

Impacts of Hurricanes Helene and Milton on Pinellas County Coast

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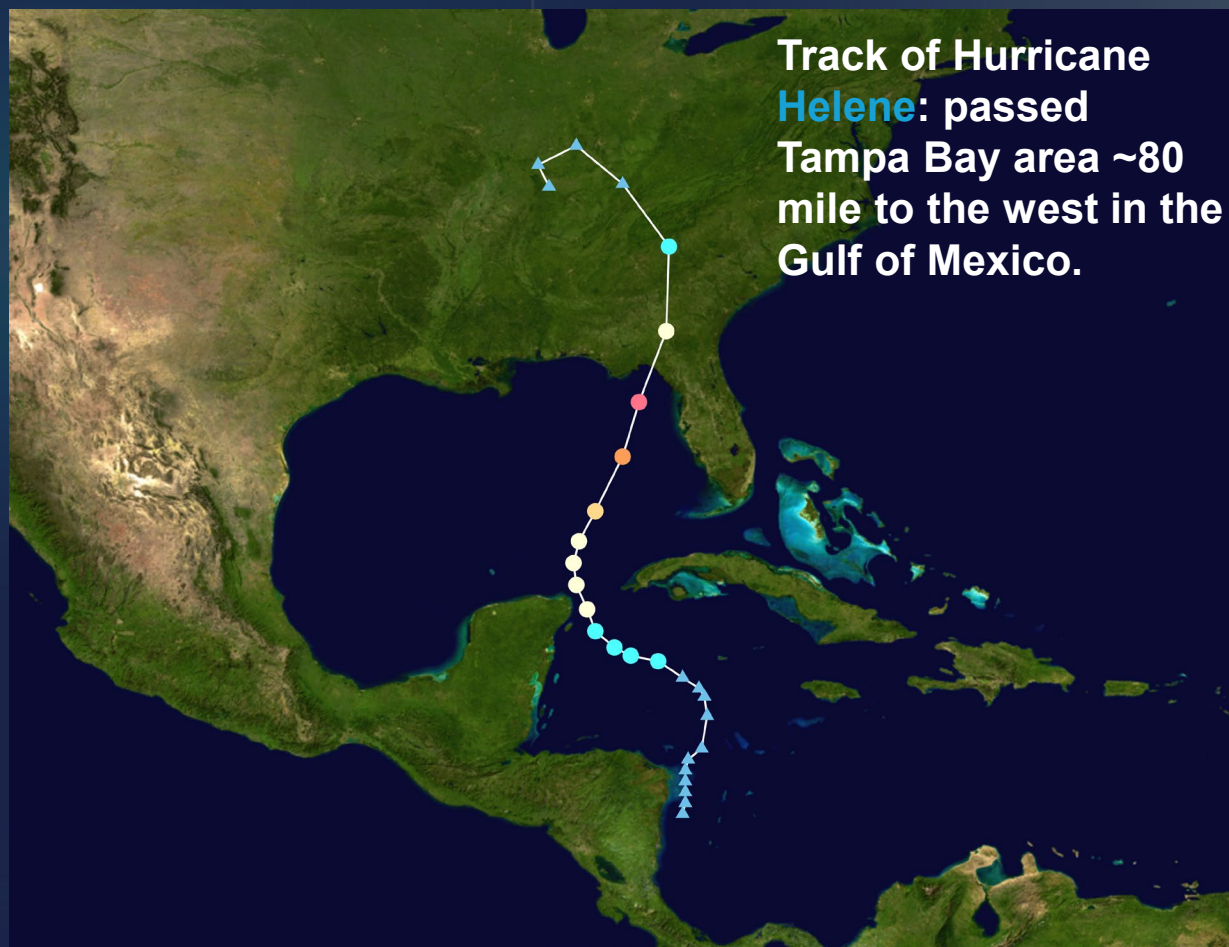
Outline

Introduction

Field Observations and Data Collection

Summary

Introduction: The Storms: Different Tracks





NATIONAL DATA BUOY CENTER

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Oceans ▼

Select Region ▼

Water level



Clearwater

Measurement data by
NOAA on Hurricanes
Helene and **Milton**: two
stations are used here.

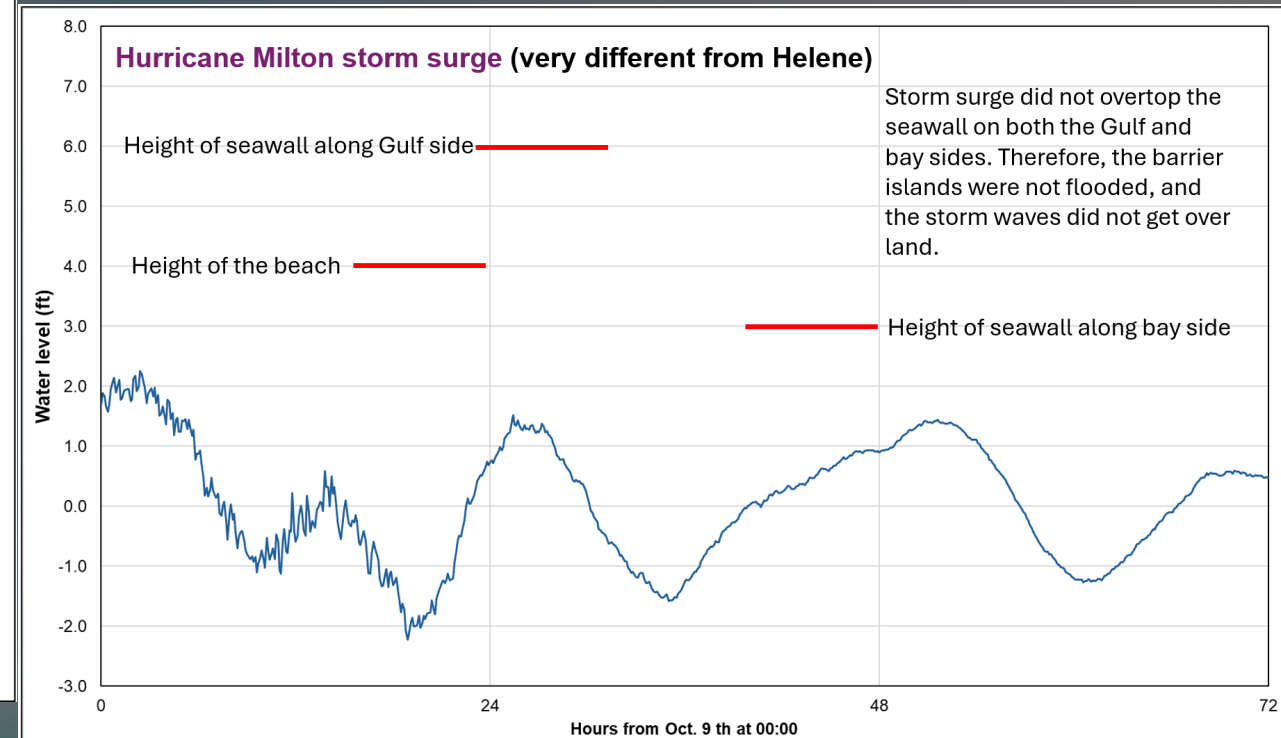
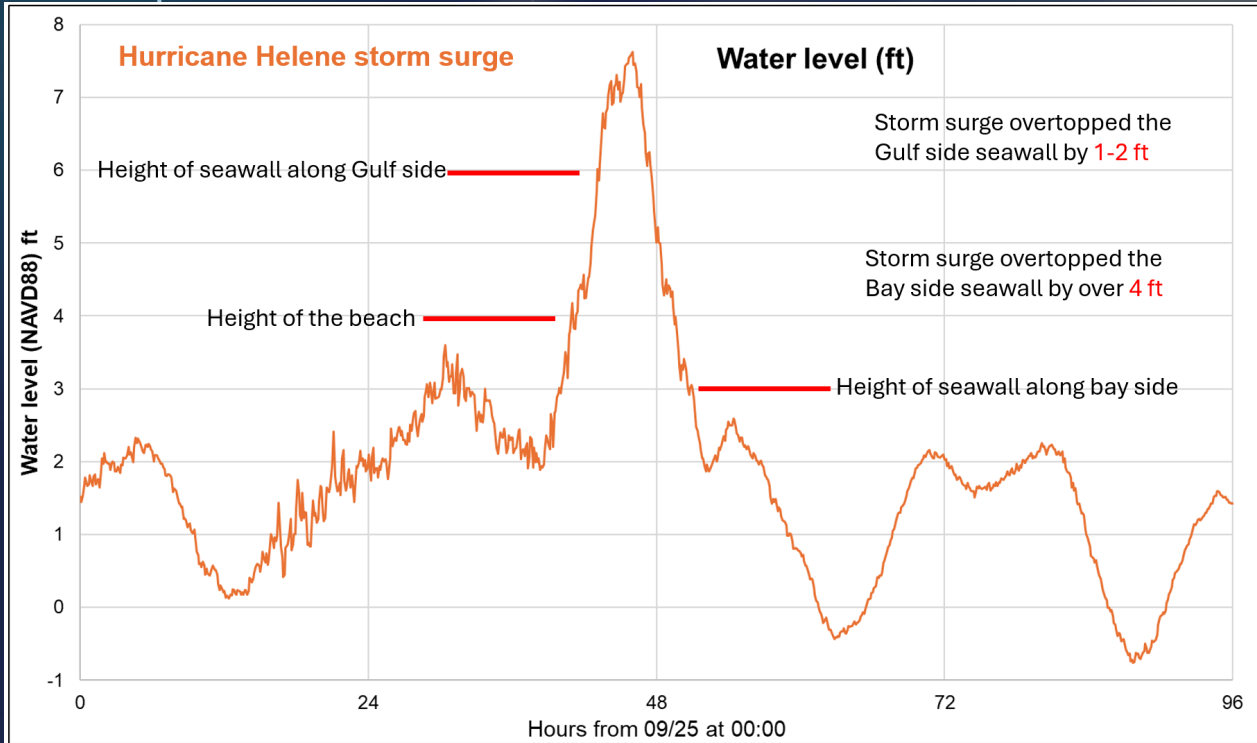
Wave



