

TAYLOR ENGINEERING, INC.

Volusia County Rapid Hurricane Response Using Trap Bags

FSBPA- St. Augustine, FL

February 8, 2024

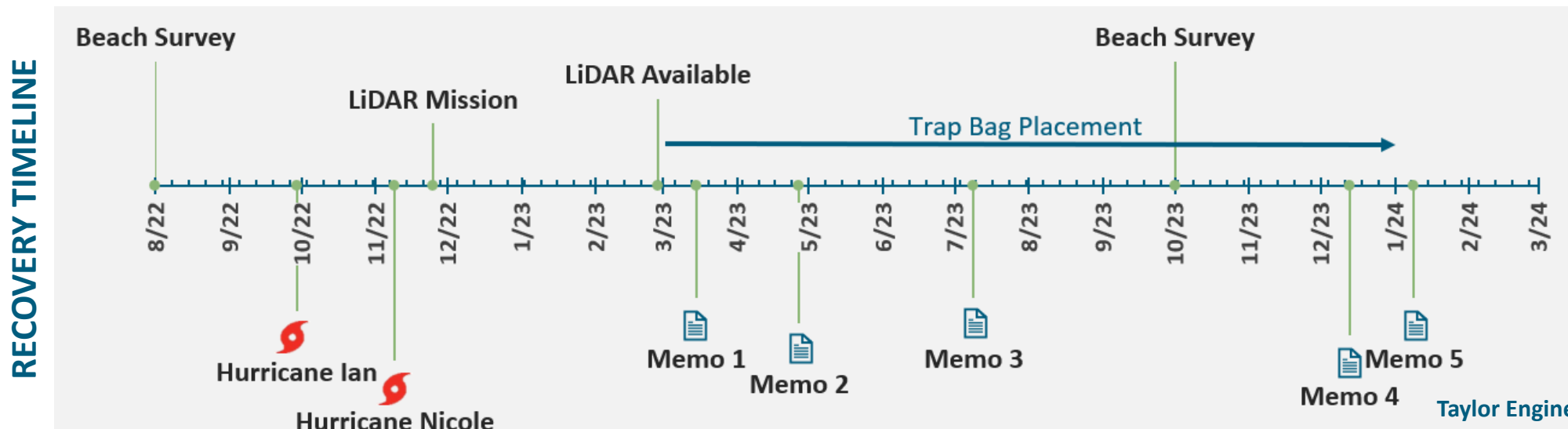
Wendy Laurent, Taylor Engineering

Jessica Fentress, Volusia County



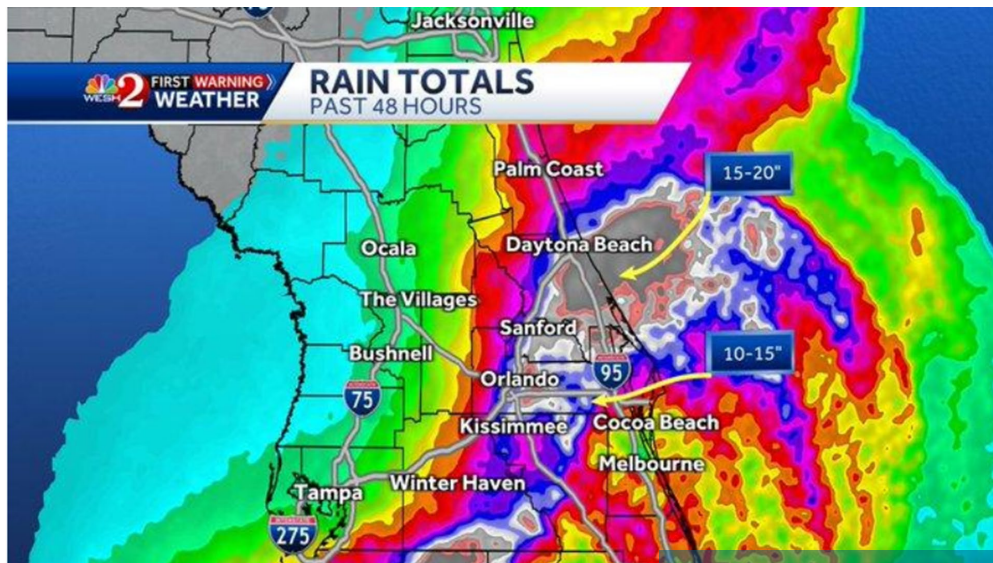
Outline

- Volusia County- Hurricane Ian- Hurricane Nicole
- Beach Impacts
- County Actions
- FEMA Reimbursement
- Moving Forward

