



# Bad News Comes in Three's: The Effects of Three Hurricanes Within a Three-Month Span on Pinellas County Beaches

Zachary Westfall, M.S., G.I.T.

Coastal Scientist

Pinellas County Public Works

John Bishop, Ph. D.

Coastal Coordinator

Pinellas County Public Works

# Outline

1. Brief Overview of Pinellas County and Project Areas
2. Discussion of the 2024 Hurricane Season
3. Go Over Photo Comparison Methods
4. Photos of Damage
5. County Post-Emergency Actions



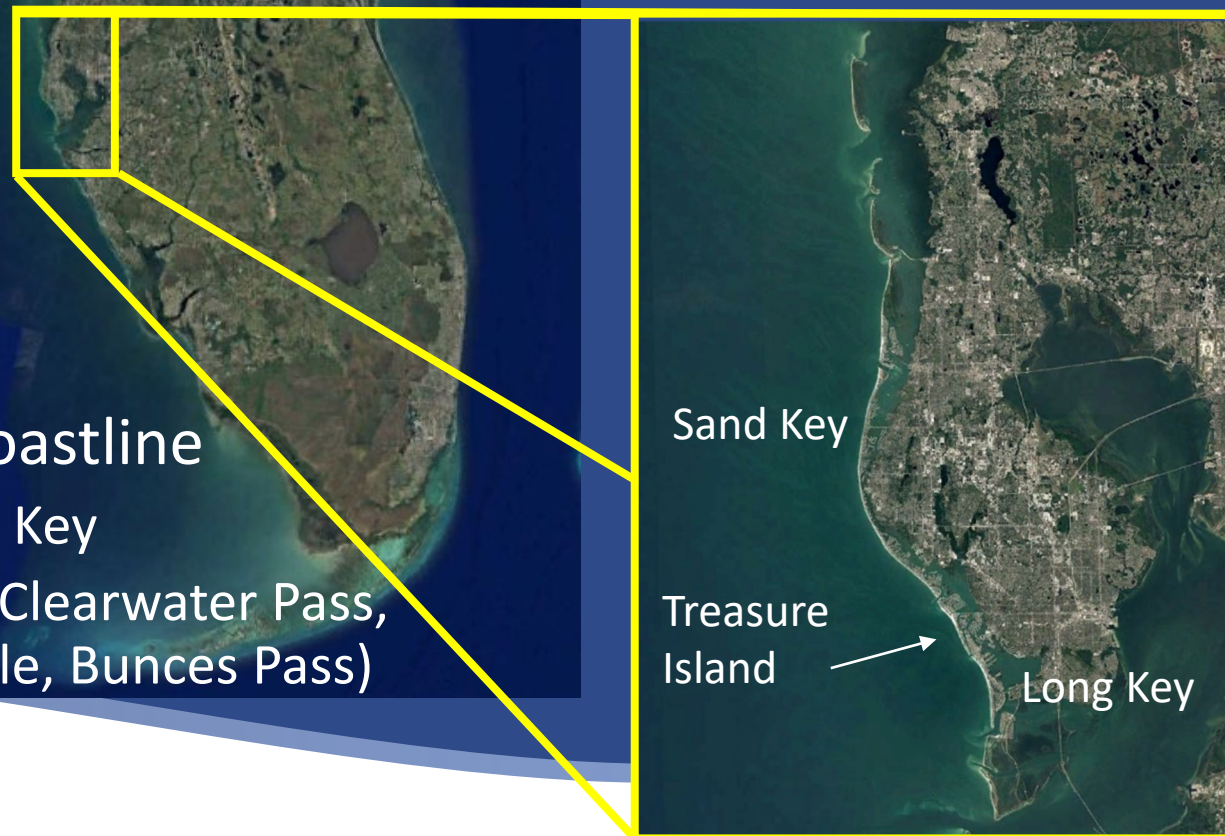
**GOOD NEWS:** First Documented Leatherback Nest  
in Over 30 Years in Pinellas County.



# Pinellas County Coastline and Projects

## 1. Pinellas County: 35 miles of Coastline

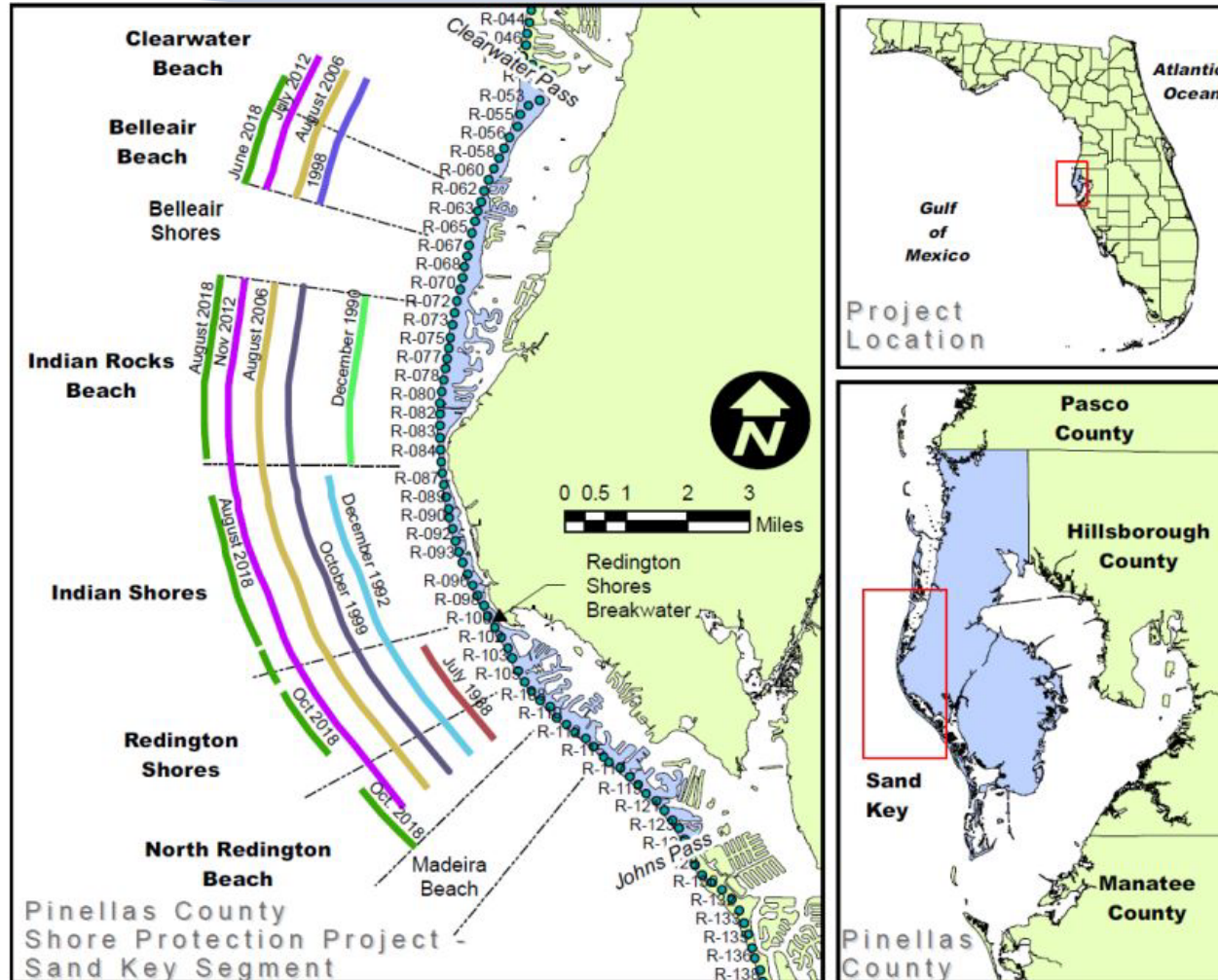
- 9 Islands including half of Anclote Key
- 6 Named Passes (Hurricane Pass, Clearwater Pass, Johns Pass, Blind Pass, Pass-a-Grille, Bunces Pass)