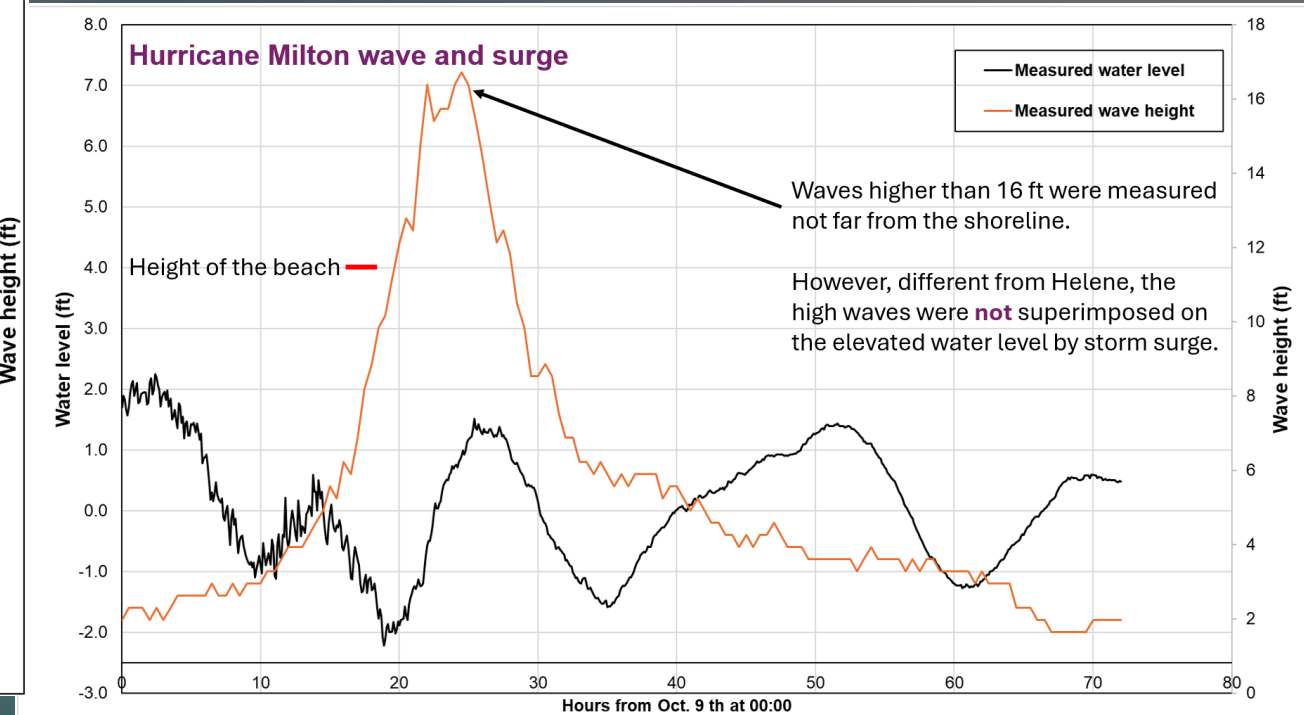
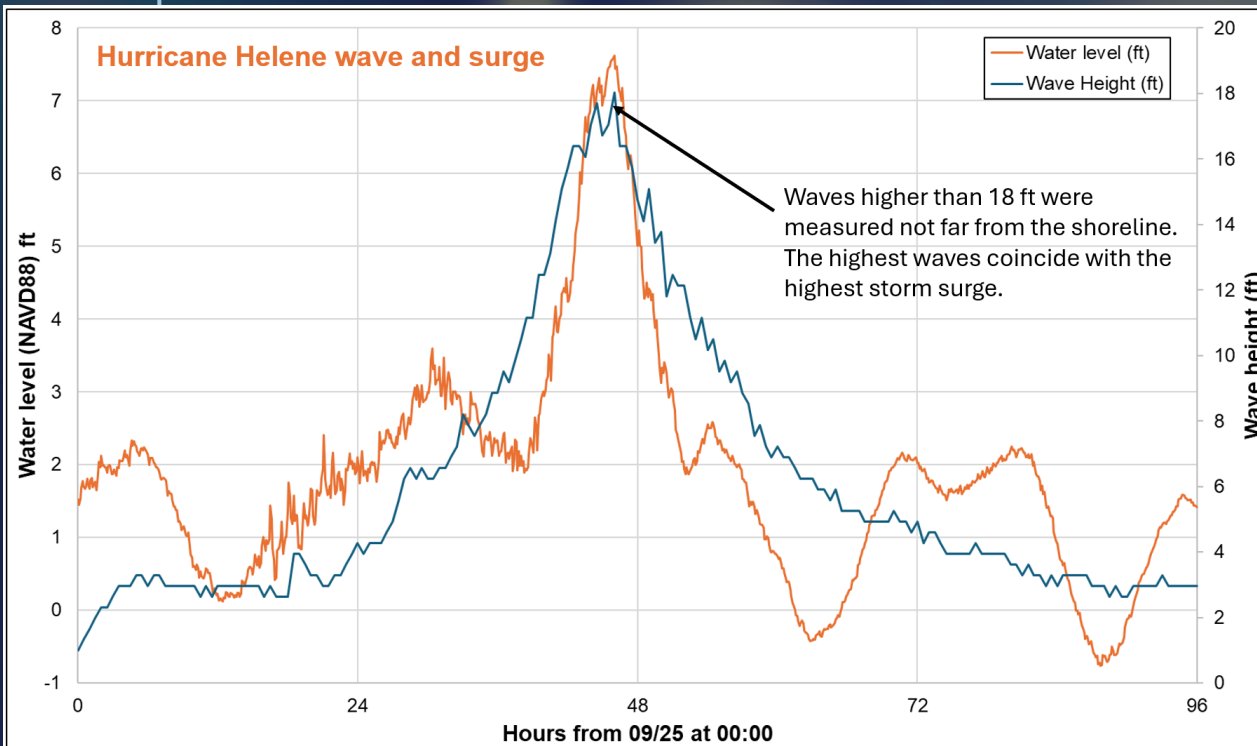
27.9N 82.17W