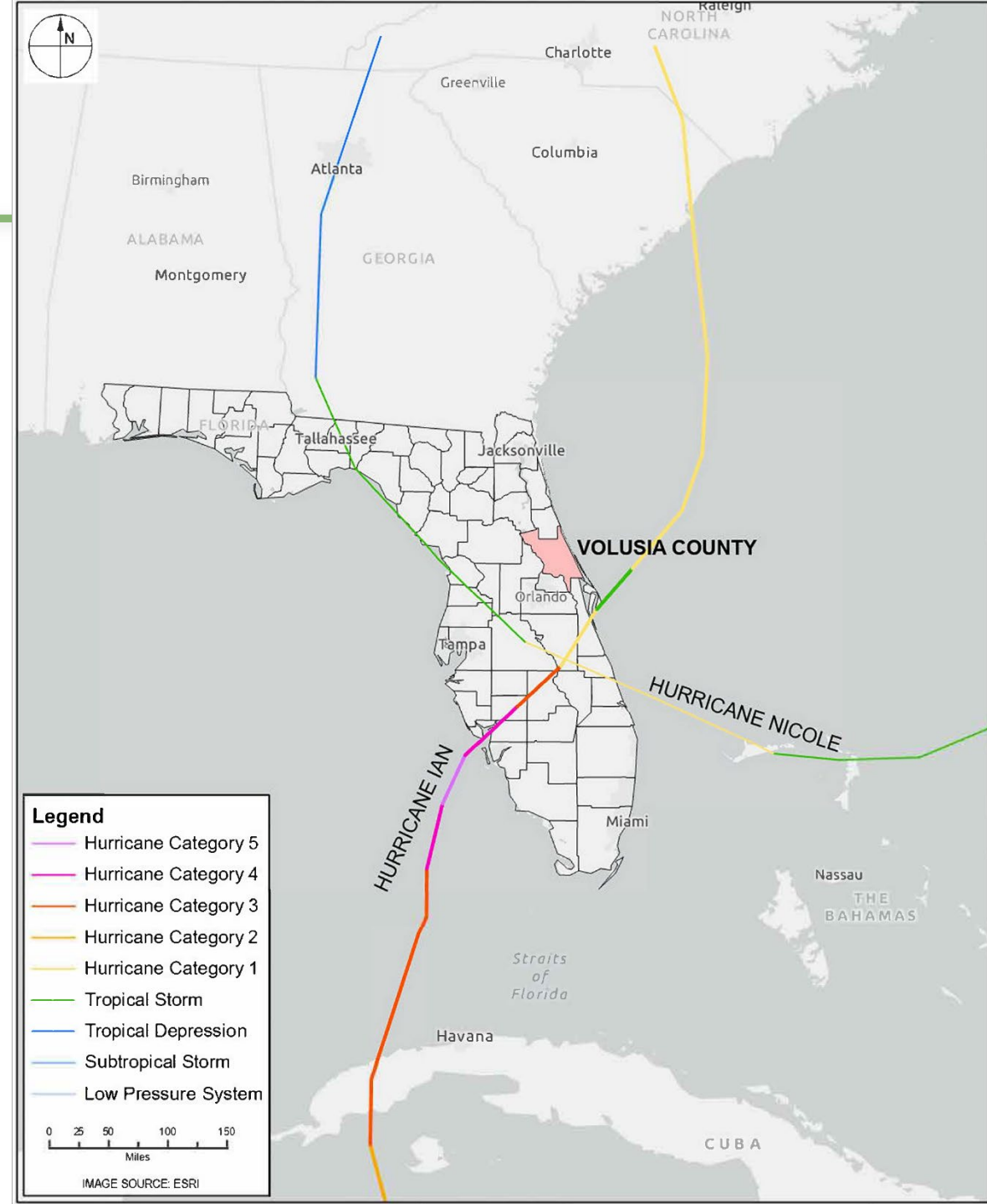


Volusia County- Hurricane Ian- Hurricane Nicole

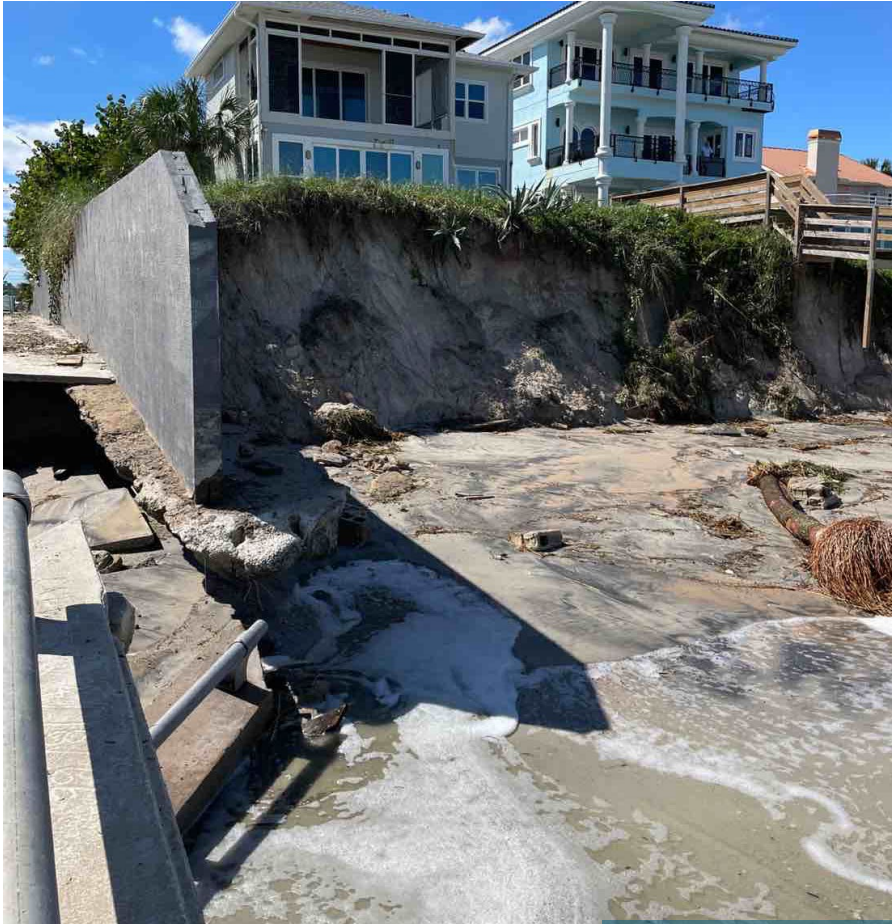
- Hurricane Ian
 - September 28-30, 2022
- Hurricane Nicole
 - November 8-10, 2022



Hurricane Ian Rainfall 15-20"



Volusia County- Hurricane Ian- Hurricane Nicole



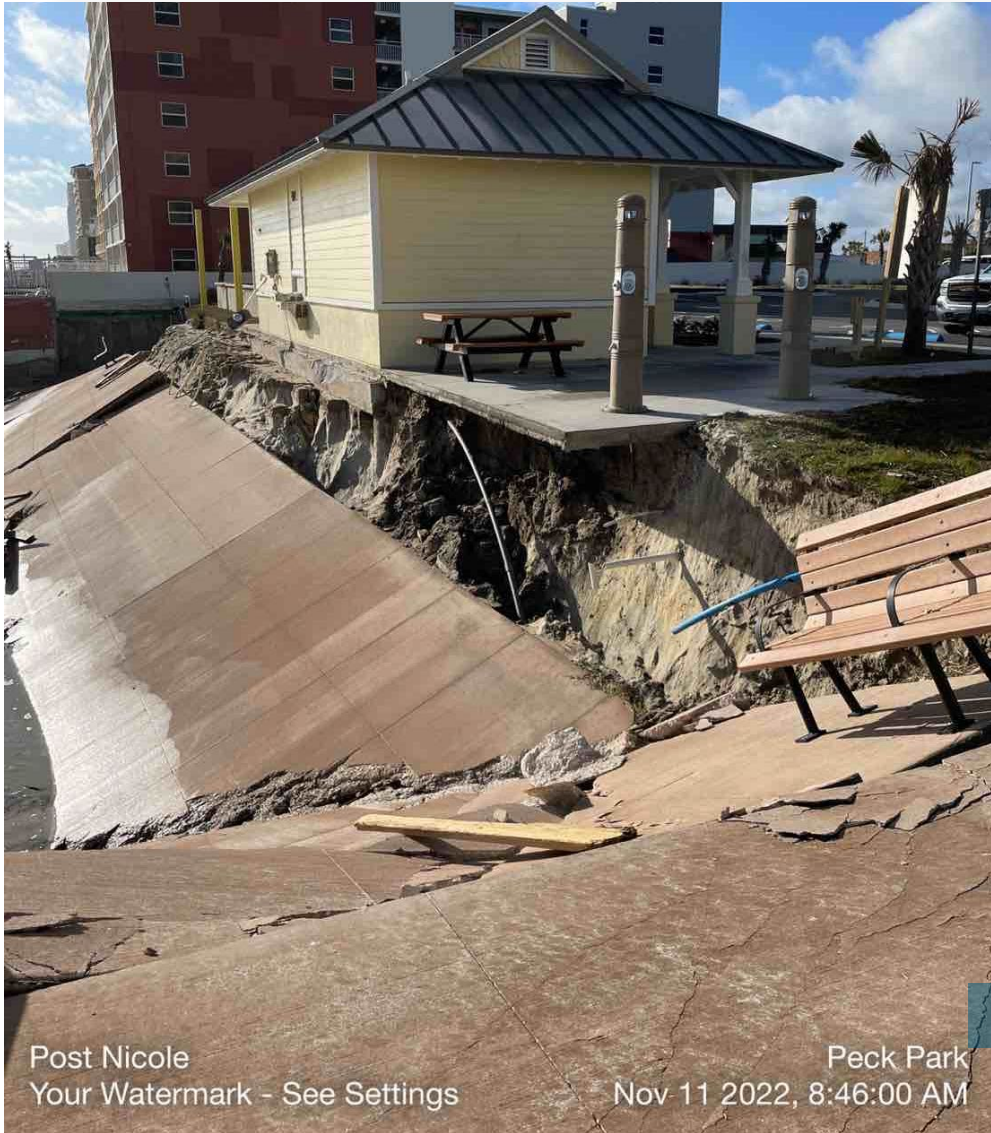
Hurricane Ian Damage (Volusia County, 2022)

