

IMPACTS OF HURRICANES DEBBY, HELENE AND MILTON ON ANNA MARIA ISLAND

Charlie Hunsicker, Manatee County
Morjana Signorin, MSc, Coastal Protection Engineering (CPE)

Co-Authors:

Sherri Swanson, Manatee County
Thomas Pierro, PE, DCE, Coastal Protection Engineering (CPE)
Chelsea Ryan, PE, Coastal Protection Engineering (CPE)



FLORIDA SHORE & BEACH
PRESERVATION ASSOCIATION
A League of Cities and Counties on Beach and Coastal Issues

38th Annual National Conference on Beach Preservation Technology
February 2025, Panama City Beach, Florida



PROJECT LOCATION



HURRICANE DEBBY (AUGUST 12, 2024)

- Landfall as Cat 3 near Apalachicola, FL
- **Water Levels:**
 - Max WL = 3.88 ft NAVD88 (Coquina tidal gage)
 - 5-year return interval
- **Waves:**
 - Hs peak = 13 ft (Egmont Key NDBC gage)
 - 30-year return interval
- **Impacts on Anna Maria:**
 - Beach deflation but no substantial dune erosion

HURRICANE HELENE (SEPTEMBER 26, 2024)

- Landfall as Cat 4 near Perry, FL
- **Water Levels:**
 - Max WL = 6.62 ft NAVD88 (Coquina tidal gage)
 - >100-year return interval
- **Waves:**
 - Hs peak = 18 ft (Egmont Key NDBC gage)
 - >100-year return interval
- **Impacts on Anna Maria:**
 - Significant beach damage, substantial sand erosion, dune retreat and destruction, and sand overwash

HURRICANE MILTON (OCTOBER 9, 2024)

- Landfall as Cat 2 near Ft Myers, FL
- **Water Levels:**
 - WL = -2.29 ft NAVD88 (drawdown, NOAA gage)
 - <1-yr return interval
- **Waves:**
 - Hs peak = 16 ft (Egmont Key NDBC gage)
 - >100-year return interval
- **Impacts on Anna Maria:**
 - Storm surge drawdown, alongshore transport, intense wave action