Esri, Garmin, NaturalVue | NOAA OCS, Esri, Garmin Powered by Esri

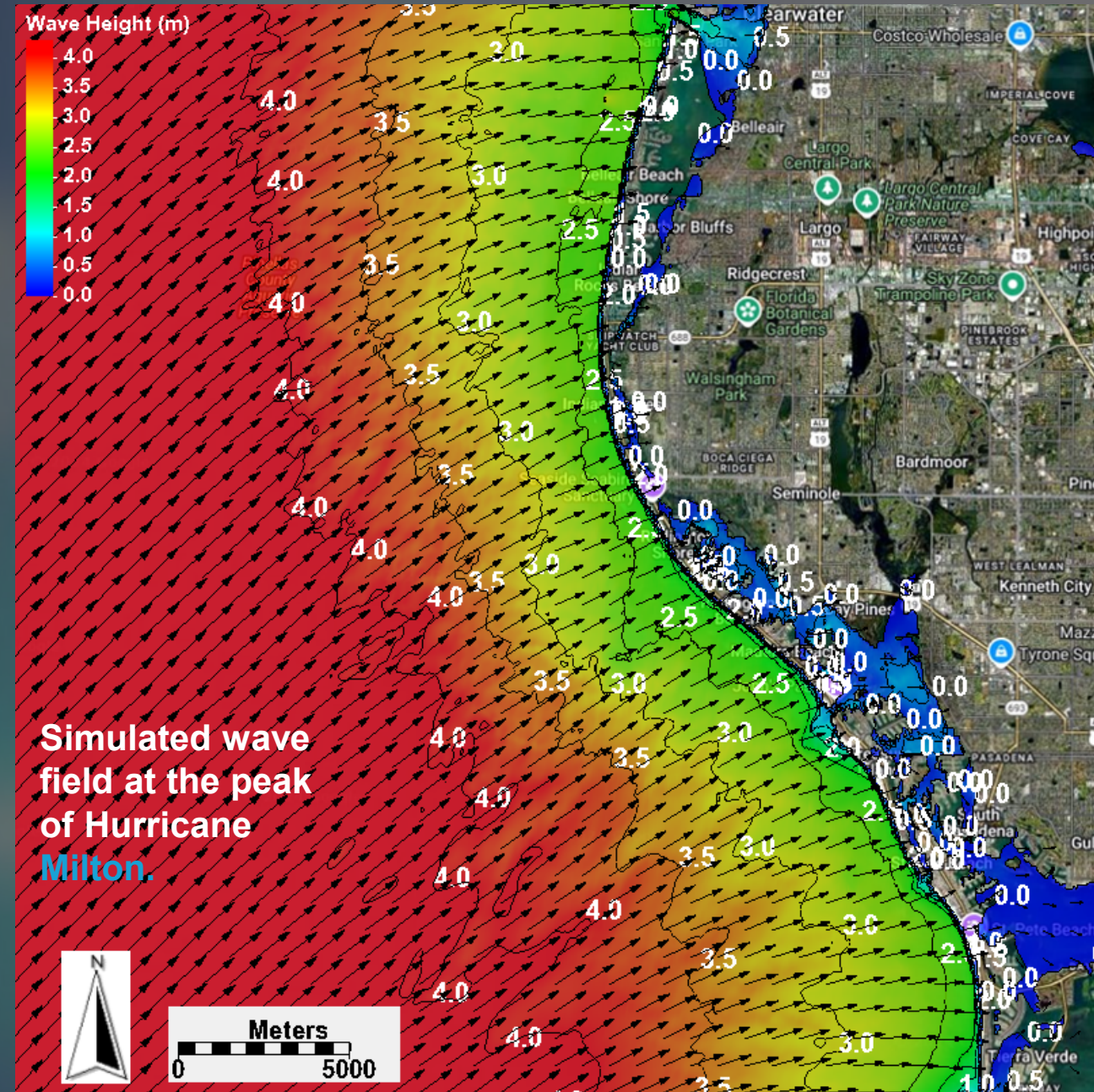
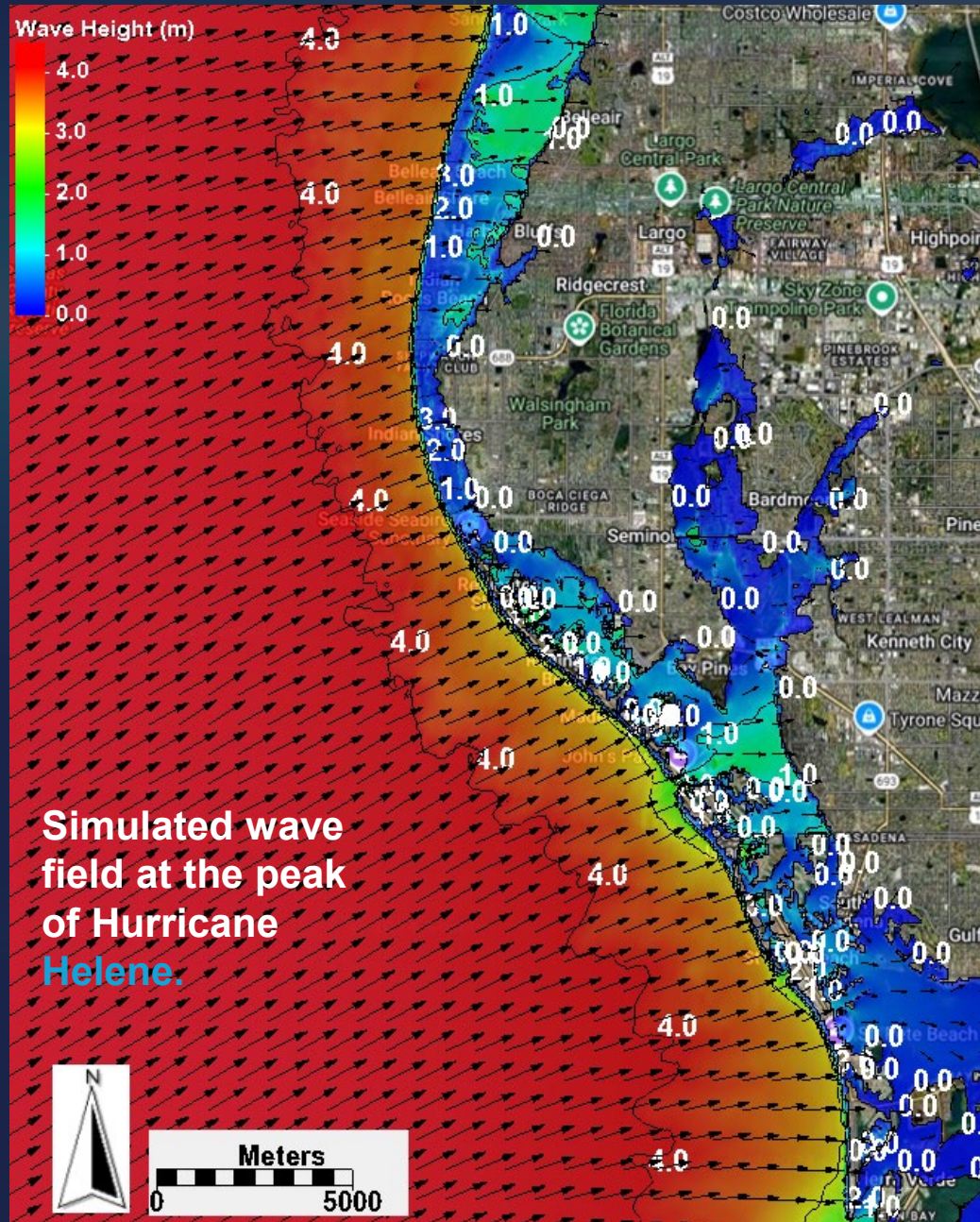
Introduction: The Storms: Different Storm Surge Levels



