

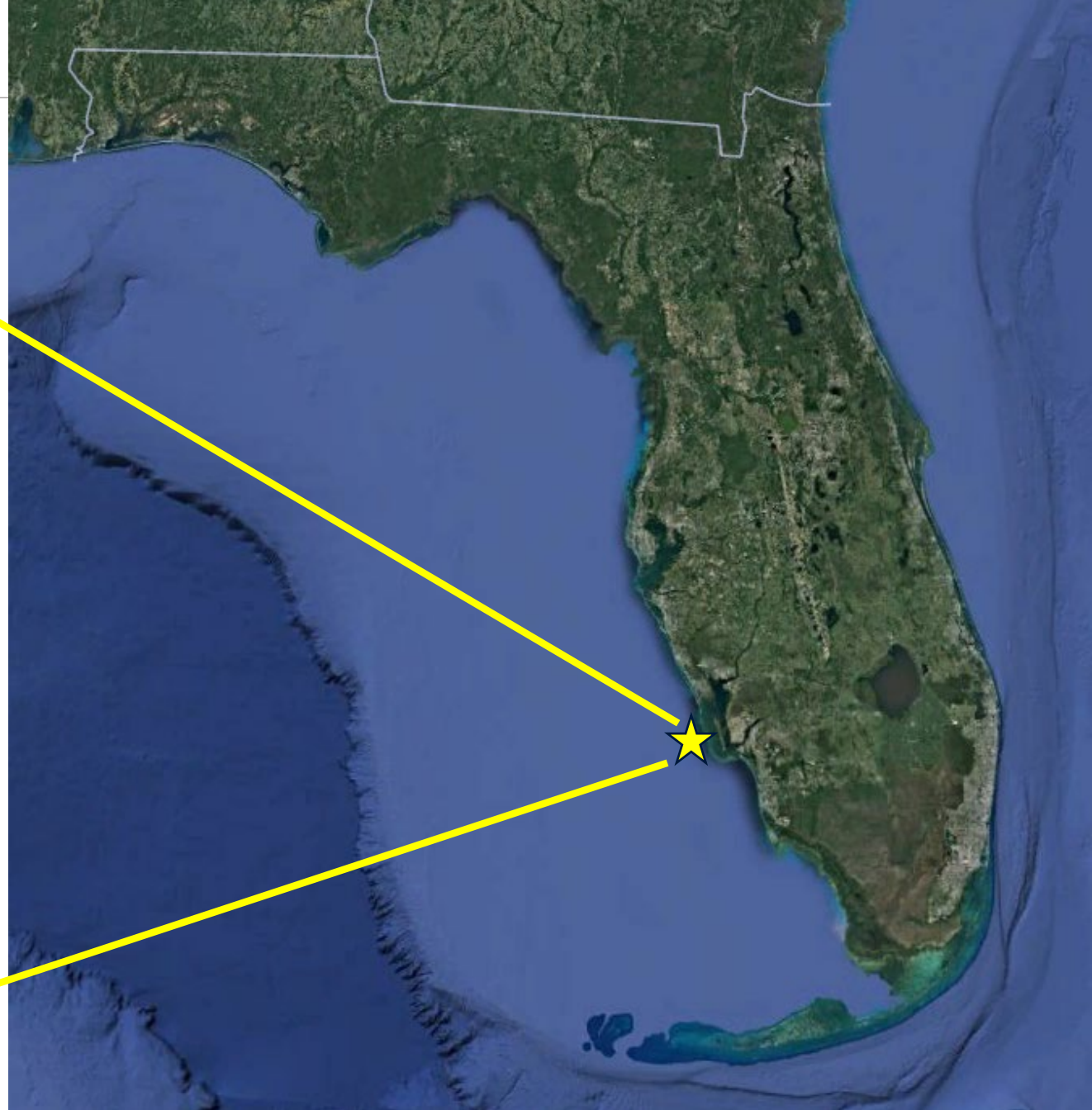


Captiva Island Coastal Impacts from Hurricane Ian and the Path to Recovery

FSBPA 2023 National Conference on Beach Preservation Technology

Wednesday, February 1, 2023

PROJECT LOCATION



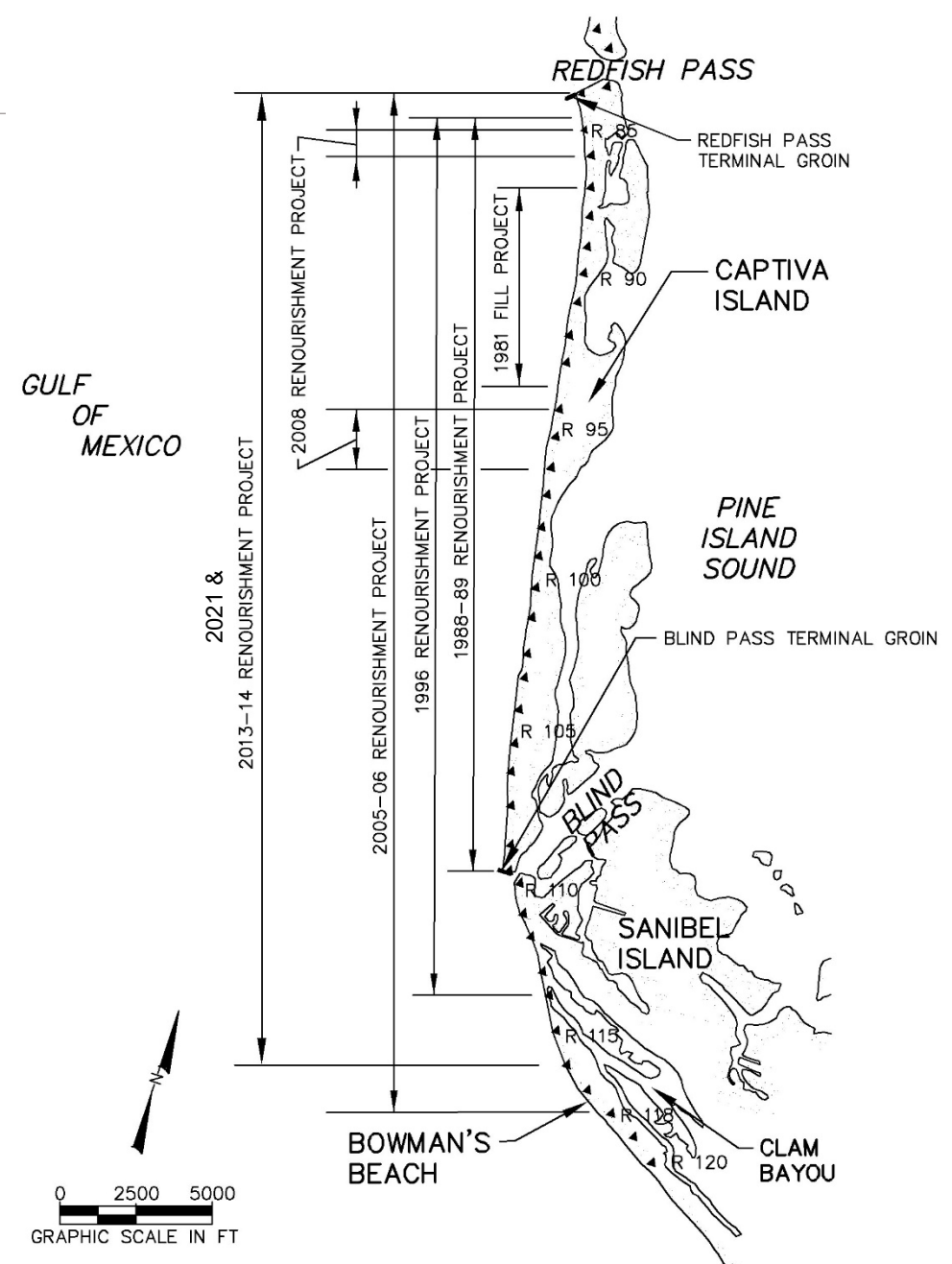
CAPTIVA PROGRAM HISTORY

- ▶ Over 50 years of nourishment projects
- ▶ Limited fill placements in 1961 and 1981; 134 groins
- ▶ First island-wide nourishment in 1988/89
- ▶ Renourished in 1996, 2005/06, 2013, and Fall 2021
- ▶ Supplement fill project in 2008 (Sunset Beach & the Village/Jensen's)