Volusia County- Hurricane Ian- Hurricane Nicole



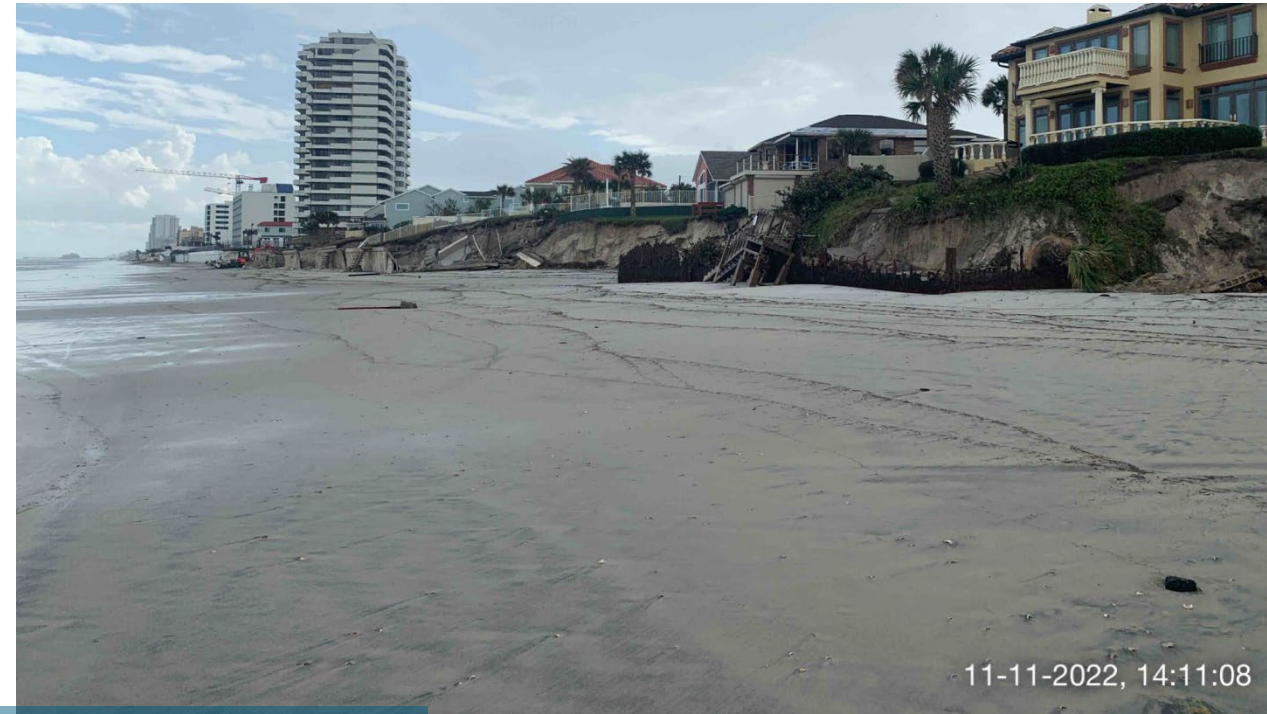
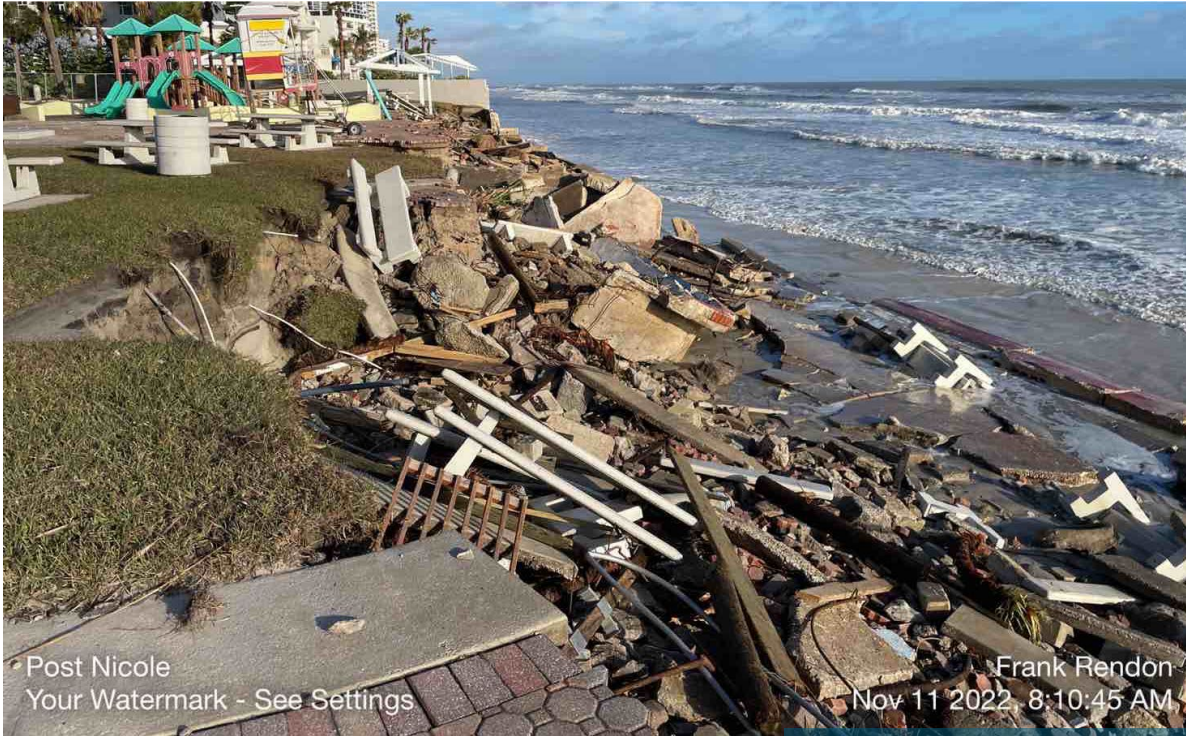
Hurricane Nicole Damage (Volusia County, 2022)