# Pinellas County Shore Protection Projects



- Sand Key which is an 11.3 mile project ranging from R-56 to R-66 and R-71 to R107.
- Traditionally a Federal Project but has been put on hold due to real estate issues. Last full nourishment was 2012
- County did a Dune Project Post-Idalia 2023-2024

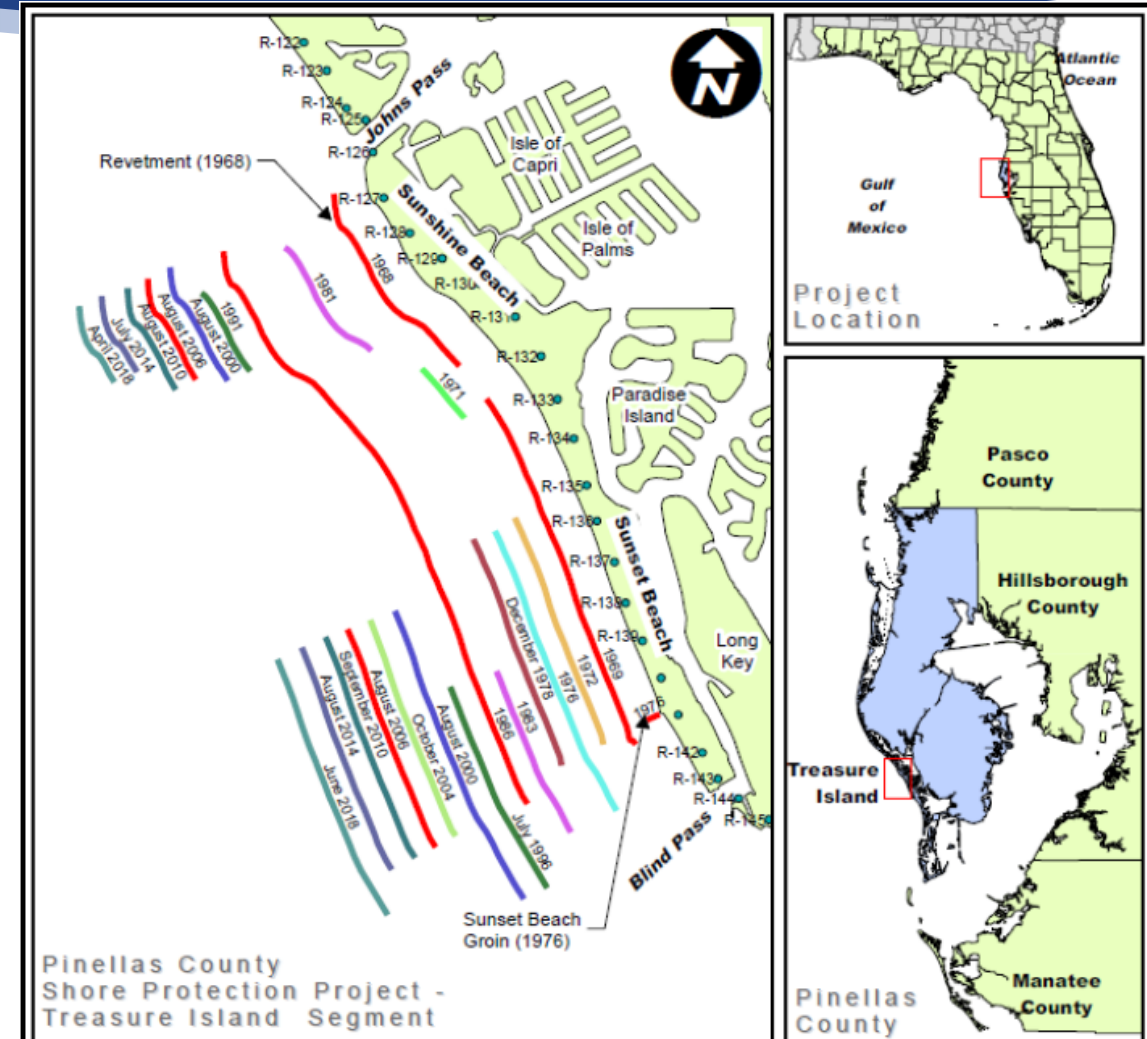




# Pinellas County Shore Protection Project



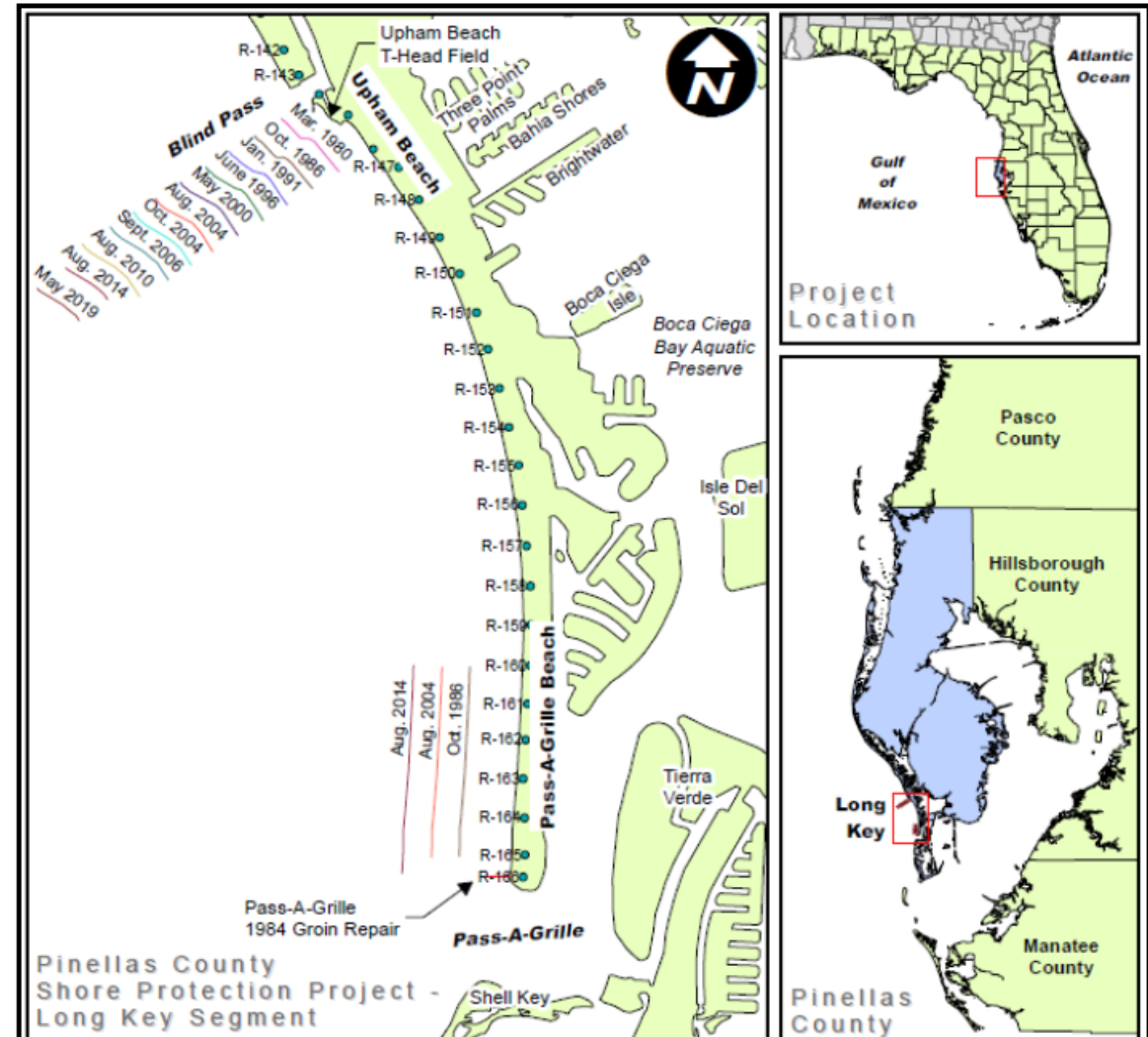
- Treasure Island Projects consist of Sunshine and Sunset Beaches (R127-R128 and R136-R141 respectively)
- Last Fully nourished in 2018