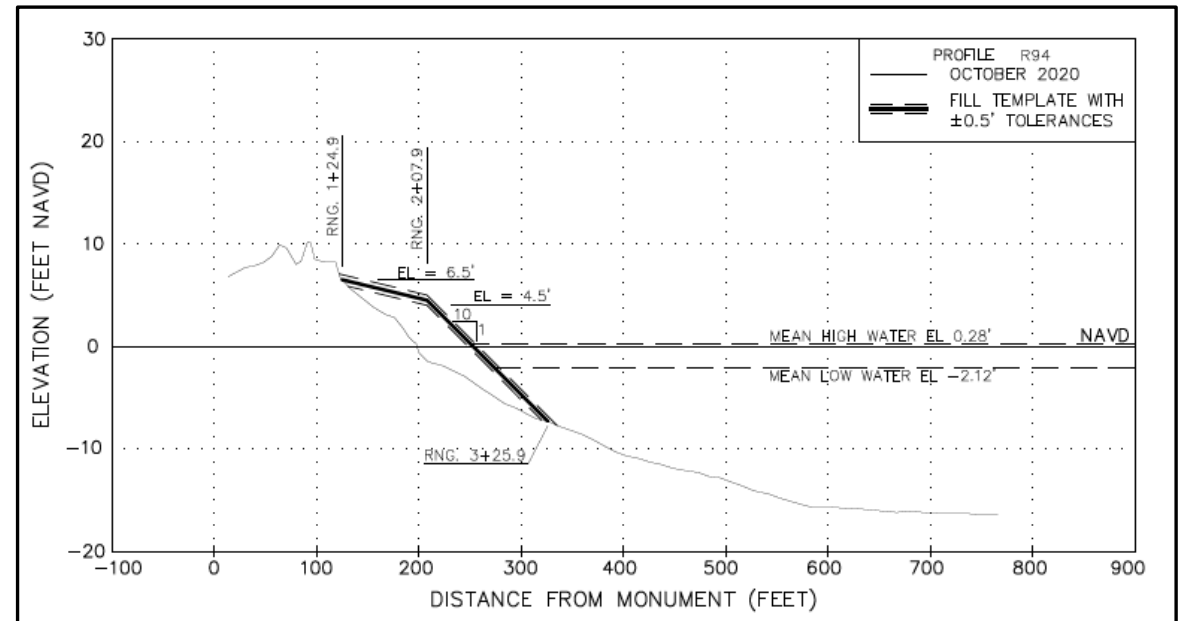
CAPTIVA PROGRAM HISTORY

- ▶ 1981 – 655,000 c.y. at South Seas Resort
 - ▶ Redfish Pass Groin
- ▶ 1988 – 1.6 Million c.y.
 - ▶ Blind Pass Groin
- ▶ 1996 – 821,000 c.y.