Introduction: The Storm: Similar Peak Storm Wave Height



Introduction: The Storm: Simulated Wave Field



Field Observations: high water marks after Helene

The actual **Helene** water level overland was **1 to 2 ft higher than that measured at the NOAA tide gauge**. This is caused by waves superimposed on the storm surge.



Measuring elevation of **Helene** water marks along Gulf side: ranges from 8.5-10.9 ft above mean sea level



Measuring elevation of **Helene** sand accumulation: ranges from 8.5-10.9 ft above mean sea level

Measuring elevation of **Helene** water marks along bay side: ranges from 8.5-9.8 ft above mean sea level



Field Observations: Debris piles

*Trash/Debris piles produced by **Helene** clean-up efforts appear to be mostly intact after **Milton***

It is not clear why the strong **Milton** wind that blew the roof off Tropicana Field, but did not “blow apart” the loosely stacked debris piles. **A topic for future study.**



After H. **Helene**: debris piles along many streets.



After H. **Milton**: the Helene debris piles did not appear to be substantially “blown apart” by wind.

Field Observations: almost all sand dunes were eroded



Before H. **Helene**: there was a narrow beach and post-Idalia artificial dune.



Pre- and Post-**Helene** aerial photos:
North Sand Key with **narrow** pre-storm
beach and **post-Idalia artificial dune**

Field Observations: damage to beach front properties

North Sand Key with **narrow** pre-storm beach and post-Idalia artificial dune

After H. **Helene**: severe beach and dune field erosion, exposing the pre-storm buried seawall



Large amount of sand washed into the first floor.

Water line indicating that the water reached about half of the first floor.



Field Observations: Scour seaward and landward of seawalls, very limited seawall collapsing

Comparing conditions after **Helene** (left) and **Milton** (right): quite similar

After H. **Helene**: severe beach erosion in front the seawall.



After **Milton**, beach gained a small amount of sand.



Field Observations: most dune overwalks destroyed.

Almost all dune overwalks were destroyed by Hurricane Helene



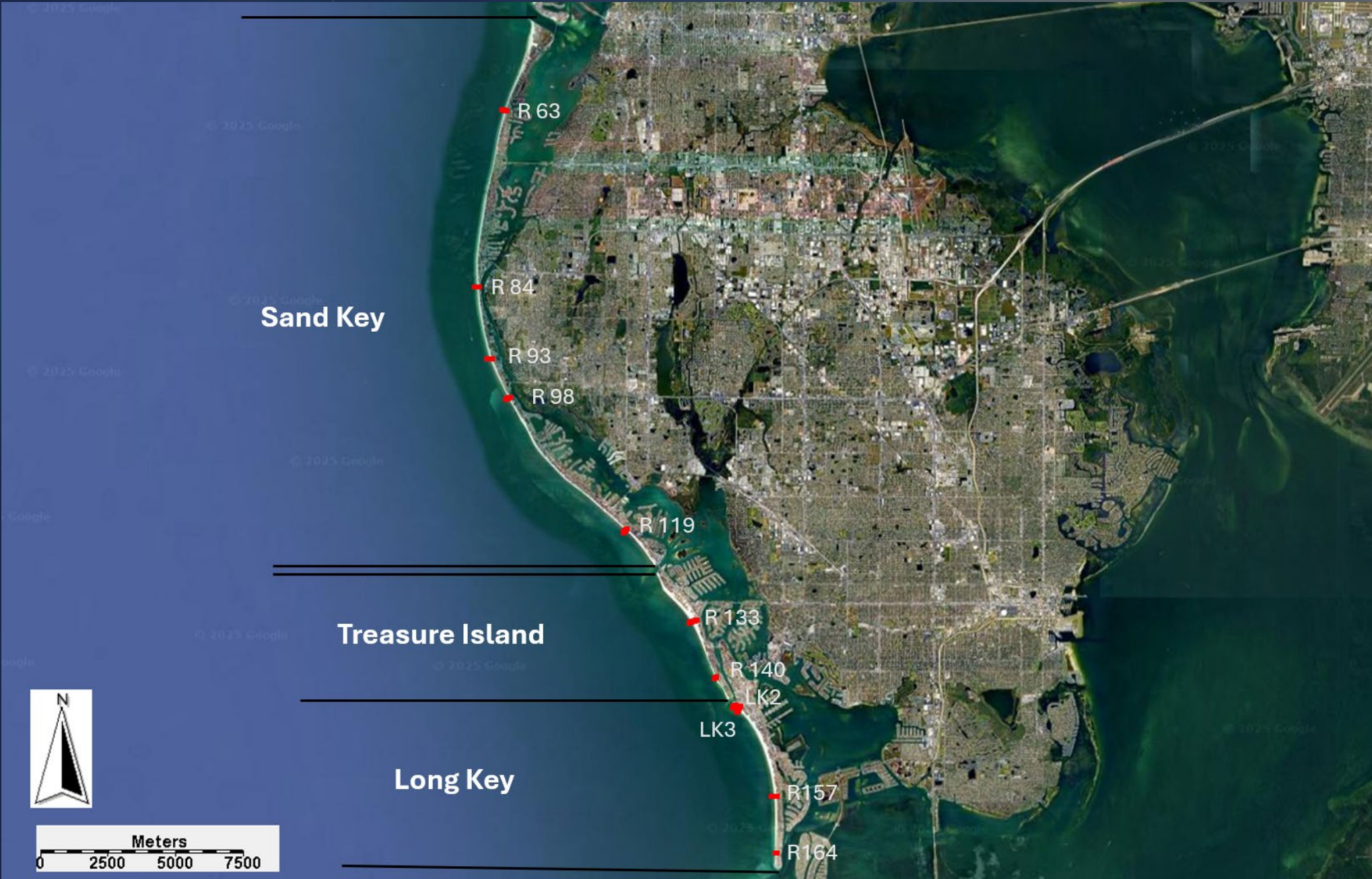
Post Helene: Dune was complete eroded. Red line marks pre-storm dune based on the pilings color change and exposed dune vegetation roots.