Volusia County- Hurricane Ian- Hurricane Nicole



Hurricane Nicole Damage (Volusia County, 2022)

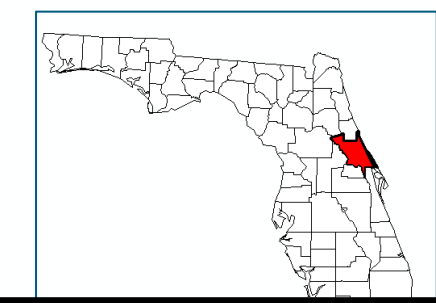
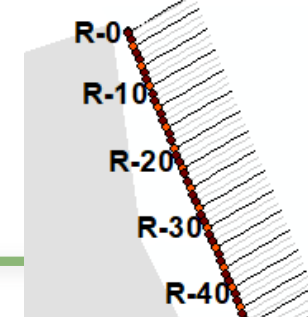
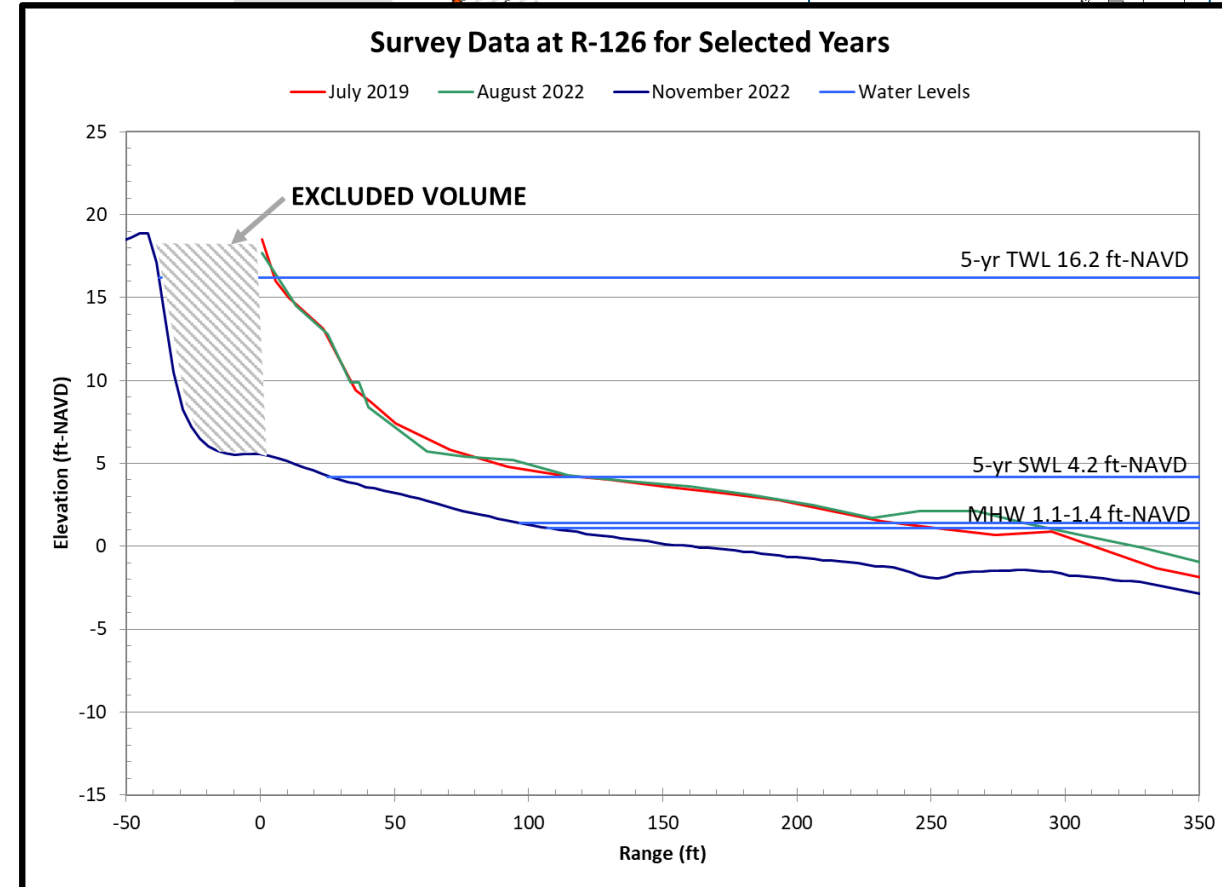
Volusia County- Hurricane Ian- Hurricane Nicole



Hurricane Nicole Damage (Volusia County, 2022)

Volusia County- Hurricane Ian- Hurricane Nicole

- County extends from R-0 to R-337
 - Monitor R-0 through R-208
- August 2022 (pre-storm)
 - Every 3rd monument
- November 2022 (post-storm)
 - LiDAR
 - Limited coverage
 - avg penetration to -6.4 ft NAVD88;
maximum 0.5 ft NAVD88
minimum -15.8 ft-NAVD88
 - Seawall resolution
 - Upland coverage limited at ~15%