- Federal Project in limbo pending WRDA 2024 and real estate re-evaluation
- \*ECL Workshop and hearing held Jan. 22<sup>nd</sup> 2025\*



# Pinellas County Shore Protection Project



- Long Key projects consist of Upham Beach (R144-R146) and Pass-a-Grille Beach (R160-R166)
- Pass-a-Grille was in the process of being nourished during all three storms-was competed in 2024
- Upham Beach was last nourished in 2019



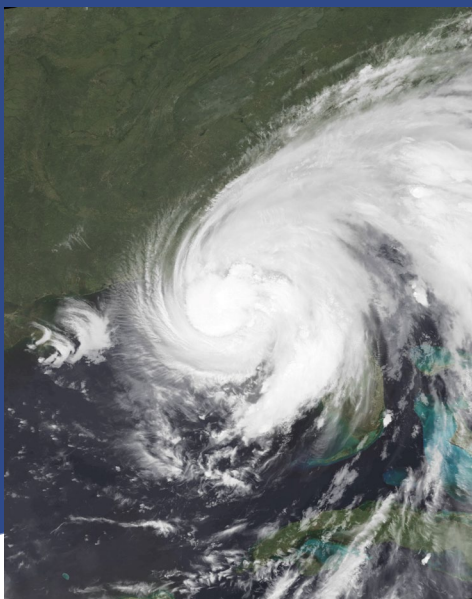


# 2024 Hurricane Season for Pinellas County



1. Hurricane Debby-Cat 1-August 5, 2024
2. Hurricane Helene-Cat 4-September 26, 2024
3. Hurricane Milton-Cat 3-October 9, 2024