- ▶ 2006 – 1,017,000 c.y.
 - ▶ Redfish Pass Groin
- ▶ 2008 – 99,000 c.y.
- ▶ 2013 – 740,000 c.y.
- ▶ 2021 – 845,600 c.y.



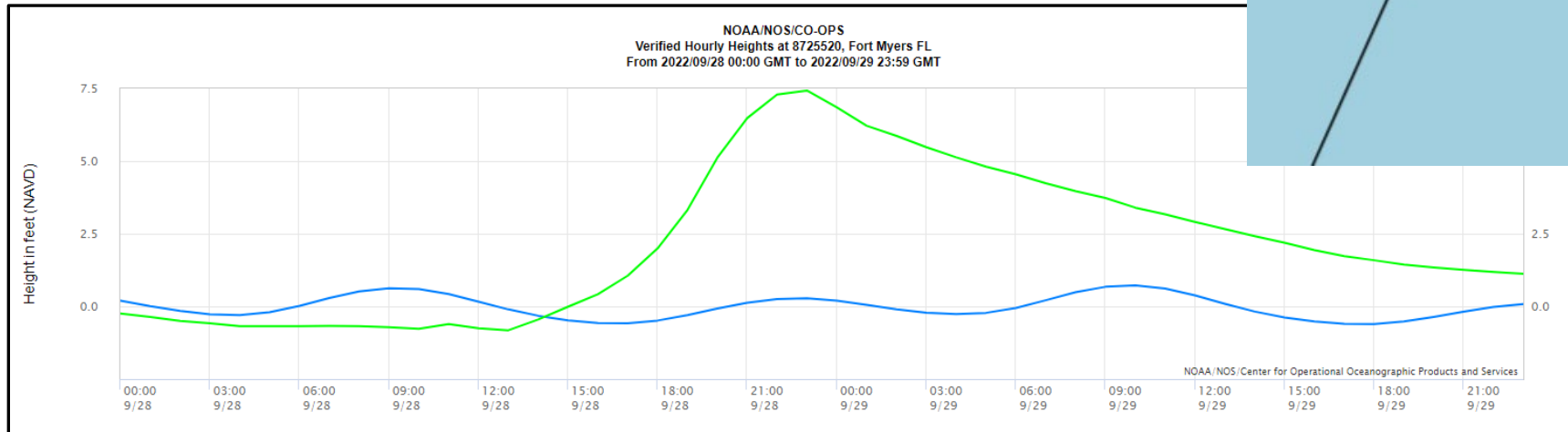
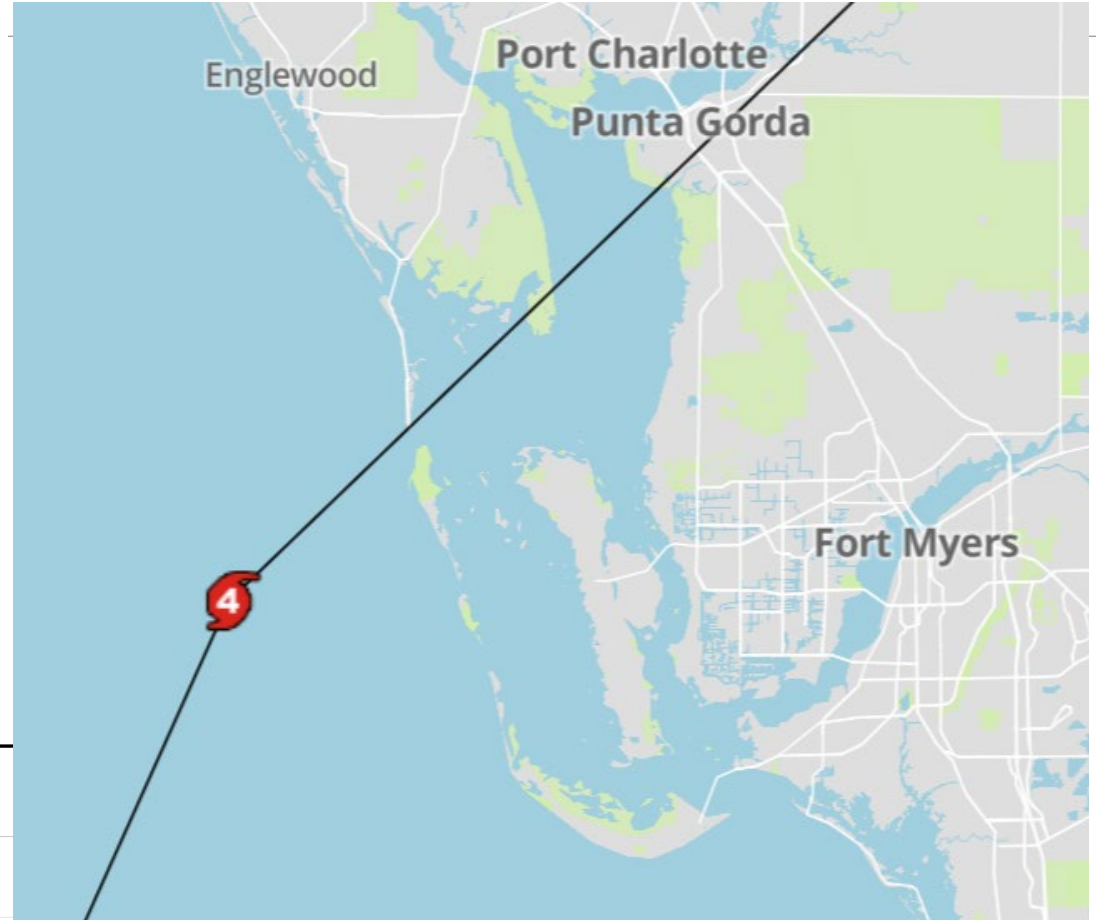
2021 PROJECT RECAP