Beach Impacts

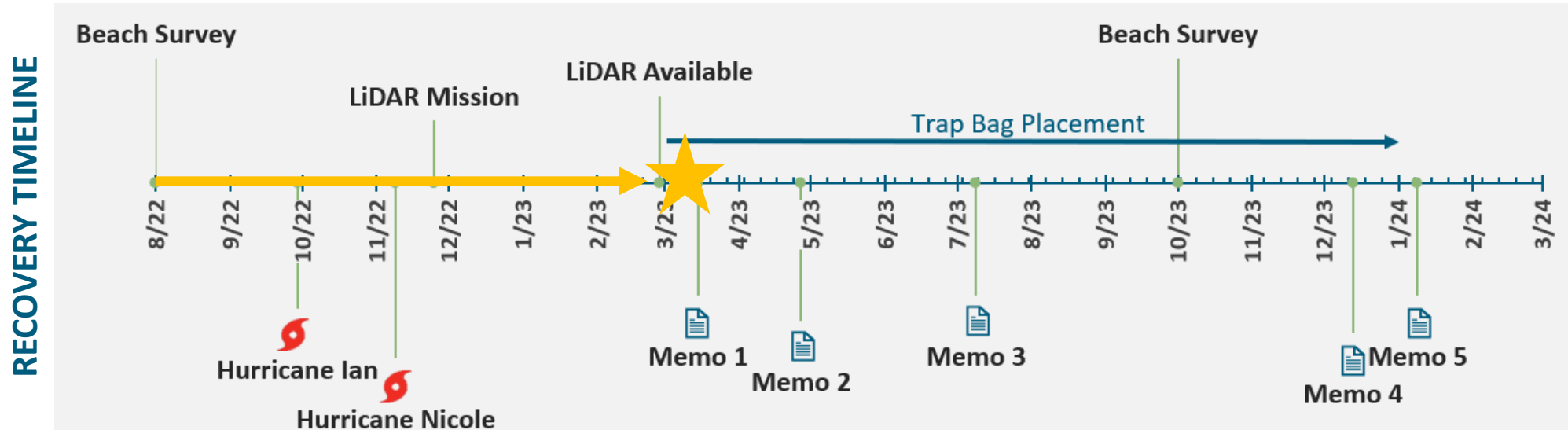
- August 2022 vs November 2022
 - >6.7 million cy of erosion (-34.1 cy/ft)
**limited by data coverage*
 - Consistent erosion magnitudes above/below MHW
 - Largest avg community loss observed in community of Ponce Inlet (R-128 to R-148)
 - Shoreline retreat averaging 100 ft
 - Largest avg community retreat observed in Wilbur-By-The-Sea (R-122 to R-128)
 - Berm lowering/deflation ~2-10 ft



2021 and 2023 Aerial Imagery
(Google Earth)



Recovery Timeline



Rapid Response

- How to react rapidly on a countywide scale with a diverse shorefront?
- V-26– beach compatible sand & agreement with FIND
 - *2018 Hurricane Preparation and Response Plan- Countywide Material Handling and Trucking Plans*
- Use over washed material



V-26 Sand(Volusia County, 2022)

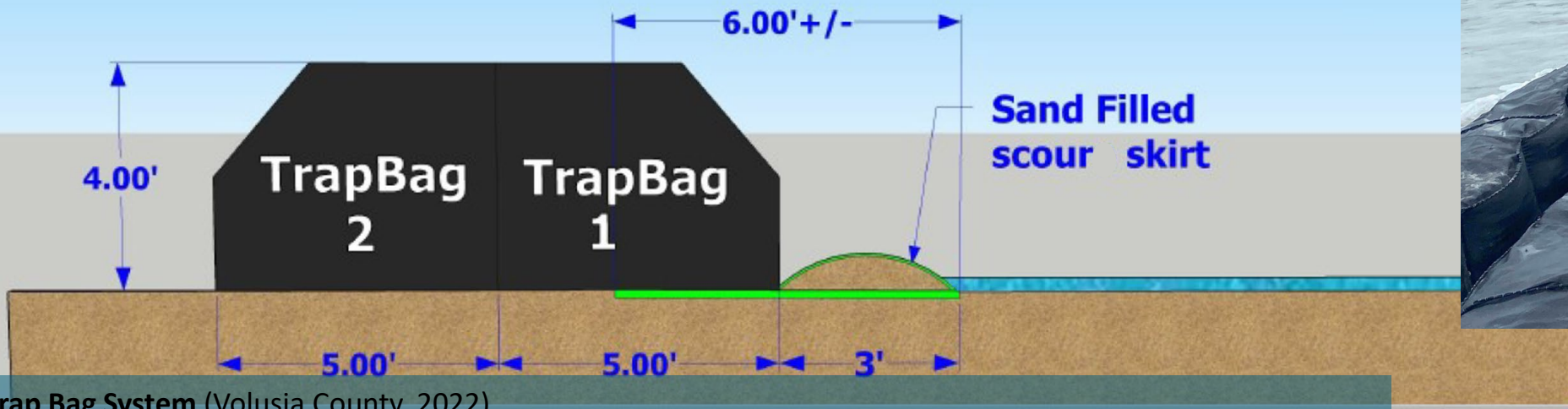


Sand Over Wash (Volusia County, 2022)



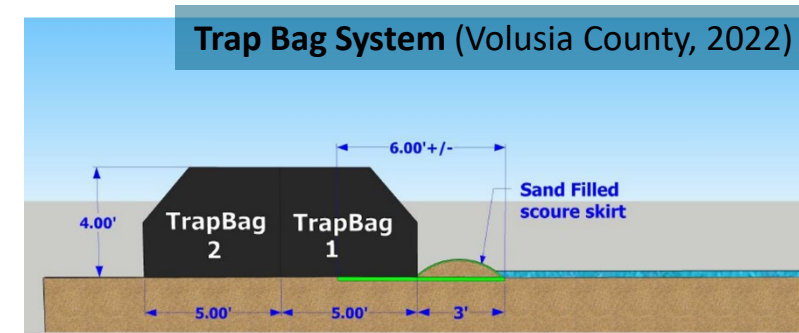
Rapid Response

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 - Trap Bags provide a great response in this situation