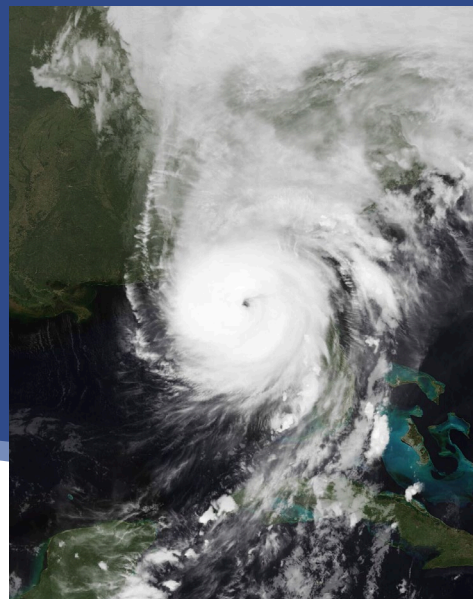
Debby



52 Days



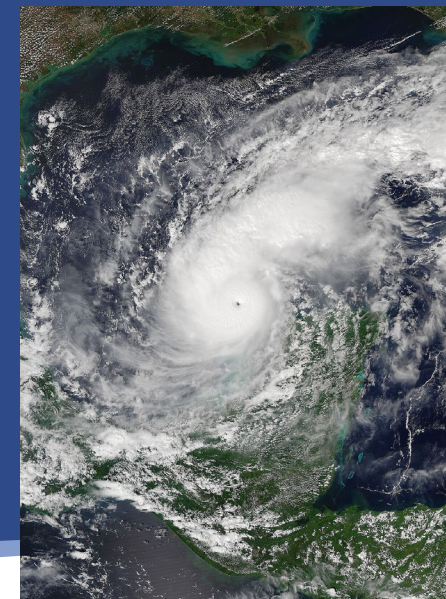
Helene



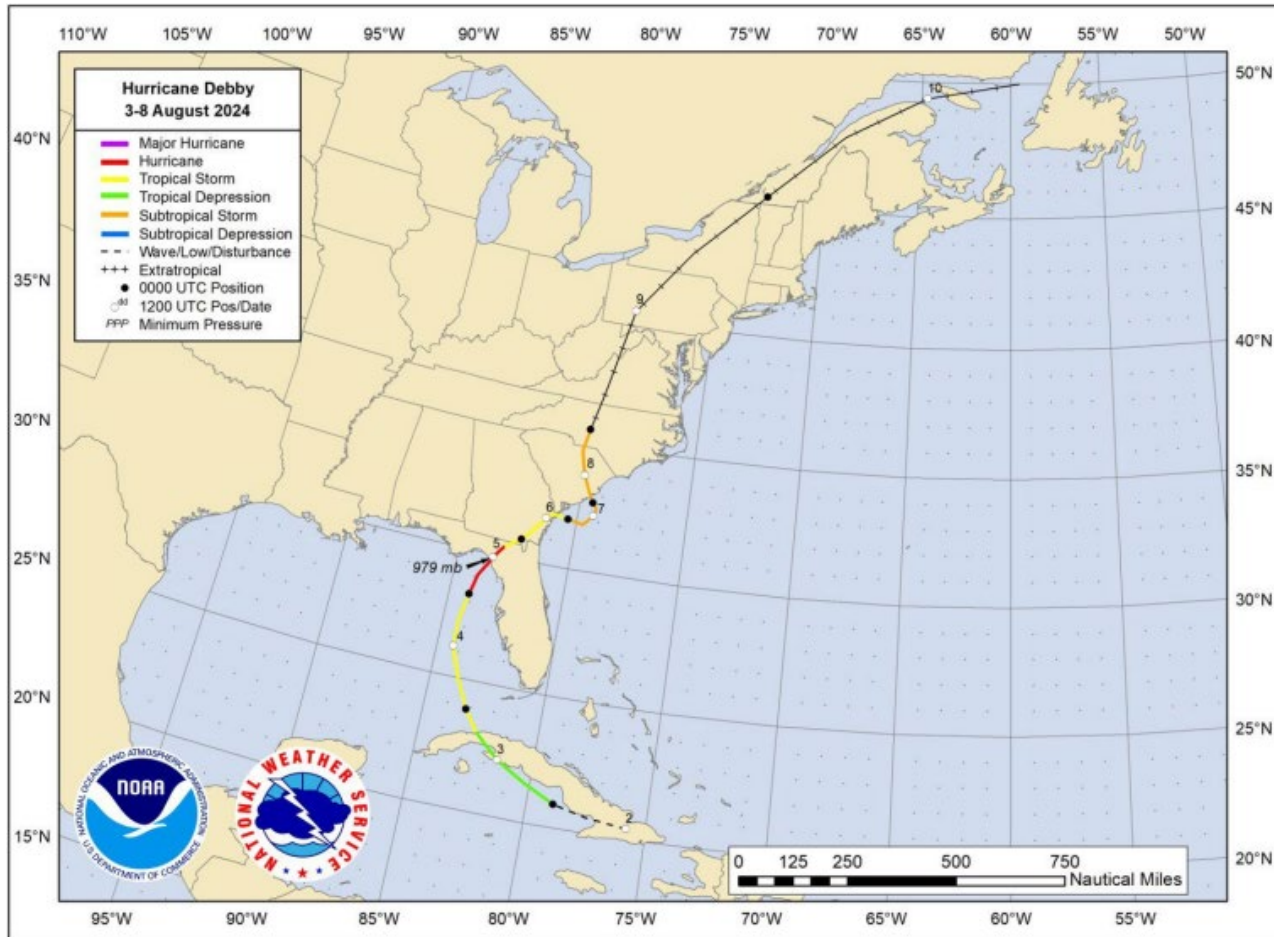
13 Days



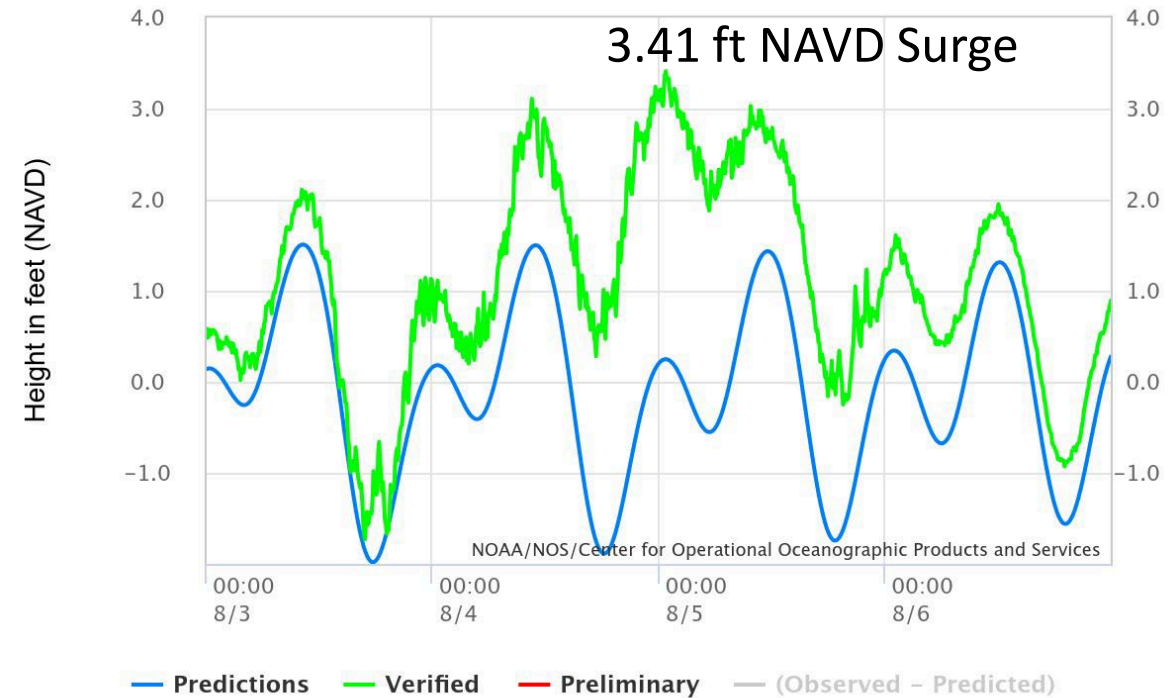
Milton



# Hurricane Debby



NOAA/NOS/CO-OPS  