PRE- AND POST-STORM DOCUMENTATION

Anna Maria Island Beaches Storm Preparedness and Response Plan

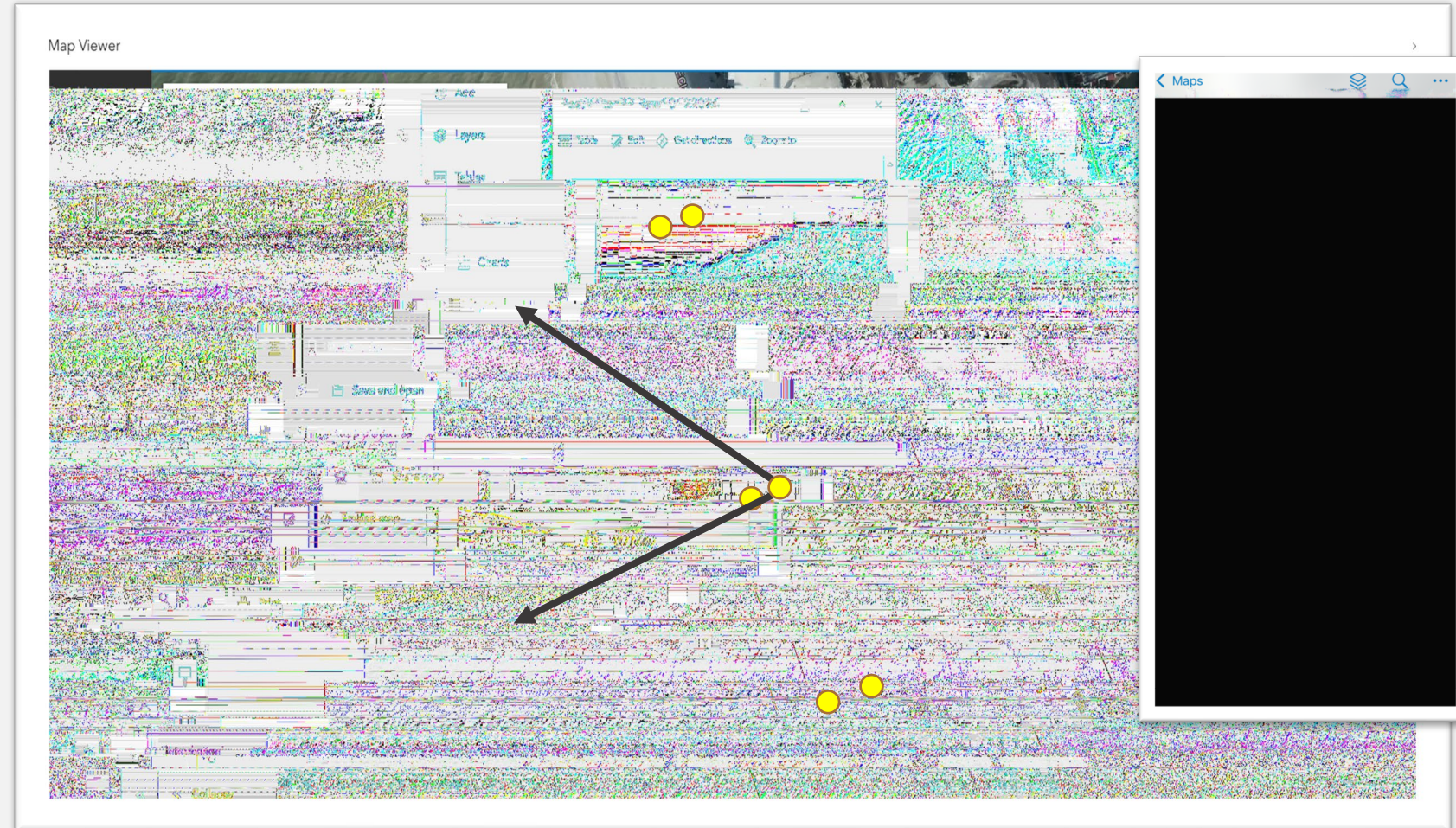
- Manatee County's proactive strategy for managing tasks during major coastal storms that threaten the beach and dune system.
- Defined actions for pre-season, pre-storm, post-storm, and post-season to improve preparedness and response to erosion impacts.



RESPONSE PLAN FLOW CHART

PRE- AND POST-STORM DOCUMENTATION

- 26 transects in Anna Maria Island
- Photos & beach width measurements
- ArcGIS Field Maps