- ▶ Entire wide island beach renourished
 - ▶ Island-wide dune constructed
- ▶ Designed to address background erosion and traditional hotspot areas
- ▶ Higher and wider beach to account for sea level rise
- ▶ Constructed between September 1, 2021 and November 9, 2021
- ▶ Fill template with minimal impacts pre-lan

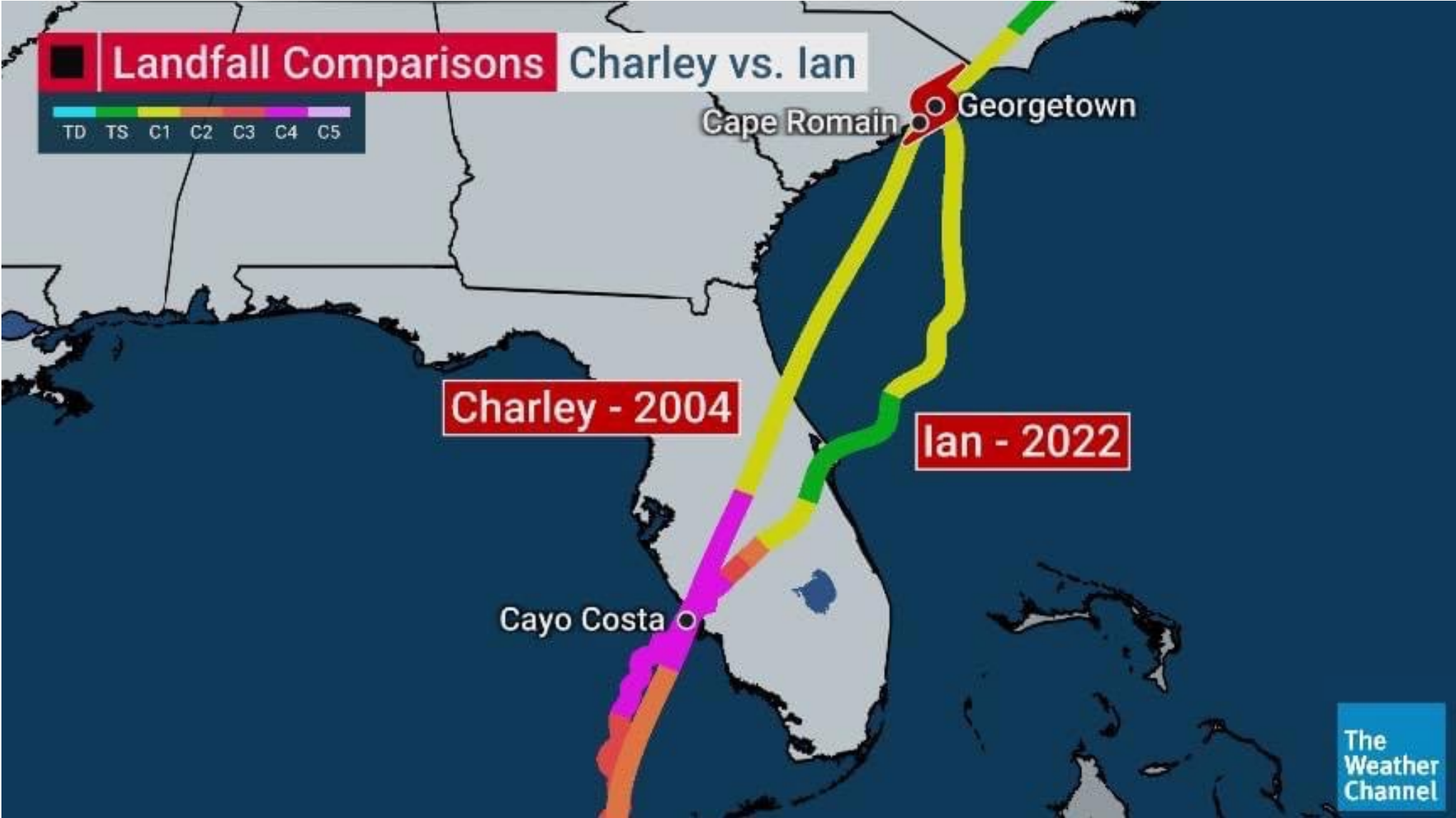


HURRICANE IAN RELATIVE TO CAPTIVA

- ▶ Landfall ~10.5 miles north
- ▶ 155 mph winds
- ▶ 7.5' surge at Ft. Myers



HURRICANE IAN RELATIVE TO CAPTIVA



DURING STORM CONDITIONS



DURING STORM CONDITIONS



WATER LEVELS



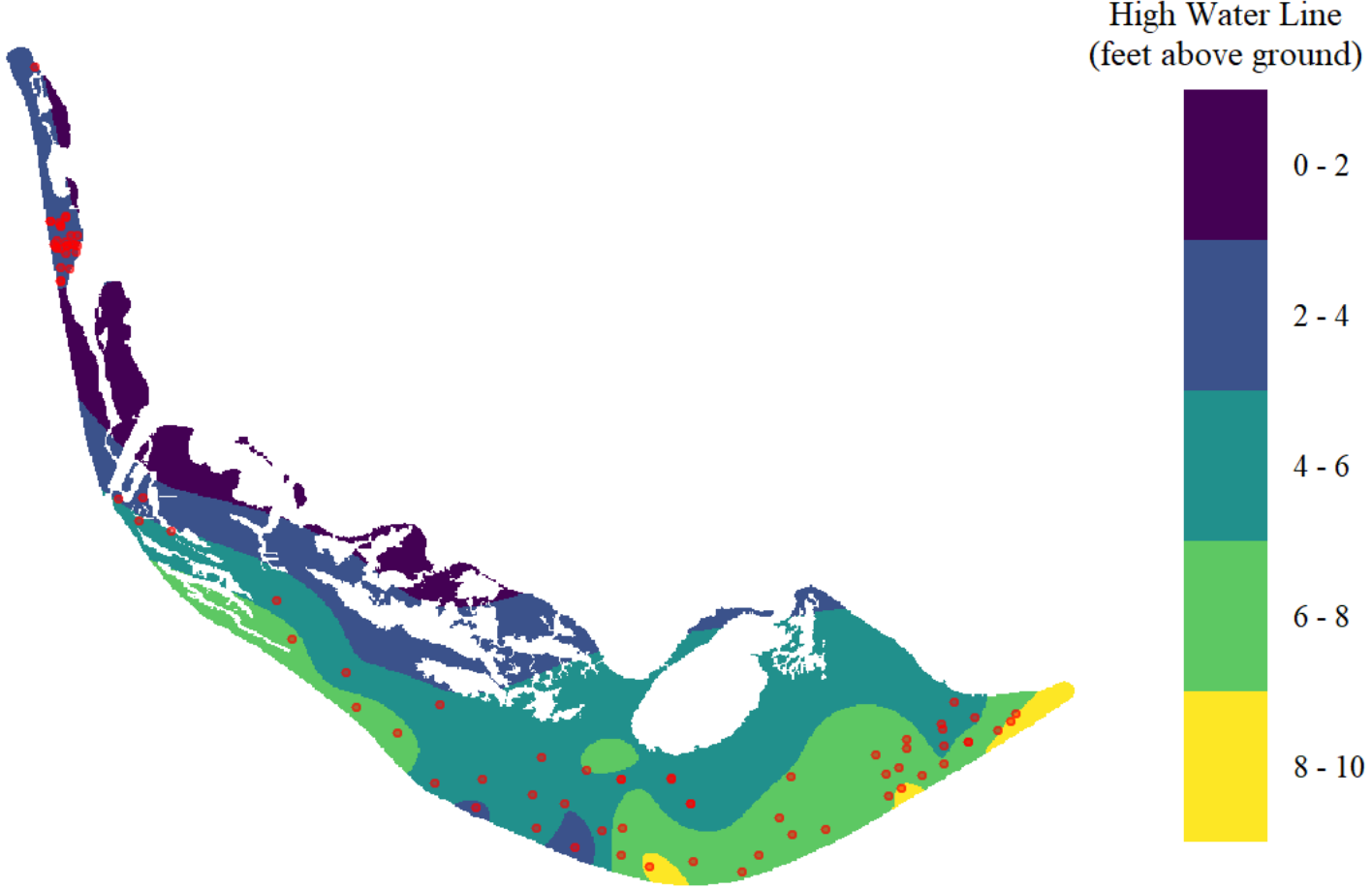
WATER LEVELS



Credit: SCCF



WATER LEVELS



Credit: SCCF



CEPD & COMMUNITY RESPONSE



CHALLENGES

- ▶ Bridge collapse
- ▶ Substantial sand overwash
- ▶ Widespread power outage
- ▶ Cell signal failure
- ▶ Beach closures
- ▶ Large-scale debris removal



BRIDGE COLLAPSE

- ▶ Challenge: One way on and off the island.
 - ▶ Increased logistical difficulty in accessing the island to evaluate the damage.
- ▶ Solution: Boat.
 - ▶ Initial visual evaluation to determine the condition of Captiva's beach was performed by boat.



SAND OVERWASH

- ▶ Challenge: Clearing the roadway while remediating debris to salvage as much sand as possible.
- ▶ Solution: Lee County DOT stepped in and cleared the roadways as efficiently as possible. The sand was cleared of debris and returned to the dune area.
- ▶ Challenge: Overwash sand on private property.