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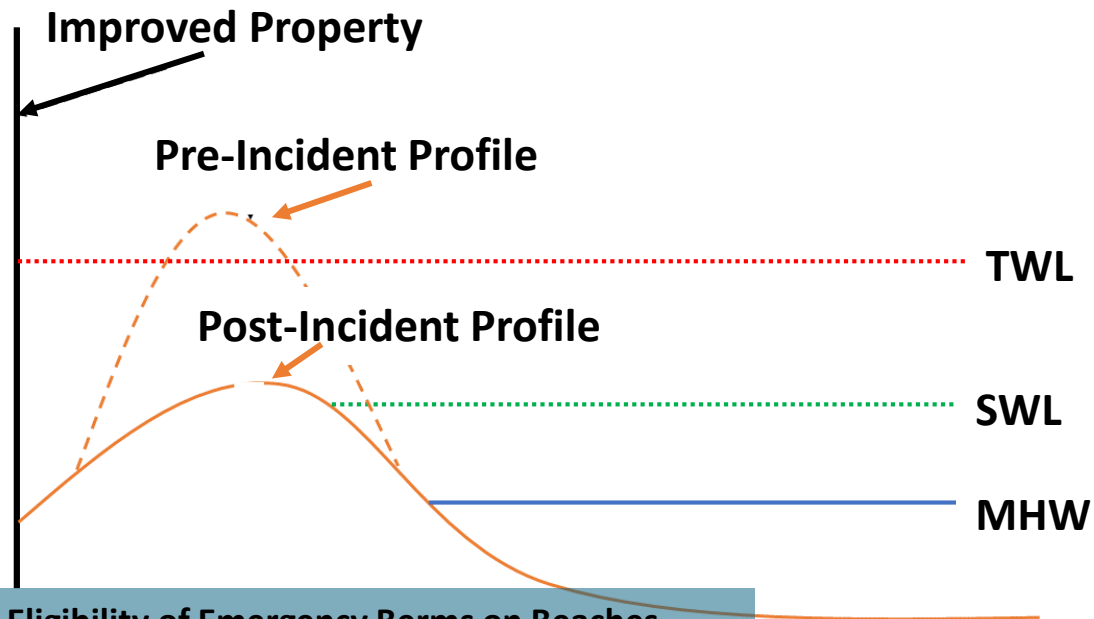


Trap Bag System (Taylor Engineering, 2023)



FEMA Reimbursement

- FEMA criteria: “If a natural or engineered beach has eroded to a point where flooding from a 5-year storm could damage improved property, cost-effective emergency protective measures on the beach that protect the improved property against damage from that 5-year storm are eligible.”



Eligibility of Emergency Berms on Beaches
(FEMA, 2020)

FEMA checklist:

- Is upland infrastructure vulnerable to a 5-yr event?
- 6 cy/ft?
- Cost effective?

FEMA Reimbursement

FEMA checklist:

- Is upland infrastructure vulnerable to a 5-yr event?
- 6 cy/ft?
- Cost effective?
- Loss in elevation?
- Pre-incident dune?

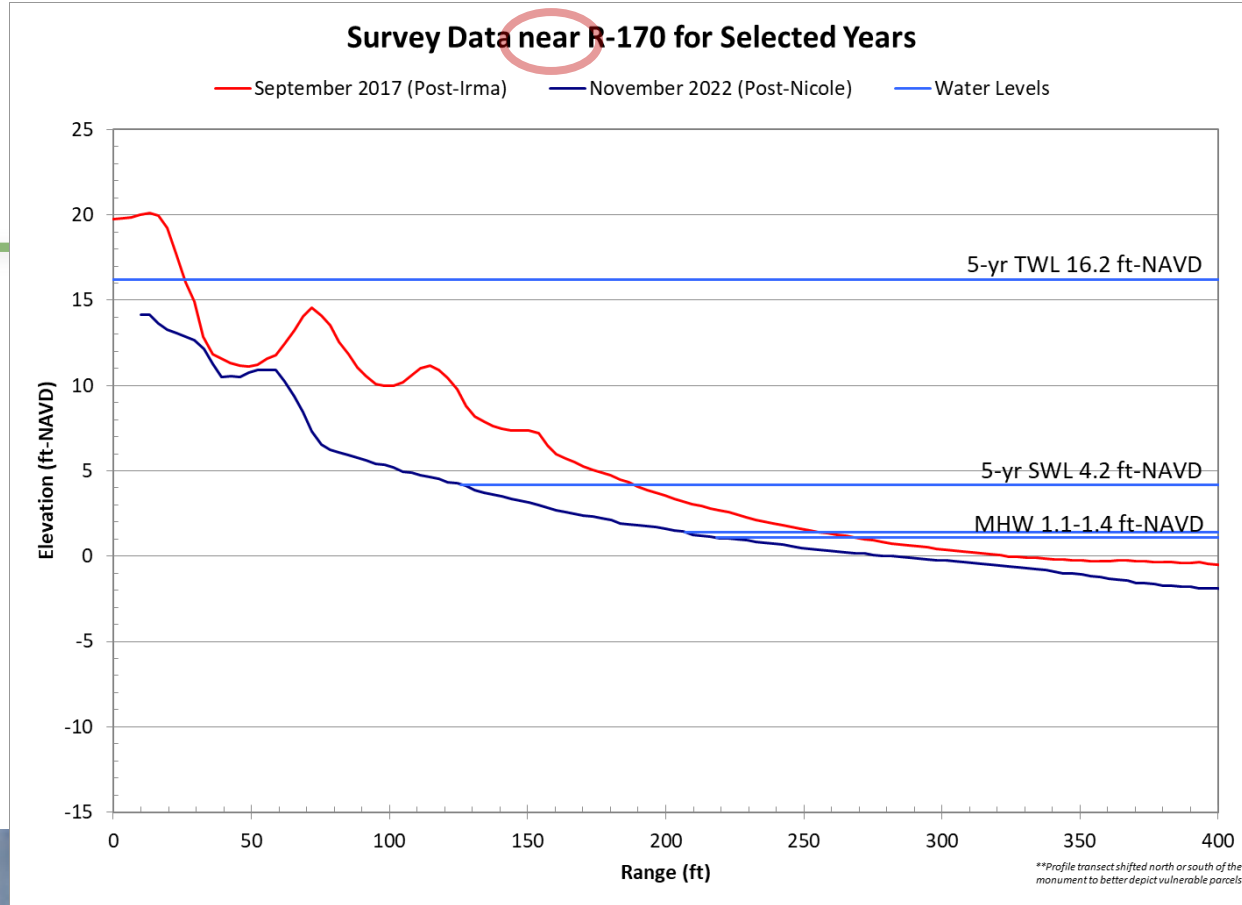
- FEMA berm is not considered cost effective
 - Trap bags protect remaining sand/upland infrastructure
- County took action and placed trap bags at parcels based on a visual assessment of the property and willingness to sign an easement

- Parcel-by-parcel analysis
 - Not eligible if the SWL is within 20 ft and MHW within 50 ft
 - Failed seawalls → eligible