Field Observations: pre-modern shore-protection exposed

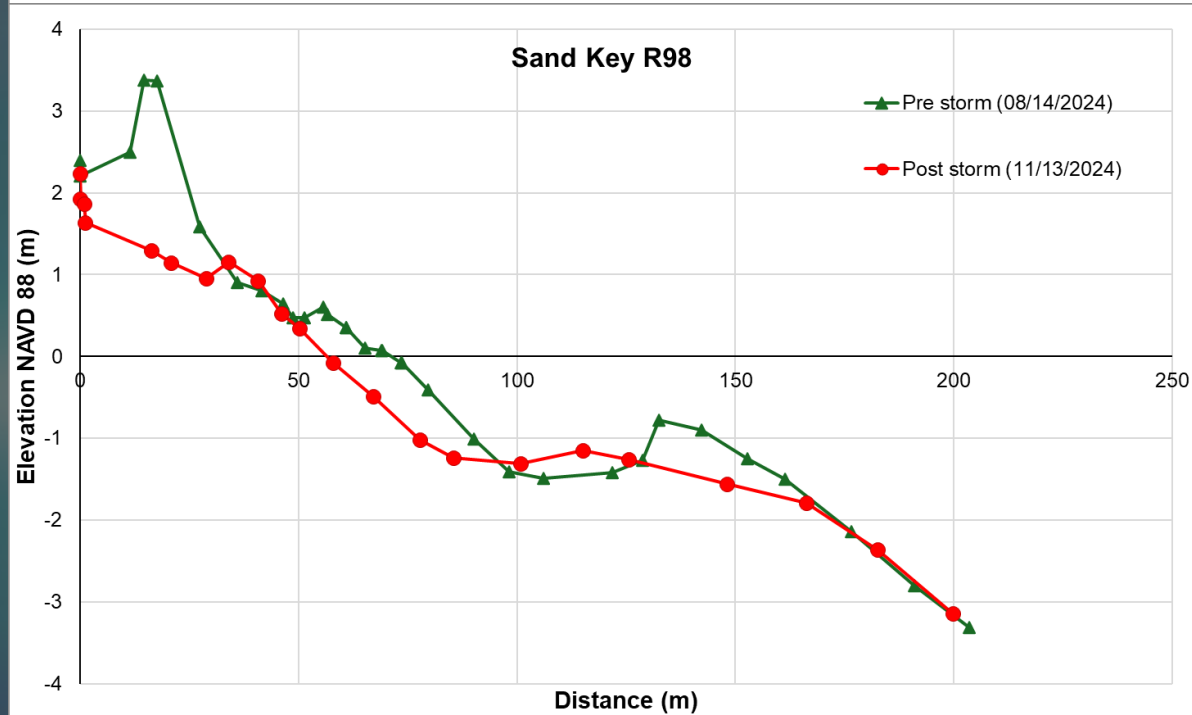
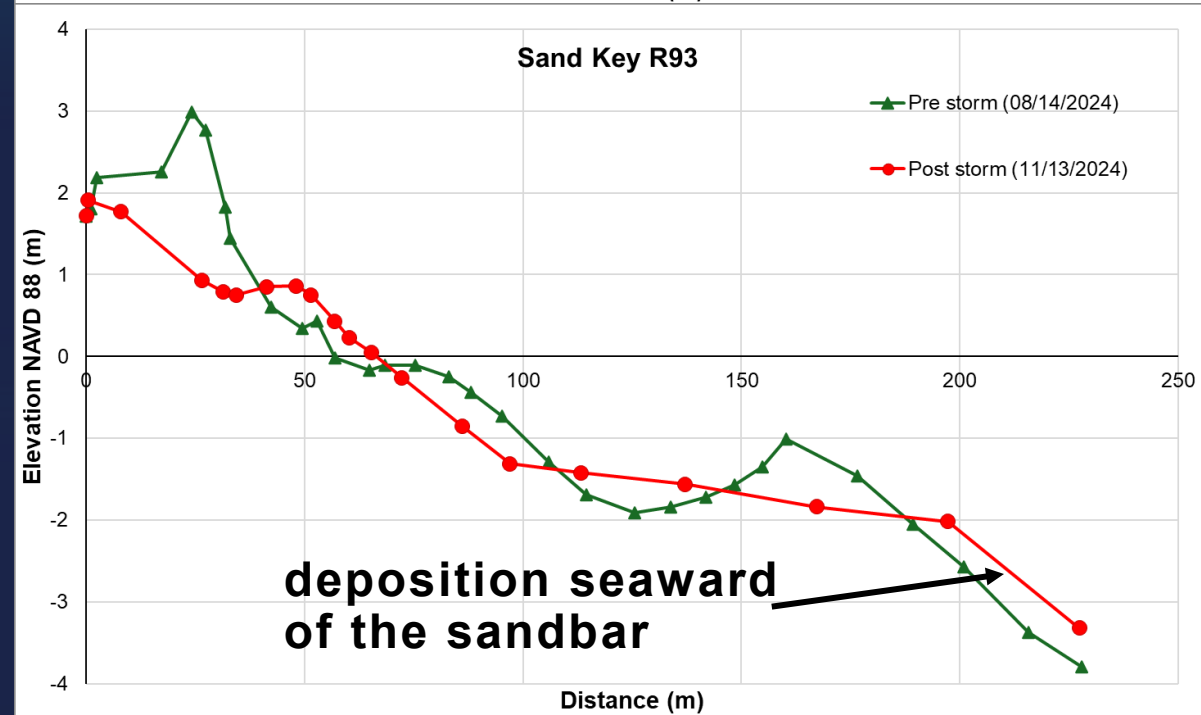
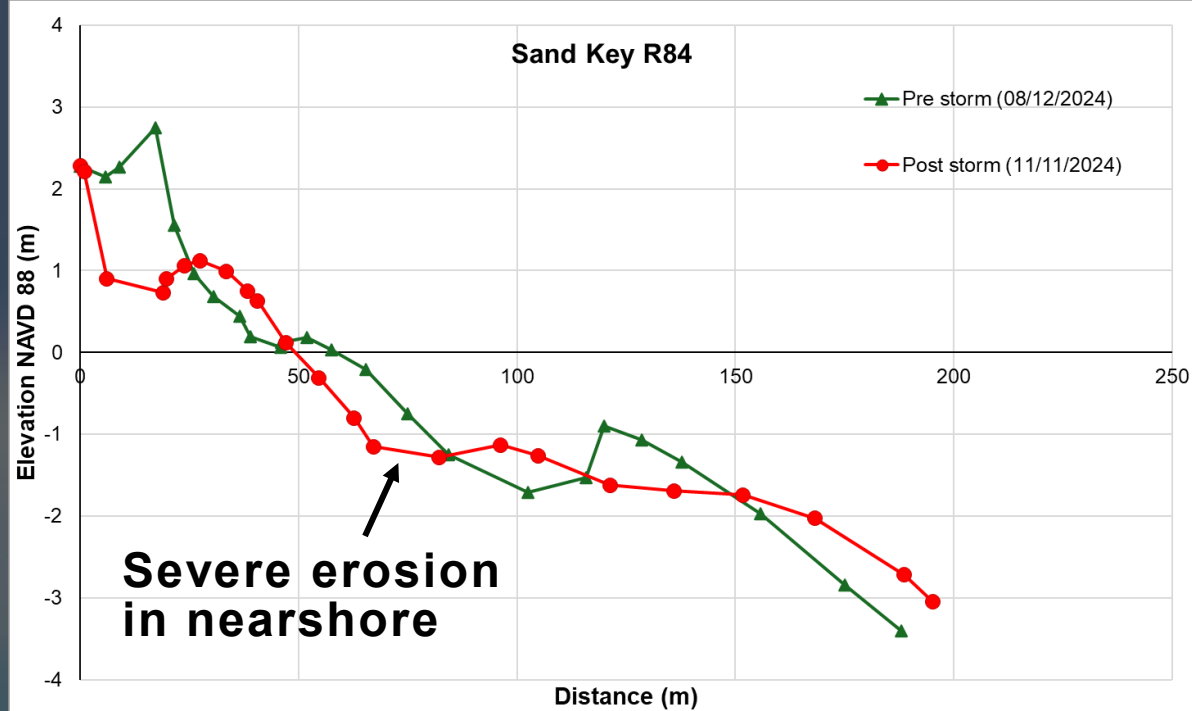
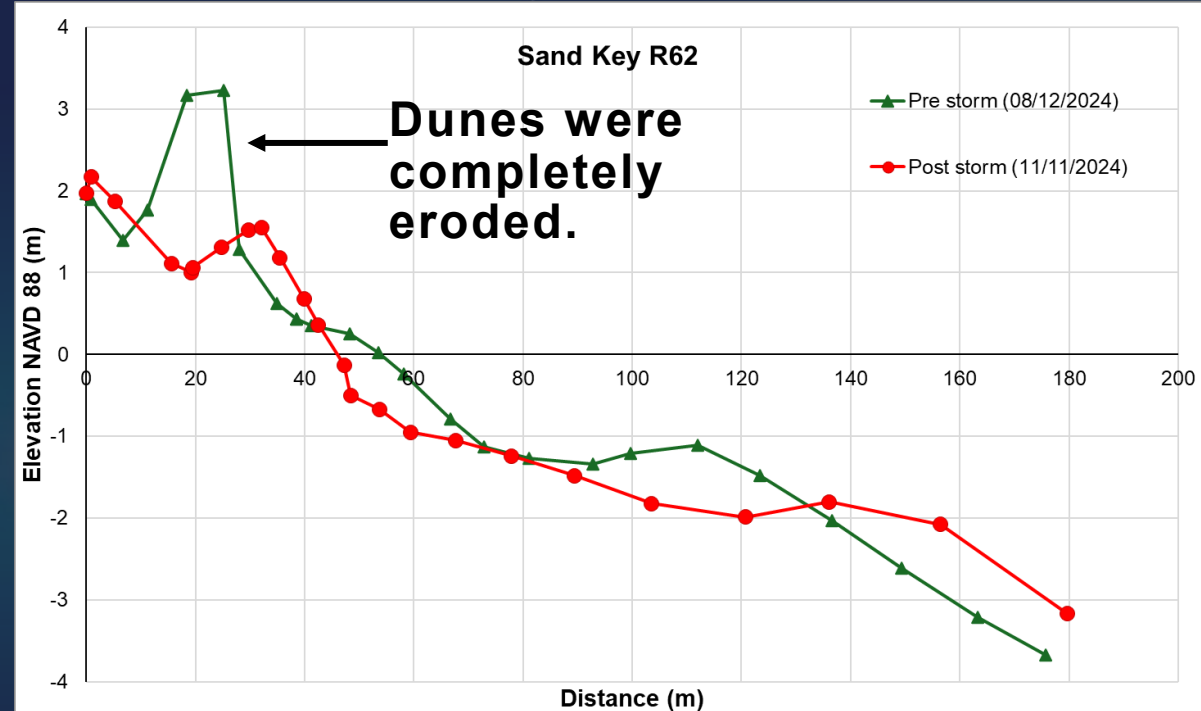
Groin field that was buried by modern-day shore-protection measures was exposed by Hurricane Helene.