Sea Level Water Levels at 8726724, Clearwater Beach FL  
From 2024/08/03 00:00 LST to 2024/08/06 23:59 LST

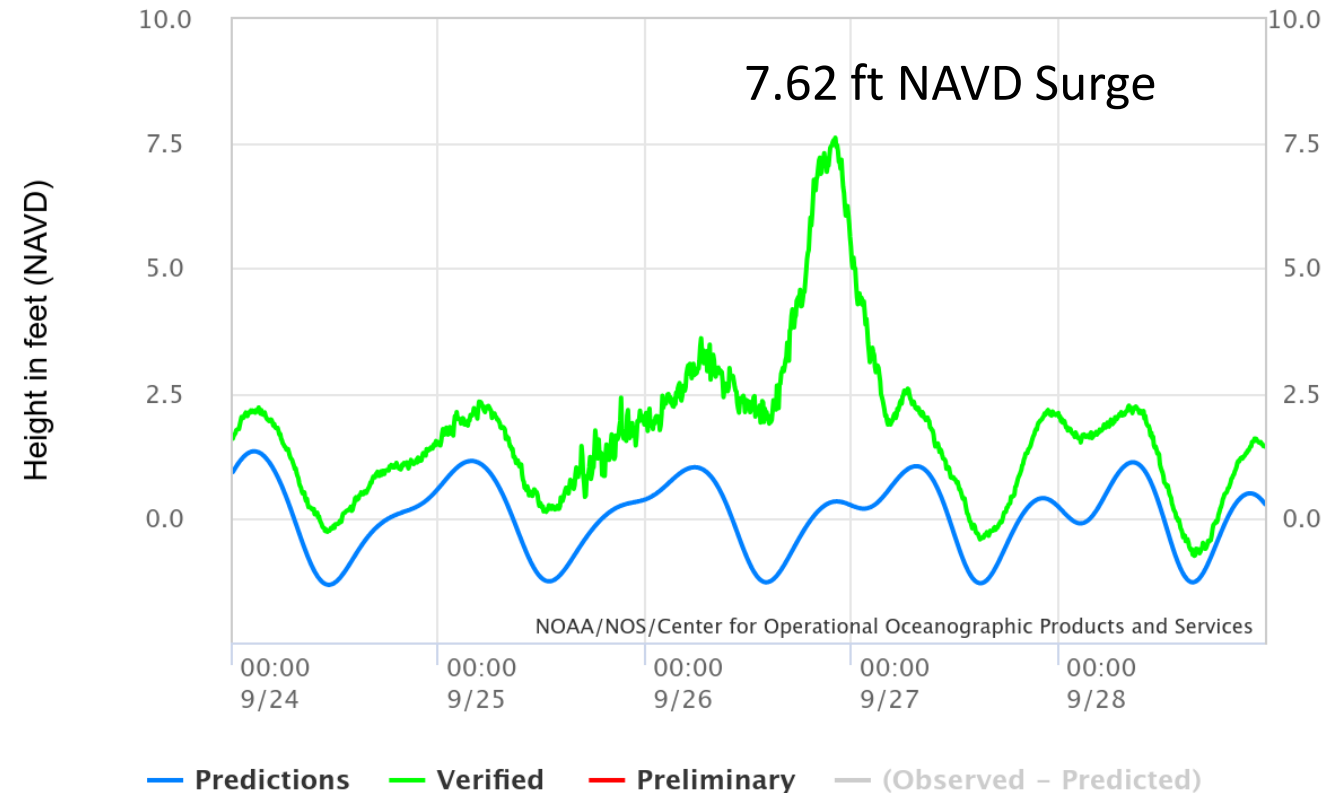




# Hurricane Helene



NOAA/NOS/CO-OPS  
Levels at 8726724, Clearwater Beach FL  
2024/09/24 00:00 LST to 2024/09/28 23:59 LST