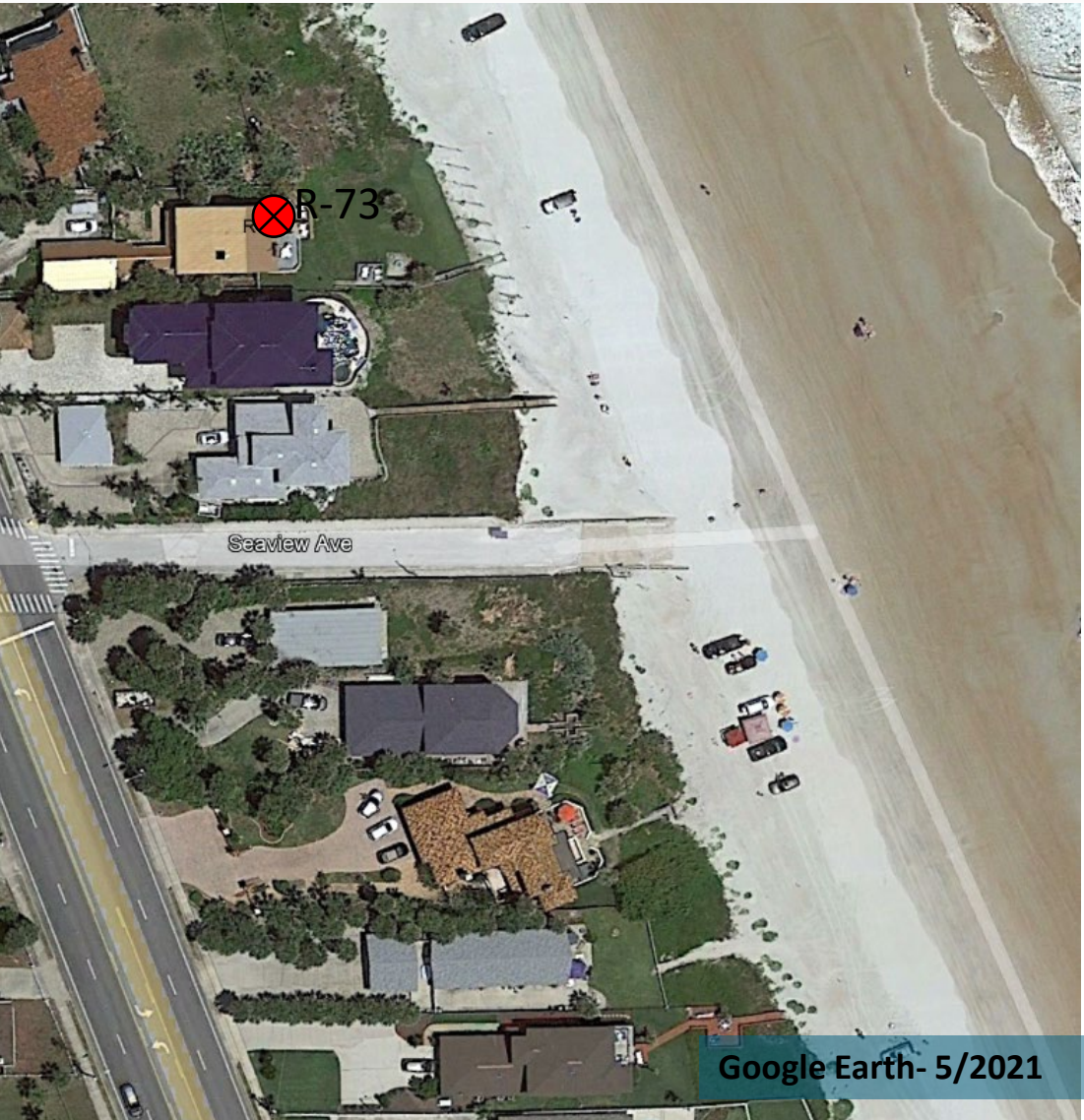
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Trap Bag Use



Trap Bag Use

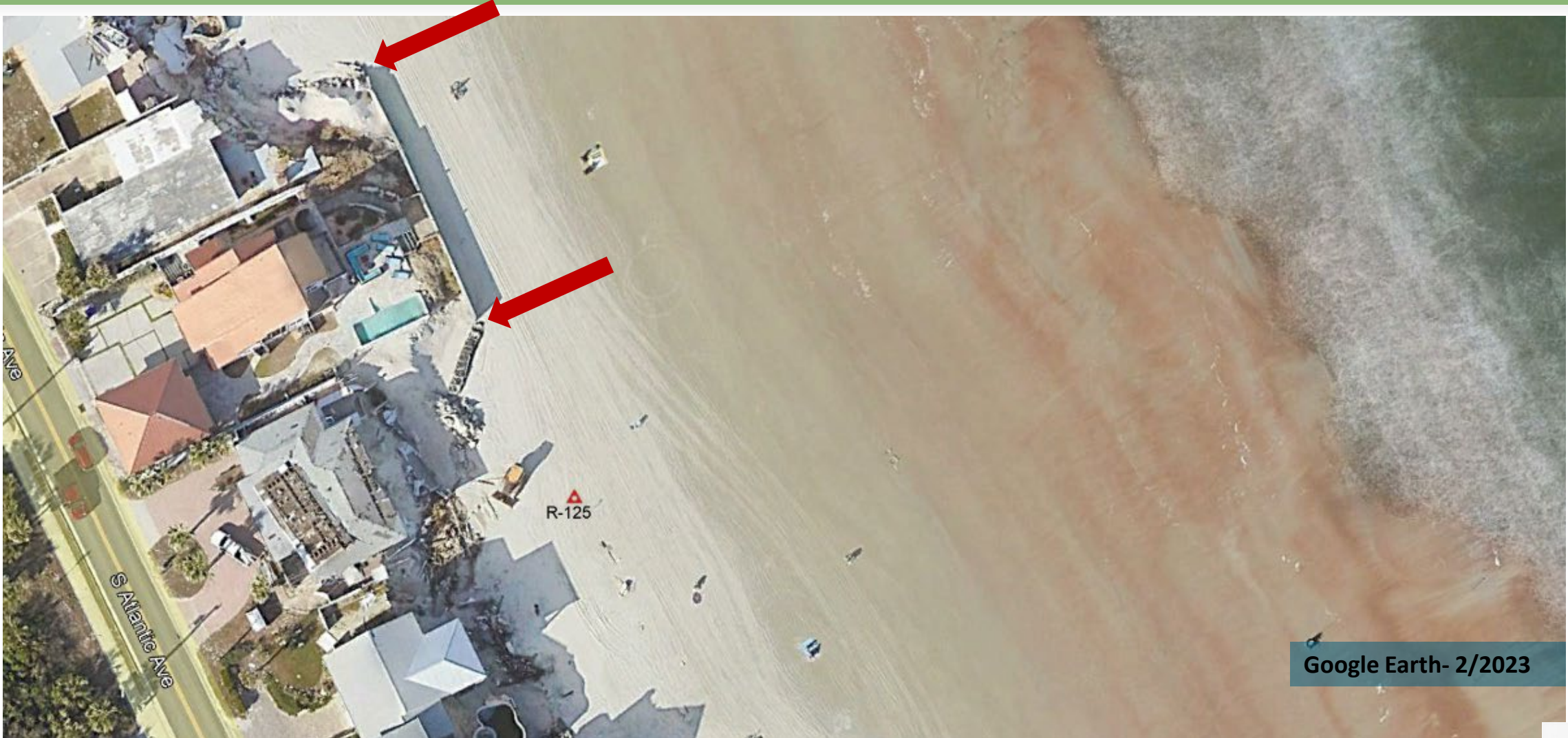


Trap Bag Use



Trap Bag System (Volusia County, 2023)