- ▶ Solution: Communication to property owners on how to obtain a permit from FDEP to return the sand to the beach.



POWER OUTAGE / CELL SIGNAL FAILURE

- ▶ Challenge: Restoration of power and communication.
- ▶ Solution:
 - ▶ Local and remote power companies were able to restore power to the islands well ahead of schedule.
 - ▶ Cell carriers worked diligently to restore communication to the islands as quickly as possible.



BEACH CLOSURE

- ▶ Challenge: Revenue losses
- ▶ Solution: All entities are working tirelessly towards ensuring the beaches are safe for the public, and that allowing the public/tourism that the beaches attract are in the best interest of the communities as recovery efforts continue.



DEBRIS REMOVAL

- ▶ Challenge: Large-scale debris removal
- ▶ Solution: Efficient coordination between state, county, and local governments. Widespread communication of expectations of property owners.



ENGINEERING RESPONSE



PHASE 1 – VISUAL ASSESSMENT

- ▶ 5 days after passage (October 3, 2022)
- ▶ Lack of accessible waterfront infrastructure
- ▶ Utilized functioning ramp in Charlotte County
 - ▶ Thanks Lee and Charlotte Counties for the collaboration 😊
- ▶ CEPD, SCCF, and Corps staff



PHASE 1 – VISUAL ASSESSMENT

- ▶ Beach width and volume changes
- ▶ General observations:
 - ▶ Volume loss
 - ▶ Beach width loss
 - ▶ Beach elevation lowered
 - ▶ Sand bars
 - ▶ Dune impacts
 - ▶ Loss of vegetation
 - ▶ More losses mid- and south-end of Island