# Hurricane Milton

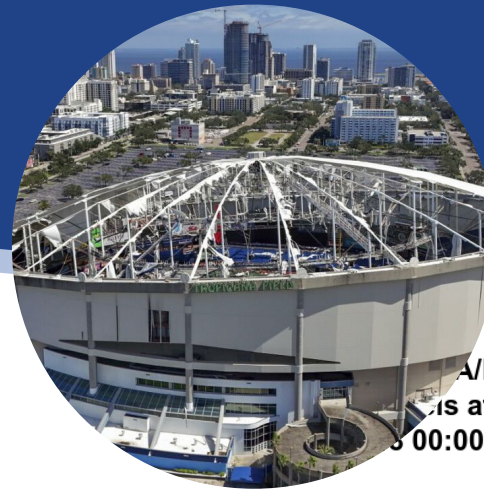
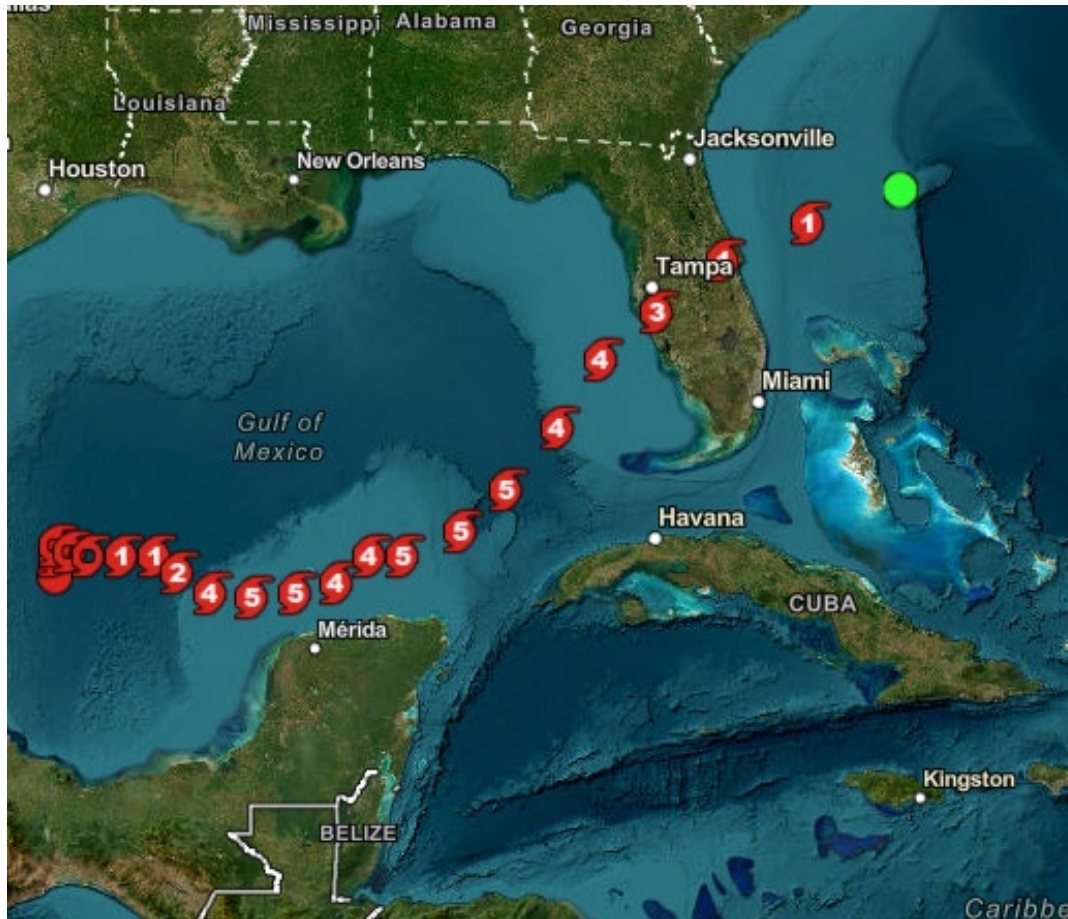
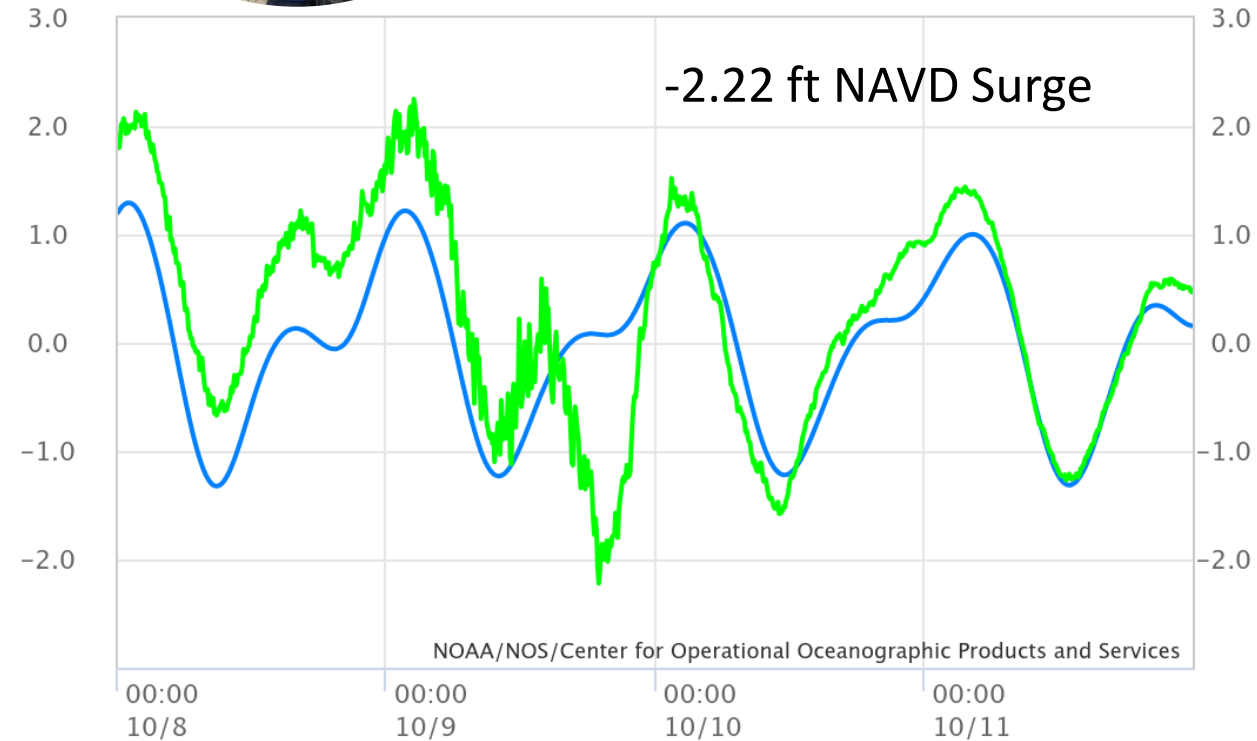