PRE- AND POST-STORM CONDITIONS



- Central Beach, R-30, facing North

Pre-Helene/Milton



Post-Helene



Post-Milton



PRE- AND POST-STORM CONDITIONS

- Cortez Beach, R-34, facing South



Pre-Helene/Milton



Post-Helene



Post-Milton

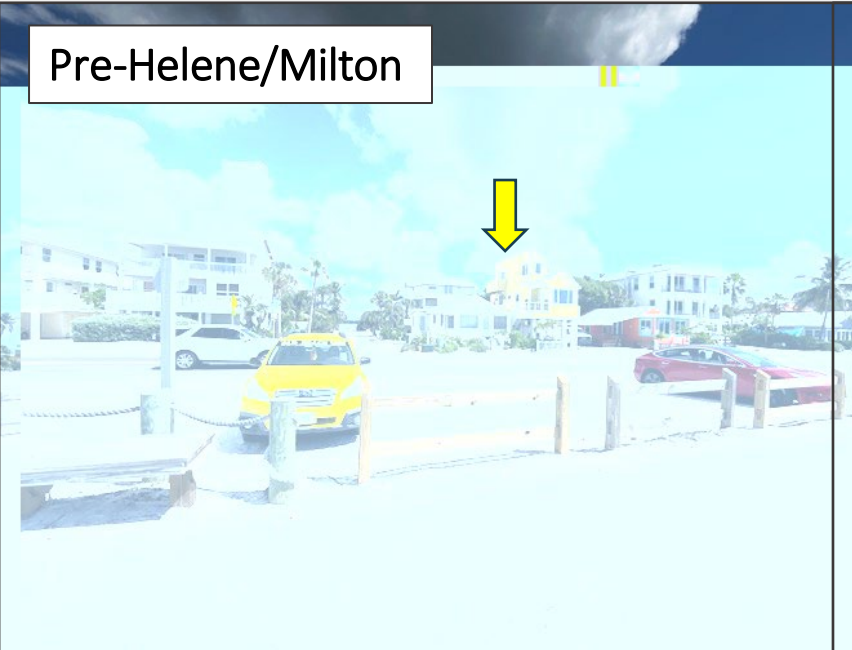


PRE- AND POST-STORM CONDITIONS

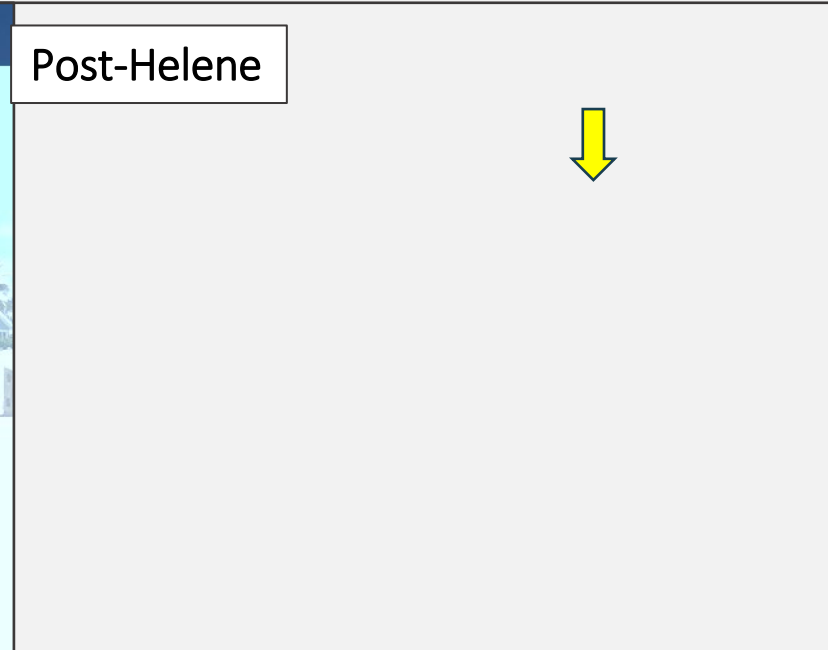
- Coquina Beach, R-35, facing West



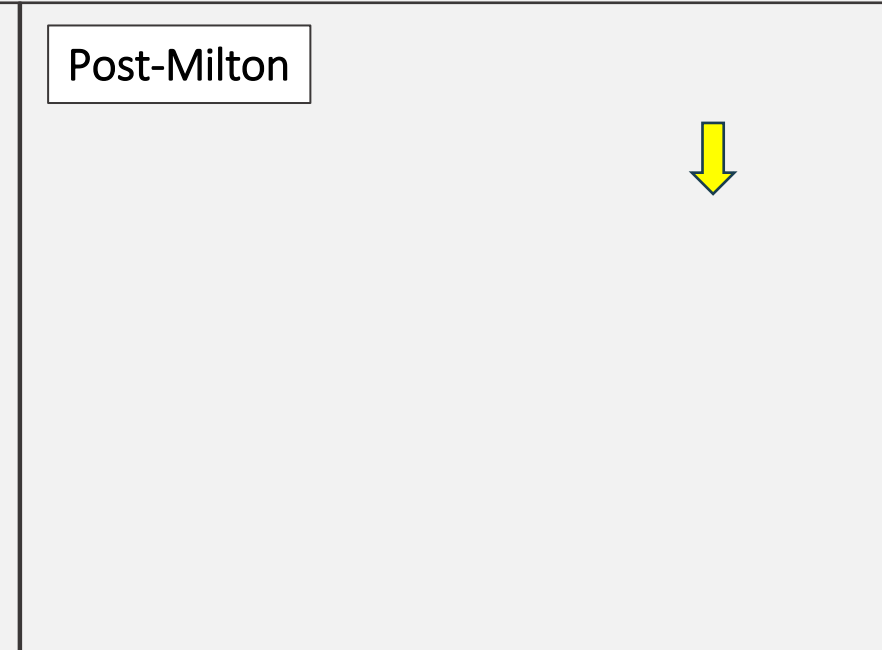
Pre-Helene/Milton



Post-Helene



Post-Milton



PRE- AND POST-STORM CONDITIONS

- Coquina Beach, R-37, facing East



Pre-Helene/Milton



Post-Helene

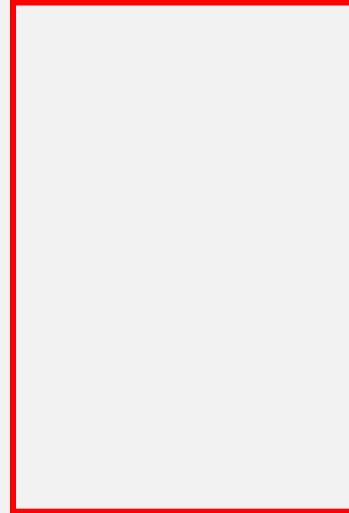


Post-Milton



ISLANDWIDE VOLUMETRIC CHANGES

- Survey dates:
 - October 2023 (pre-storm)
 - August 2024 (post-Debby)
 - October 2024 (post-Helene and Milton)



ISLANDWIDE VOLUMETRIC CHANGES

Pre- vs Post-Helene/Milton
Erosion
Accretion

Pre-Helene/Milton

Post-Helene/Milton



ISLANDWIDE VOLUMETRIC CHANGES

| Area | October 2023 (Pre-Debby) to October 2024 (Post-Helene and Milton) | |
|------------------------------|---|---|
| | Volume Change (cy) above DOC (-18 ft NAVD88) | Volume Change (cy) above MHW (+0.23 ft NAVD88) |
| North Area (R-7 to R-12) | 24,500 | -10,600 |
| Central (R-12 to R-33.5) | -240,100 | -242,300 |
| Coquina (R-33.5 to R-41.5) | -121,000 | -61,500 |
| Total (R-7 to R-41.5) | -336,600 (-9.8 cy/lf) | -314,400 (-9.1 cy/lf) |

Contribution to Volume Losses:

- Hurricane Debby: 15%
- Hurricane Helene: 60%
- Hurricane Milton: 25%

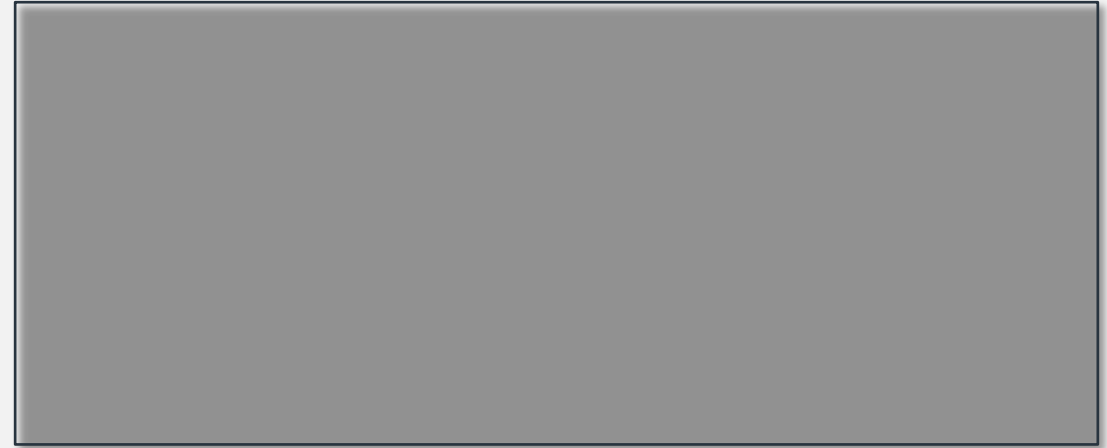
RECOVERY OF OVERWASHED SAND

- Outreach to local governments (Lee and Collier Counties) with similar post-storm recovery experience
- FDOT cleared roads; sand & debris stockpiled at Coquina Beach
- Quick decisions on sand management:
 - County managed all the sand from Anna Maria Island's three municipalities
 - Sand Debris Management team was formed with assigned roles
 - Separate sand piles for different uses: Overwashed sand from Coquina Beach to be returned to the beach; All other sand sent to Hidden Harbor Park and stockpiled for trail and road projects
 - All sand was sifted before reuse



COLLECTION AND STOCKPILING OPERATIONS

- Only sand overwashed from Coquina Beach was to be returned to the rebuild the dunes
- Drone estimate ~34,000 cy
(Actual volume placed 34,650 cy)
- One observer from CPE and the County Emergency Management Coordinator present at all times, frequent visits from Manatee County Natural Resources Dept staff



A YEAR'S WORTH OF WORK IN 45 DAYS ...

Photo Credit: Islander File
Photo Jacob Merrifield

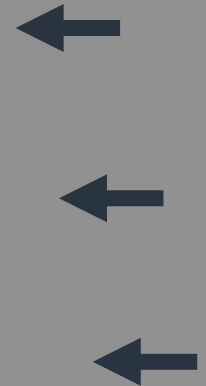
SAND SCREENING AND REPLACEMENT

- All sand to be returned to the beach was screened with a $\frac{3}{4}$ inch diamond pattern screen.
- Beach quality sand was placed on public beach.
- 3.3 cy/lf dune placement along the entire extent of Coquina Beach (1.4 miles), some locations dune was reinforced (2 or 3 rows of placement).

Sand sifting

Dune post-grading

Dune placement



TEAM EFFORT!

Charlie Hunsicker (Natural Resources, Manatee County)
Sherri Swanson (Natural Resources, Manatee County)
Natalie Moreno (Natural Resources, Manatee County)
Annette Cottrell (Natural Resources, Manatee County)
Joseph Mandara (Natural Resources, Manatee County)
Vicki Hommel (Financial Management, Manatee County)
Brad Szink (Public Safety, Manatee County)
Albert Rosenstein (Public Works, Manatee County)
Chad Butzow (Public Works, Manatee County)
Pat Shea (Utilities, Manatee County)
Carmine DeMilio (Property Managmt, Manatee County)
Chet Brown (Public Safety, Manatee County)
David Shurmur (Parks, Manatee County)
Aimie Johnson (Parks, Manatee County)

Shane Fitzgerald & Team (Ashbritt)
ICS Materials
TetraTech
Hagerty Consulting
Tom Pierro (CPE)
Morjana Signorin (CPE)
Lauren Floyd (CPE)
Chelsea Ryan (CPE)
Dylan Nestler (CPE)
Akash Sahu (CPE)
Katie Velasquez (CPE/MRD)
Frank Marshall (CPE-NC)
Daniela Cordeiro (CPE)
Chase Davis (CPE)
Michelle Pfeiffer (CPE)
APTIM
EOMAP
FDEP
FEMA
USACE



NEXT STEPS...

- There's still a long road ahead...
- Reconstruct Central Beach and Coquina Beach projects
- Restoration of storm protection for Gulf Drive at Cortez Beach/North Coquina
 - Dune planting
 - Construction of dune overwalks meeting ADA accessibility criteria
 - Resetting the lifeguard patrol towers
 - Completing the armoring revetment
 - Overwash scour pads and trail replacement

THANK YOU!



Charlie Hunsicker

charlie.hunsicker@mymanatee.org

Morjana Signorin

msignorin@coastalprotectioneng.com