BEACH PERFORMANCE



October 2021



October 2022



BEACH PERFORMANCE



BEACH PERFORMANCE



October 2021



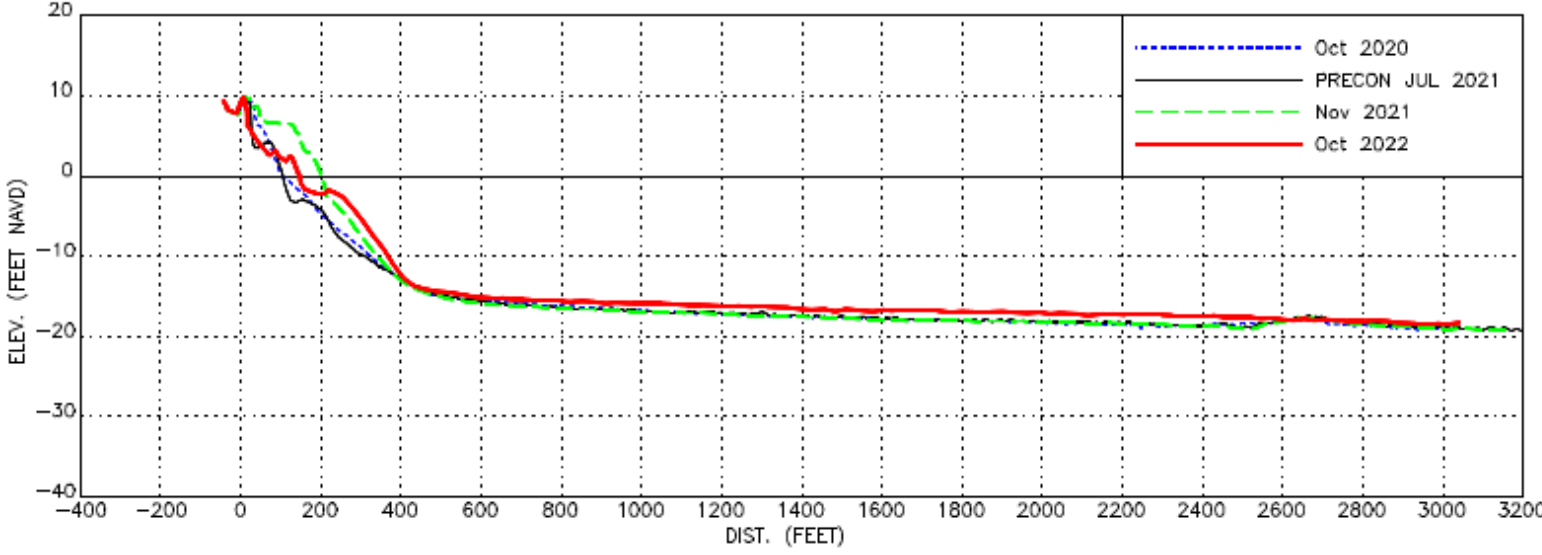
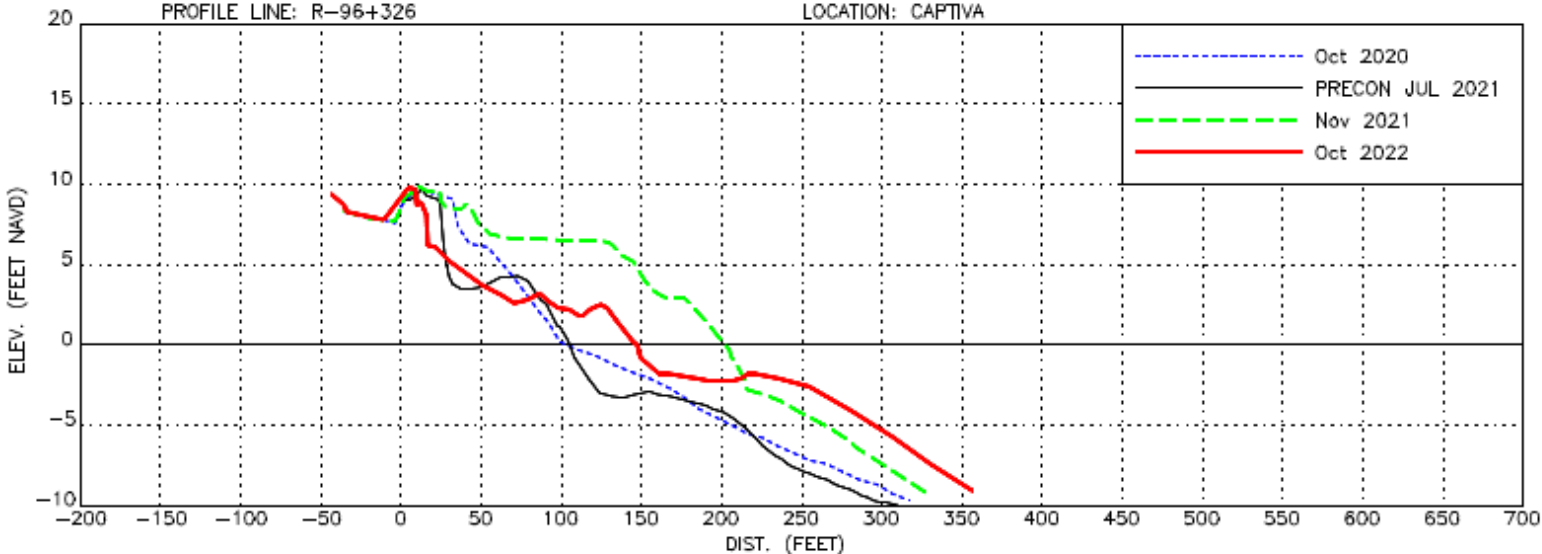
October 2022