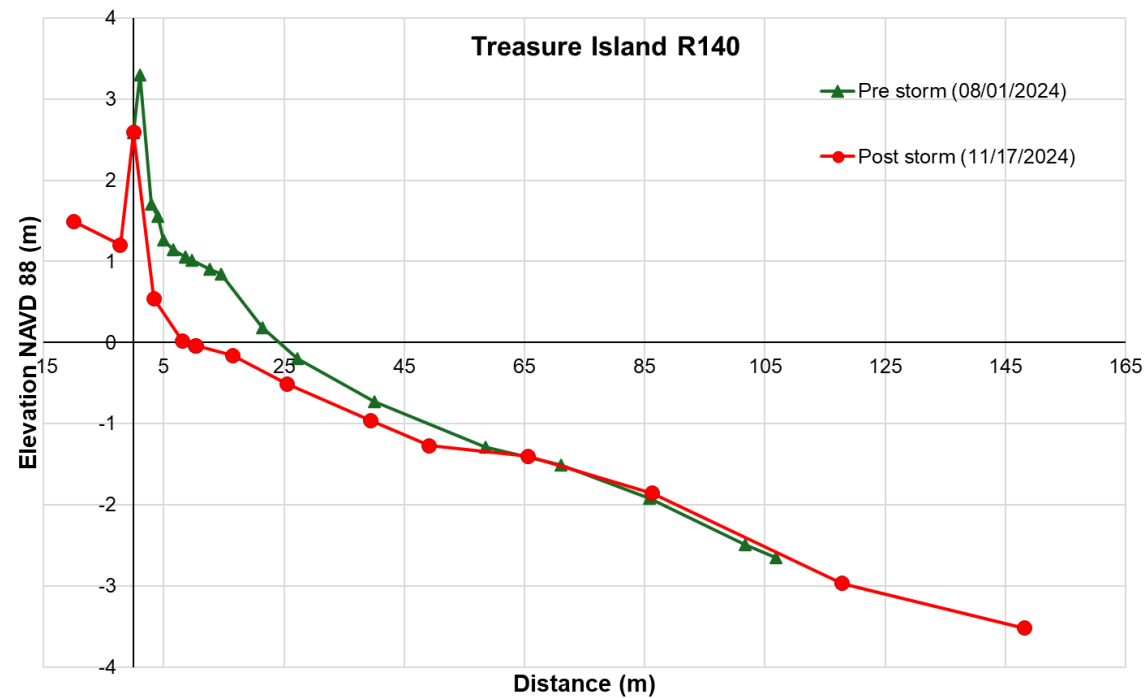
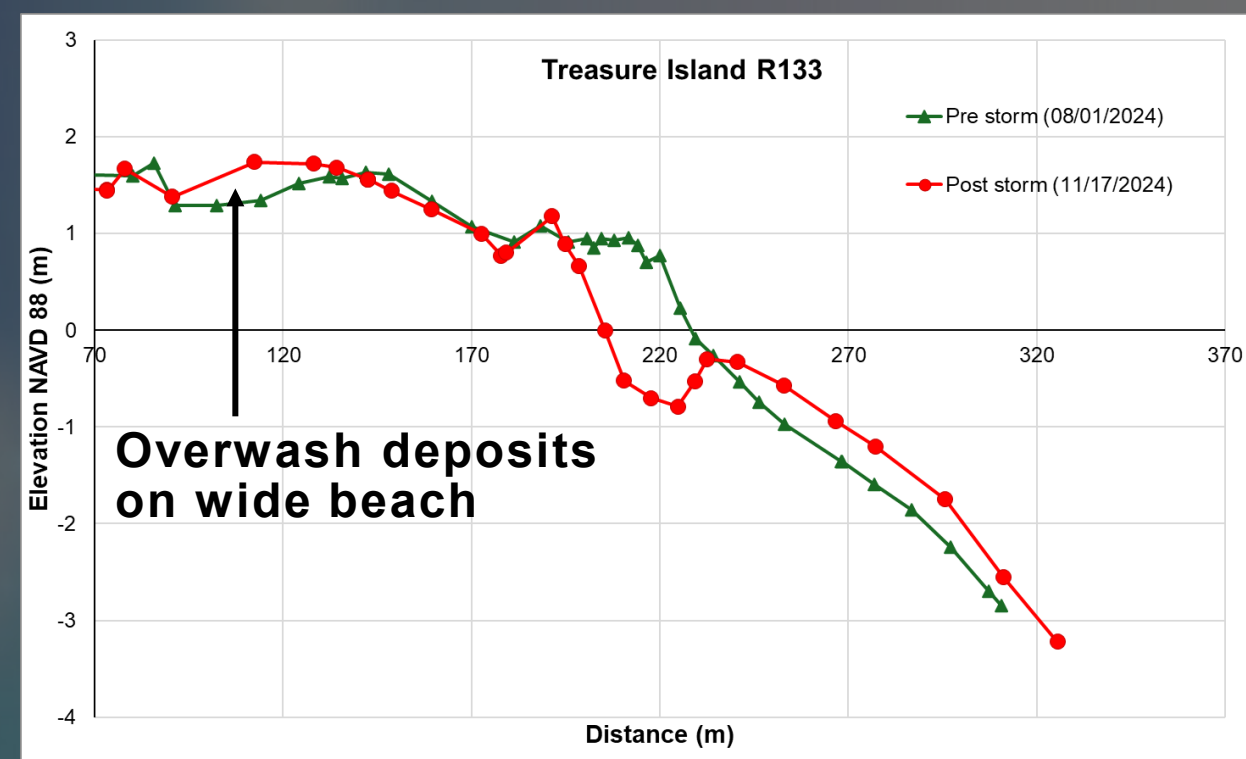
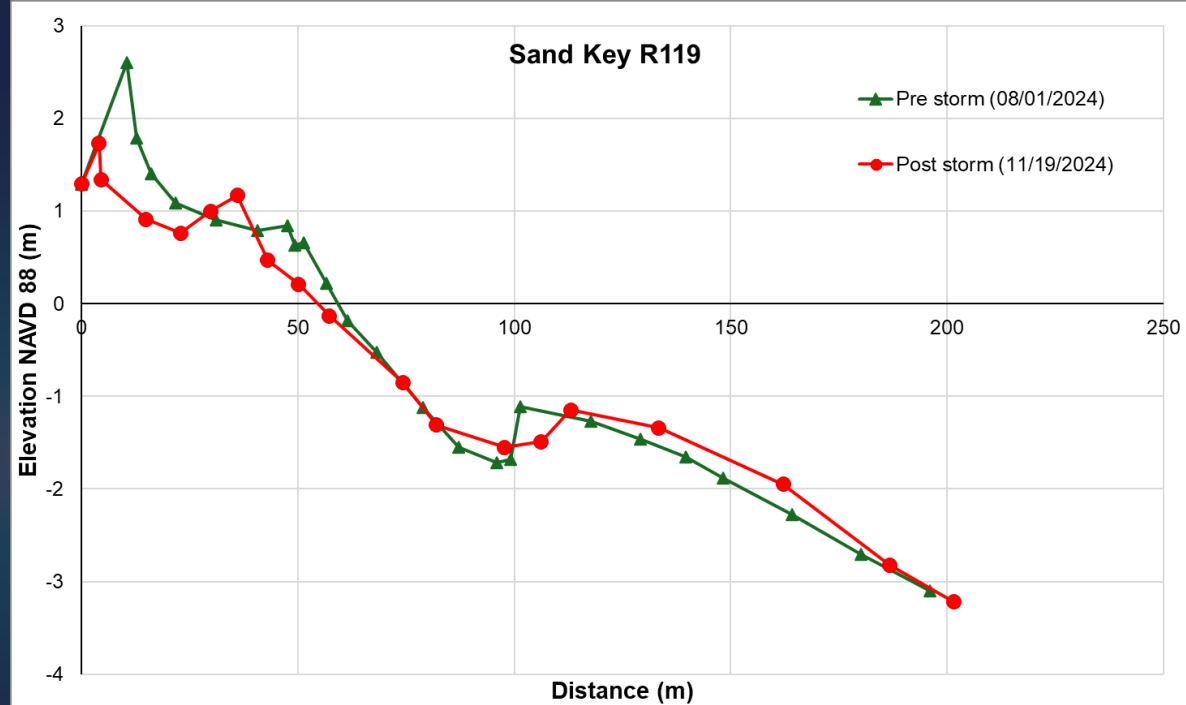


