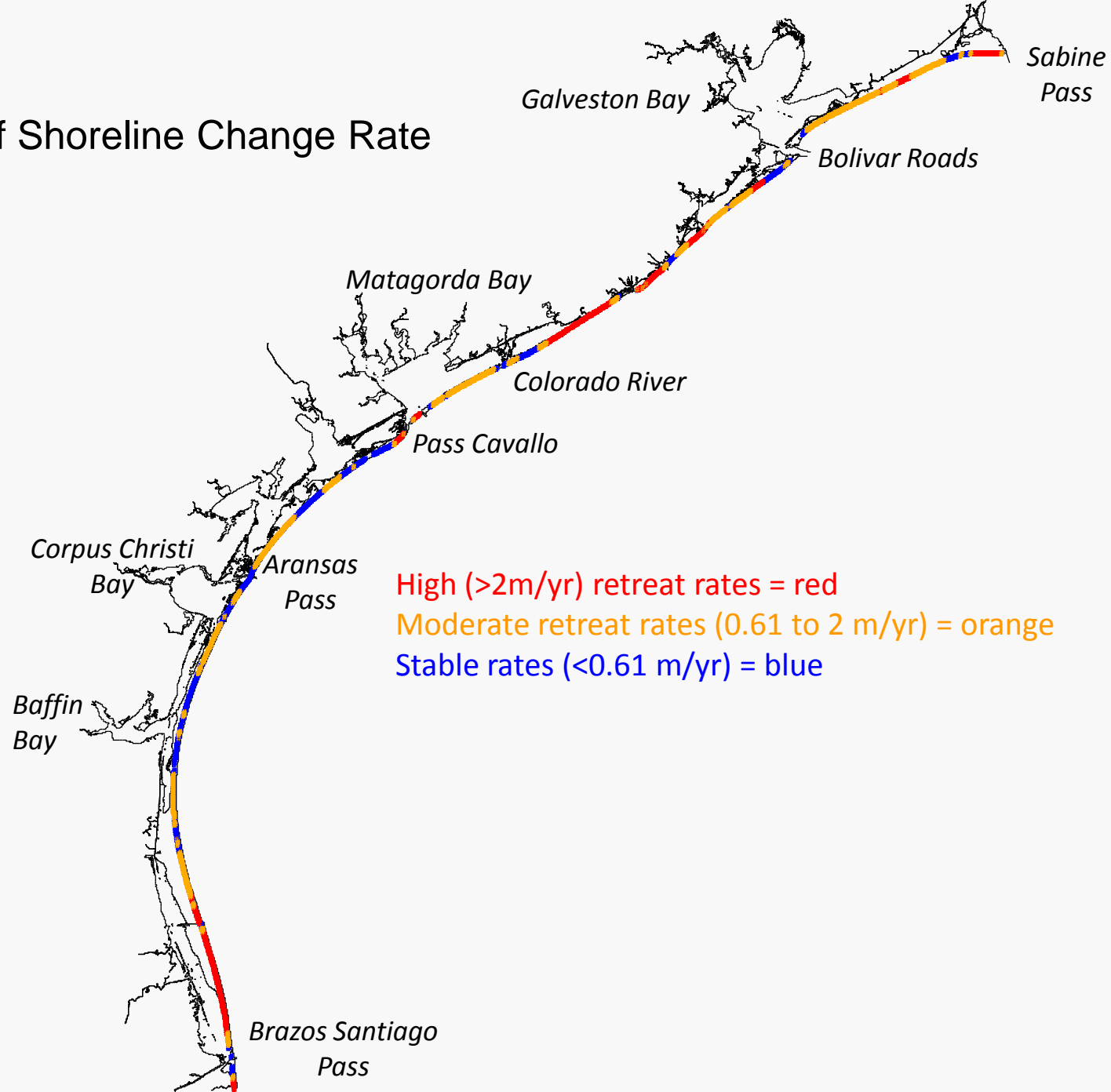
Erosion / Deposition
December 2008



pre-storm foredune



Gulf Shoreline Change Rate











2005/09/29

Climate change, sea-level rise, storm impacts,
shoreline change, human intersections

Summary

Galveston Island Geohazards map

- Science-based product for developing and applying policy
- Shows current and potential future environmental conditions
- Human time scale projections
- Used historical sea-level and shoreline change to project changes
- Need training of local staff
- Need to form alternative development scenarios that preserve tax base and land use