Photo Courtesy  
FOX13



Height in feet (NAVD)

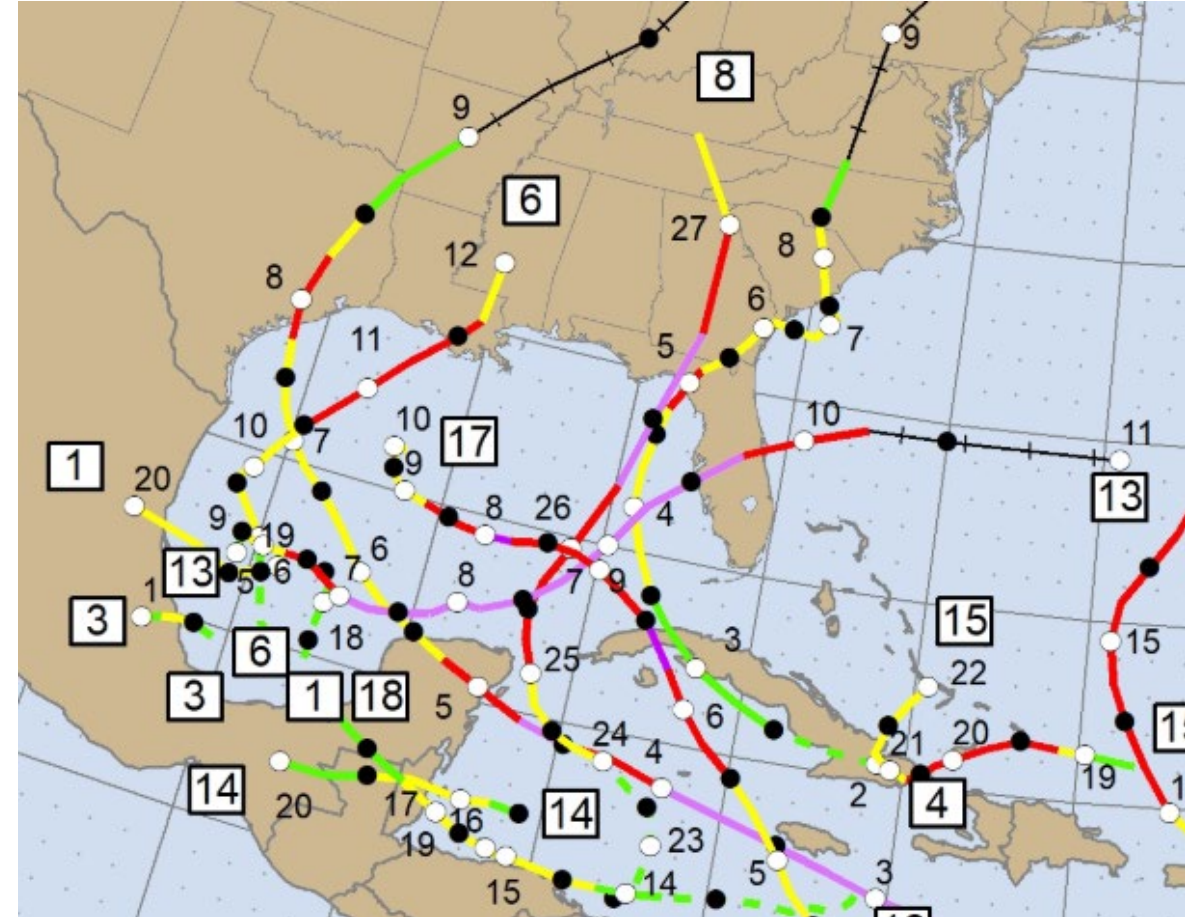


— Predictions — Verified — Preliminary — (Observed - Predicted)



# 2024 Hurricane Season Overview

- Hurricane Debby chewed away at the toe of the County Dune Project and brought significant rain.
- Hurricane Helene caused catastrophic flooding damage with one of the highest recorded water levels since Hurricane Idalia (2023)
- Hurricane Milton caused a negative surge but brought wind/rain and was the 5<sup>th</sup> lowest pressure hurricane on record (897 mbar) and the lowest on record since 2005.



# Photo Comparison Method

Problem: We all try to gather photo documentation but it's always hard to reference it picture to picture.

Solution: Use a free and easy to use App to occupy the same location every time!