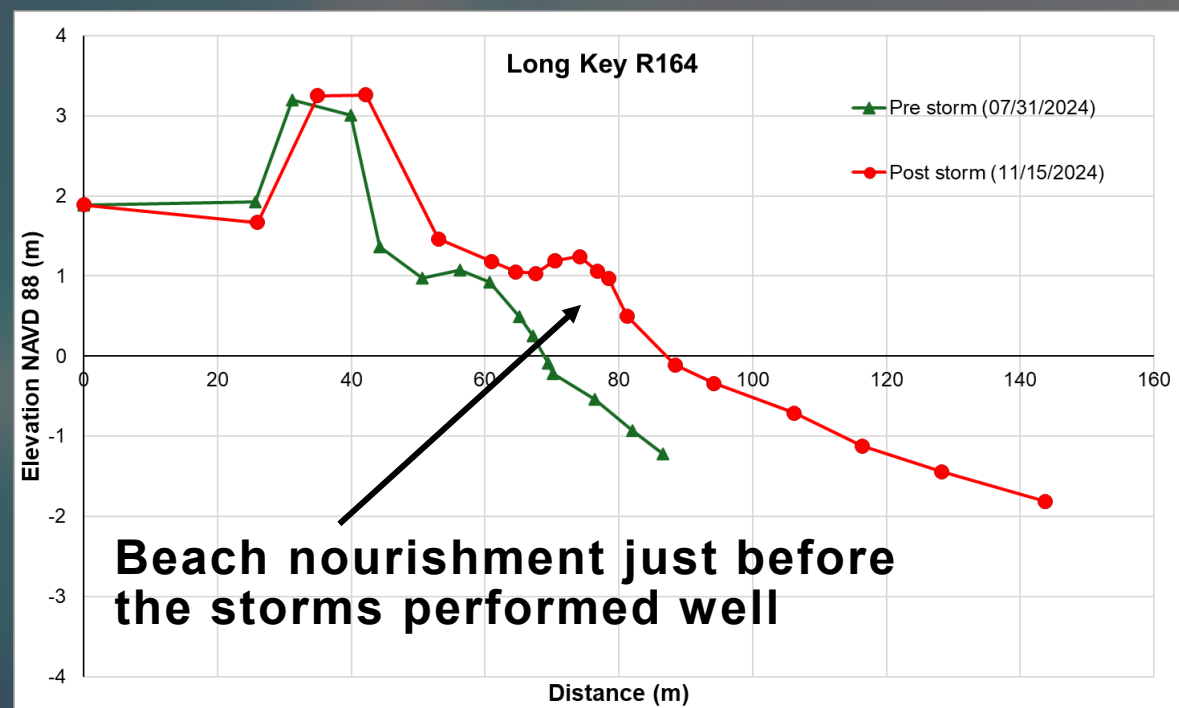
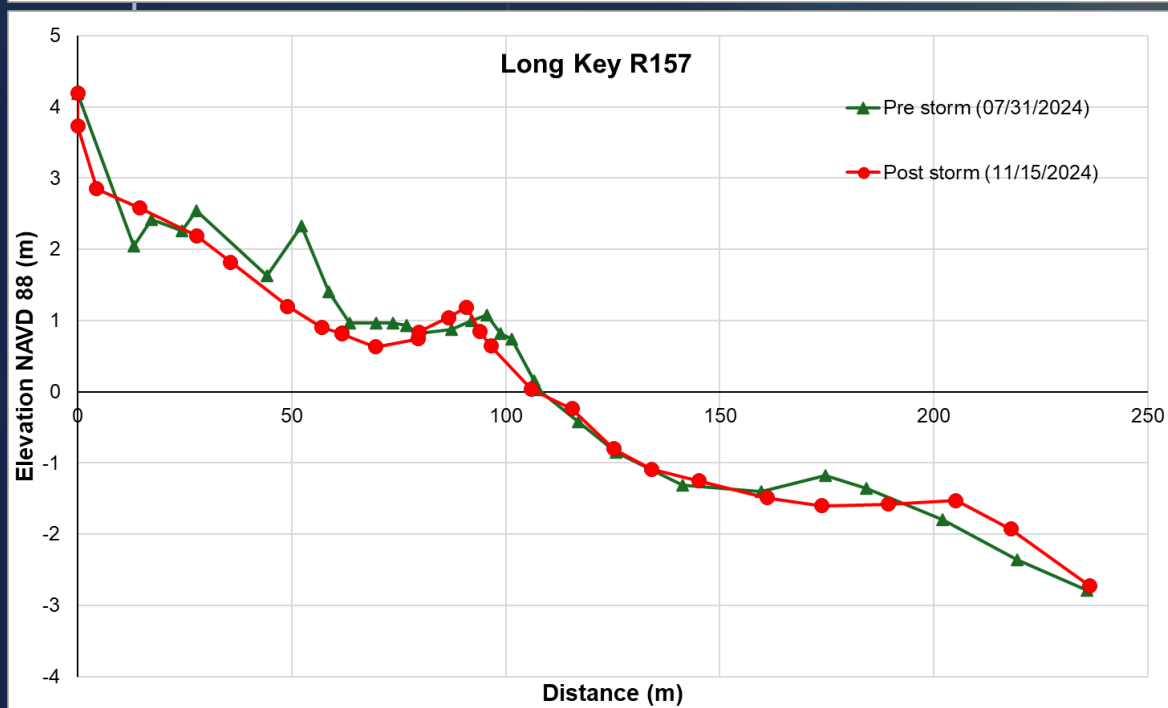
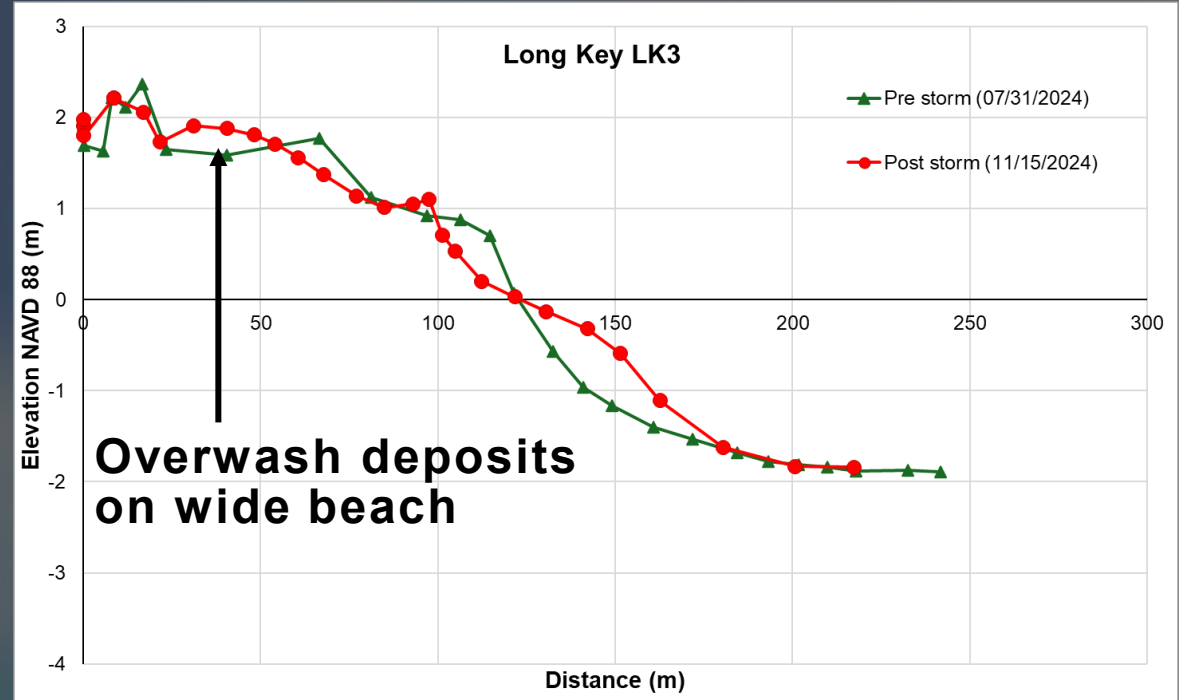
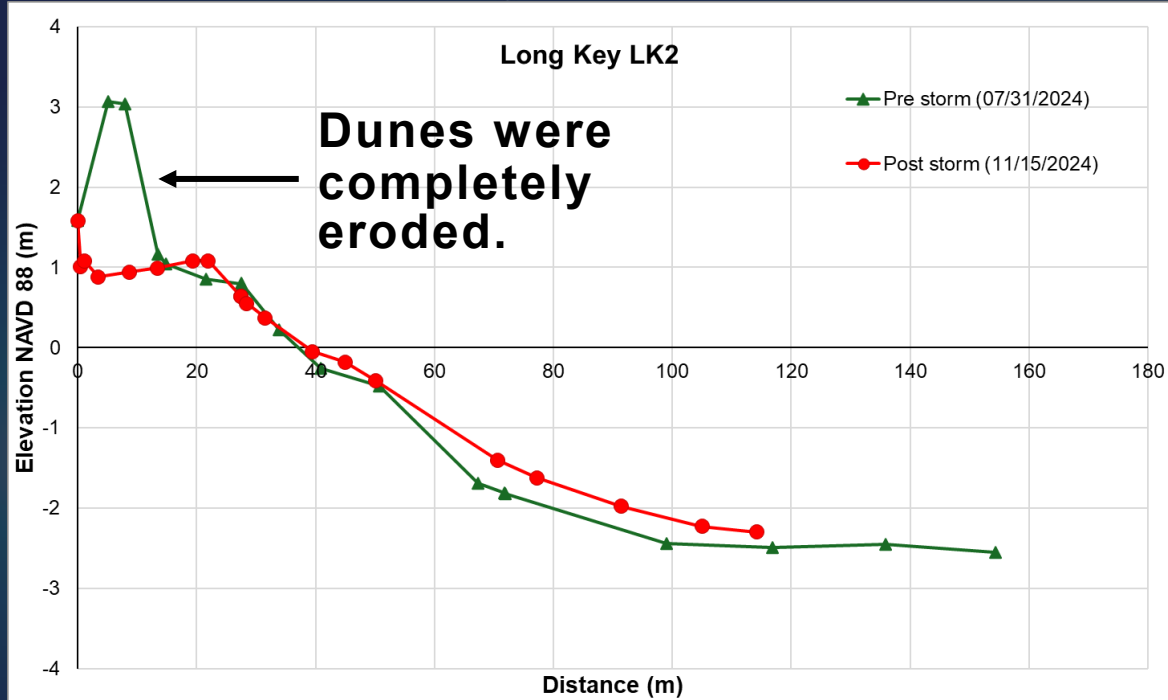
Pre- and Post-Storm Beach Surveys



Due to the short time between Helene and Milton, beach surveys were not conducted between the storms.







Summary

- 1) *Hurricane Helene's storm surge overtopped the seawalls surrounding the barrier island by over 2 ft along the Gulf side and 4 ft along the bay side.*
- 2) *Severe scour occurred both landward and seaward of the seawall, although very few seawalls collapsed.*
- 3) *Practically all sand dunes were eroded, with most dune overwalks damaged.*
- 4) *Significant amount of sand was moved offshore to water deeper than 2 m (7 ft) along middle and northern Sand Key, likely by Hurricane Milton.*
- 5) *Beach nourishment worked, at Pass-A-Grille Beach.*
- 6) *Beach nourishment is desperately needed.*