Trap Bag Use



Google Earth- 2/2023

Trap Bag Use



Trap Bag System (TE, 2023)



Turtle Nesting Adjacent to Trap Bags (Volusia County, 2023)



Vegetation Establishment Adjacent to Trap Bags (Volusia County, 2023)

Trap Bag Use



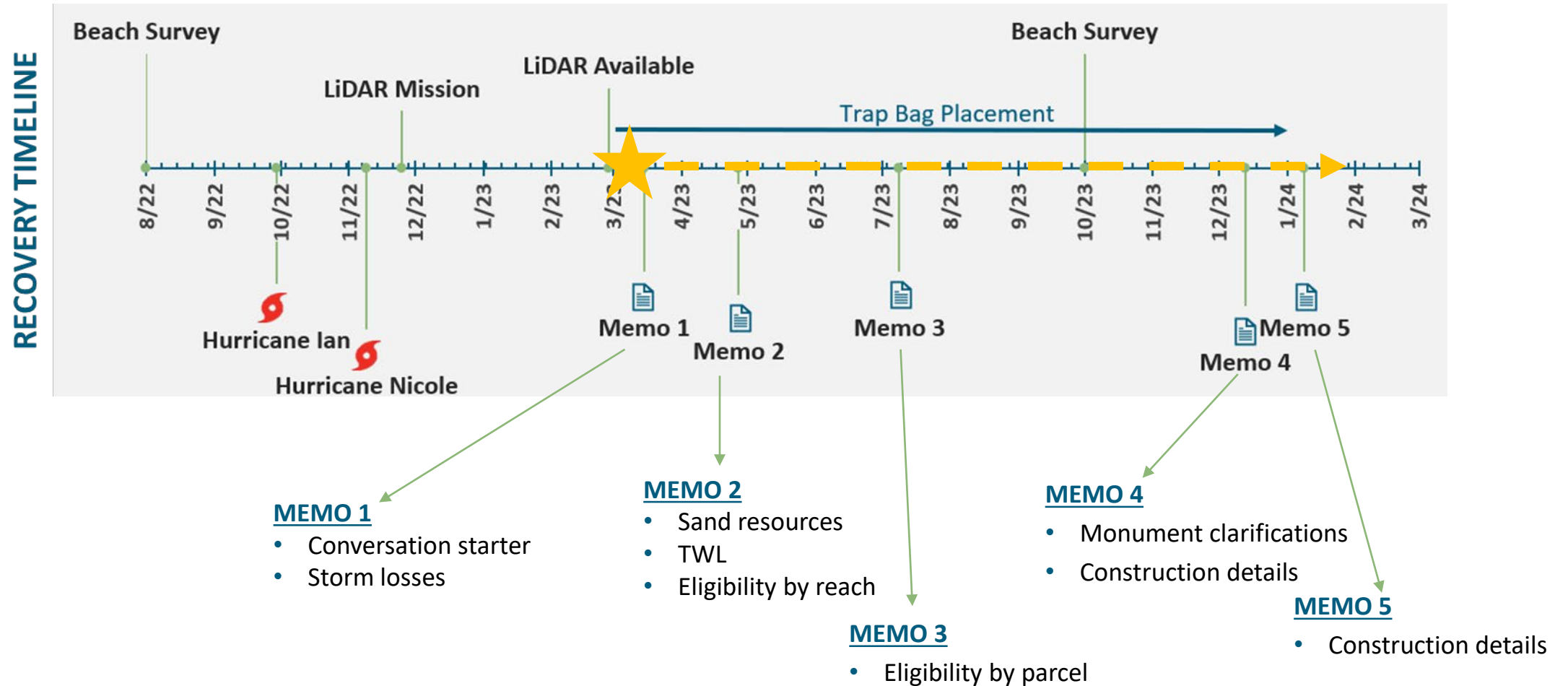
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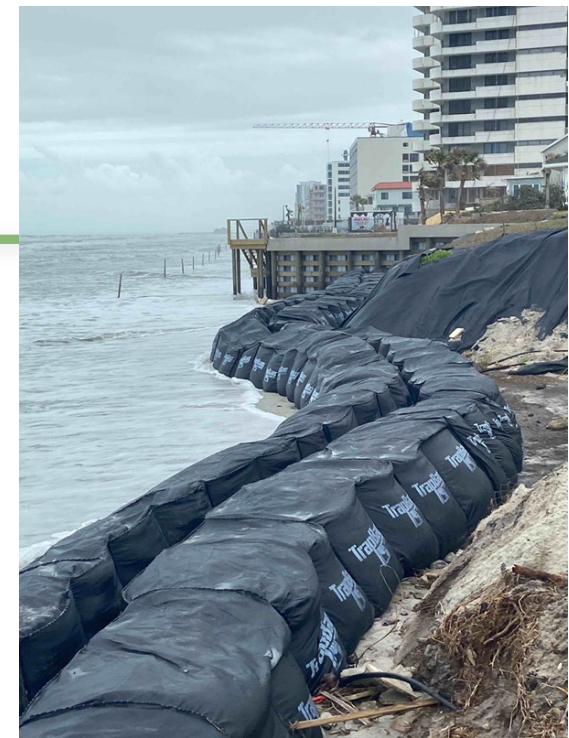


Recovery Timeline



Moving Forward

- Catastrophic damage on the countywide scale
 - Loss of dune system, beach berm deflation, seawall failures
 - Recovery observed in 2023; action still needed
- Volusia County shows the successful use of the trap bag system as a **rapid response, temporary protection measure**
 - Requesting reimbursement for \$2.38 million
 - >24,000 linear feet of protection at nearly 300 parcels
 - Average of ~2 cy/ft
 - Construction spanned March 2023 – January 2024
- Finalize FEMA Category B application... await reviews...
- Create/implement long-term solutions





Post Nicole
Your Website: www.volusia.org
New: 11-09-2020 9:49:00 AM

Peck Park



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