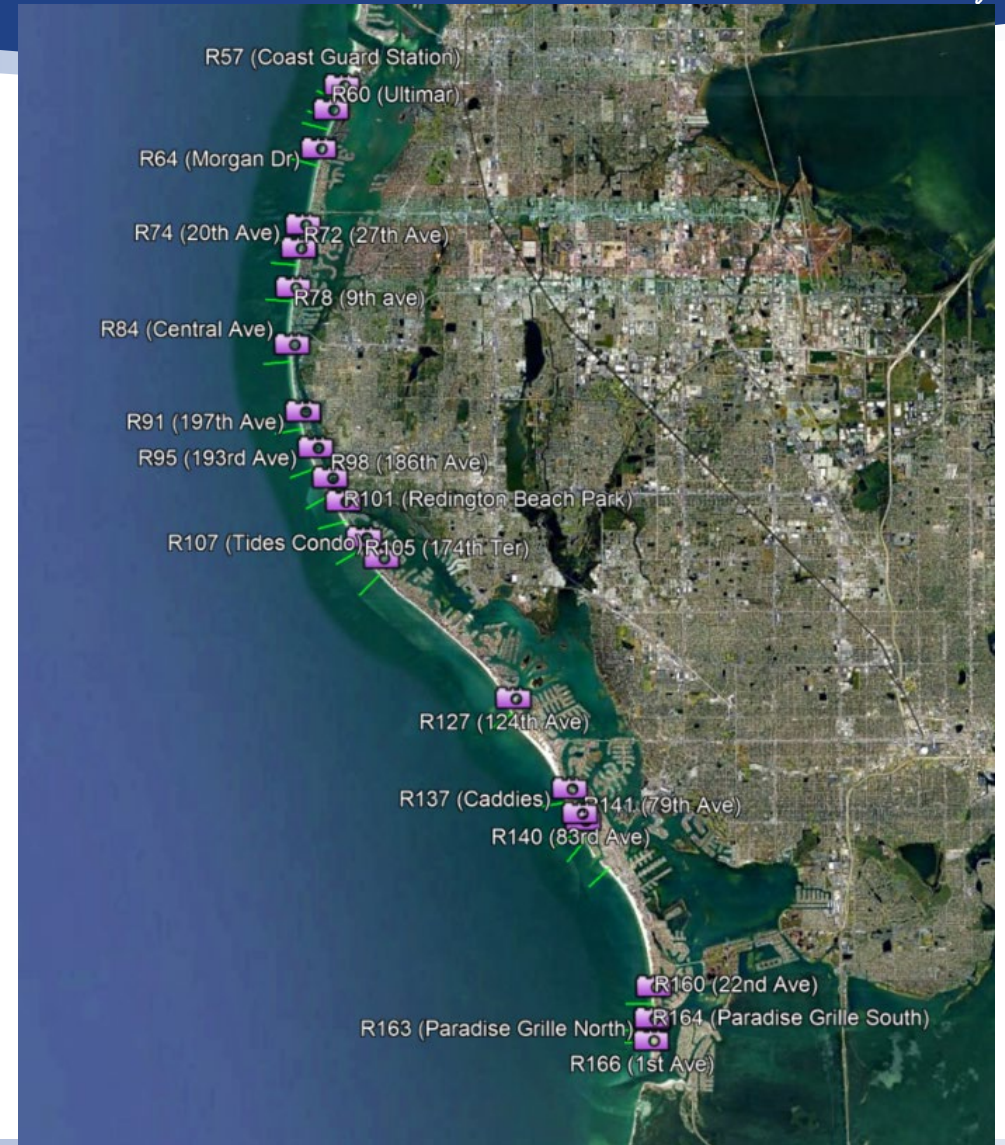
# Photo Comparison Method

Use Google Earth Mobile and create a Storm Photo Project










21 Different Locations (associated with project areas)

Take Photos Looking North and South at every location

Point the middle of your camera toward the horizon where the beach vanishes in the distance



# Photo Comparison Method

 R-057A_CW_20240928_405_1	9/30/2024 9:46 AM	JPG File	5,296 KB
 R-057A_CW_20240928_428_1	9/30/2024 9:46 AM	JPG File	3,154 KB
 R-057A_CW_20240928_434_1	9/30/2024 9:46 AM	JPG File	3,656 KB
 R-058_CW_20240928_367_1	9/30/2024 9:46 AM	JPG File	4,089 KB
 R-060_CW_20240928_31_1	9/30/2024 9:46 AM	JPG File	3,820 KB
 R-060_CW_20240928_48_1	9/30/2024 9:46 AM	JPG File	2,853 KB
 R-060_CW_20240928_69_1	9/30/2024 9:46 AM	JPG File	5,116 KB
 R-060_CW_20240928_86_1	9/30/2024 9:46 AM	JPG File	4,882 KB
 R-063A_BB_20240928_66_1	9/30/2024 9:46 AM	JPG File	3,885 KB

**Python Code that sorts the pictures by nearest monument location and date using EXIF data of the photos and renames them**







# Results of Post Storm Data Collection

7-24-2024

R-64



8-5-2024

R-64





8-2-2024

R-141



8-5-2024

R-141





9-24-2024

R-57



9-28-2024

R-57





9-24-2024

R-60



9-28-2024

R-60





9-24-2024

R-64



9-28-2024

R-64





9-24-2024

R-64



9-28-2024

R-64





9-24-2024

R-74



10-10-2024

R-74





9-24-2024

R-74



9-28-2024

R-74





9-24-2024

R-78



9-28-2024

R-78





9-24-2024

R-84



10-10-2024

R-84





9-24-2024

R-91



9-28-2024

R-91





9-24-2024

R-95



10-10-2024

R-95





9-24-2024

R-98



10-10-2024

R-98





9-24-2024

R-107



10-10-2024

R-107





9-24-2024  
R-107



9-28-2024  
R-107





9-28-2024

R-107



10-10-2024

R-107





9-24-2024

R-127



9-28-2024

R-127





9-24-2024

R-140



10-01-2024

R-140







10-11-2024

R-140



9-24-2024

R-141



10-11-2024

R-141





9-24-2024

R-160



10-11-2024

R-160





# Too Much Sand.....



~2 to 5 feet of overwash sand on roads and in buildings



# Sand Sieve Operation



Non-Compliant Material



Types of Debris Removed



Post-Processed Sand

- Identified areas to stockpile excess sand (County Parks)-educated staff
- Used a sand spec of  $\frac{3}{4}$  inches for sieving after consultation with CEGG
- Did not place sand that did not comply with sand rule



# Sand Sieve Operation



- Washover sand placed back on the beach
- Able to put back a portion of the dune project that was destroyed



# Conclusion- Photo Comparison

Identify locations that would be good to document.

Create a Google Map project with the photo locations

Start documenting beach changes over time with time-series photos

Possibility to Include in Citizen Science





# Thank You!



## What's Next?

- Pinellas County has submitted an emergency permit application to fill Sand Key, Treasure Island, and Upham Beach
- Awaiting guidance document for WRDA 2024 to understand how/if the USACE can renourish some portions of our beaches

**Zachary Westfall, M.S., G.I.T.**

**Coastal Scientist**

Public Works

Pinellas County Government

22211 Hwy 19 N, Bldg 10

Clearwater, FL 33765

[zwestfall@pinellas.gov](mailto:zwestfall@pinellas.gov)

Office (727) 464-8841

## Questions?