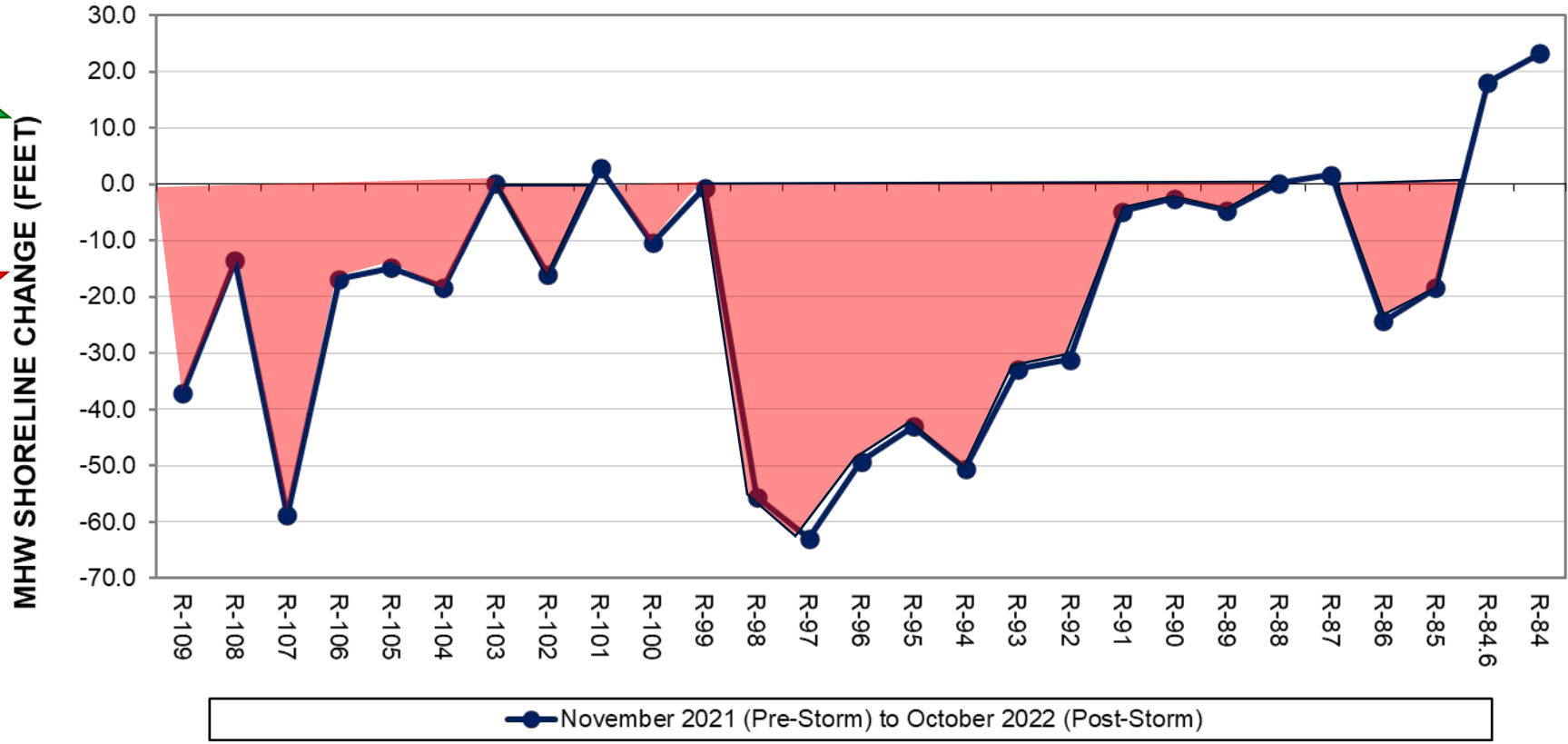
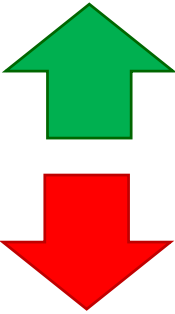
BEACH PERFORMANCE



PHASE 2 – SURVEYS & ENGINEERING ASSESSMENT



SHORELINE CHANGE

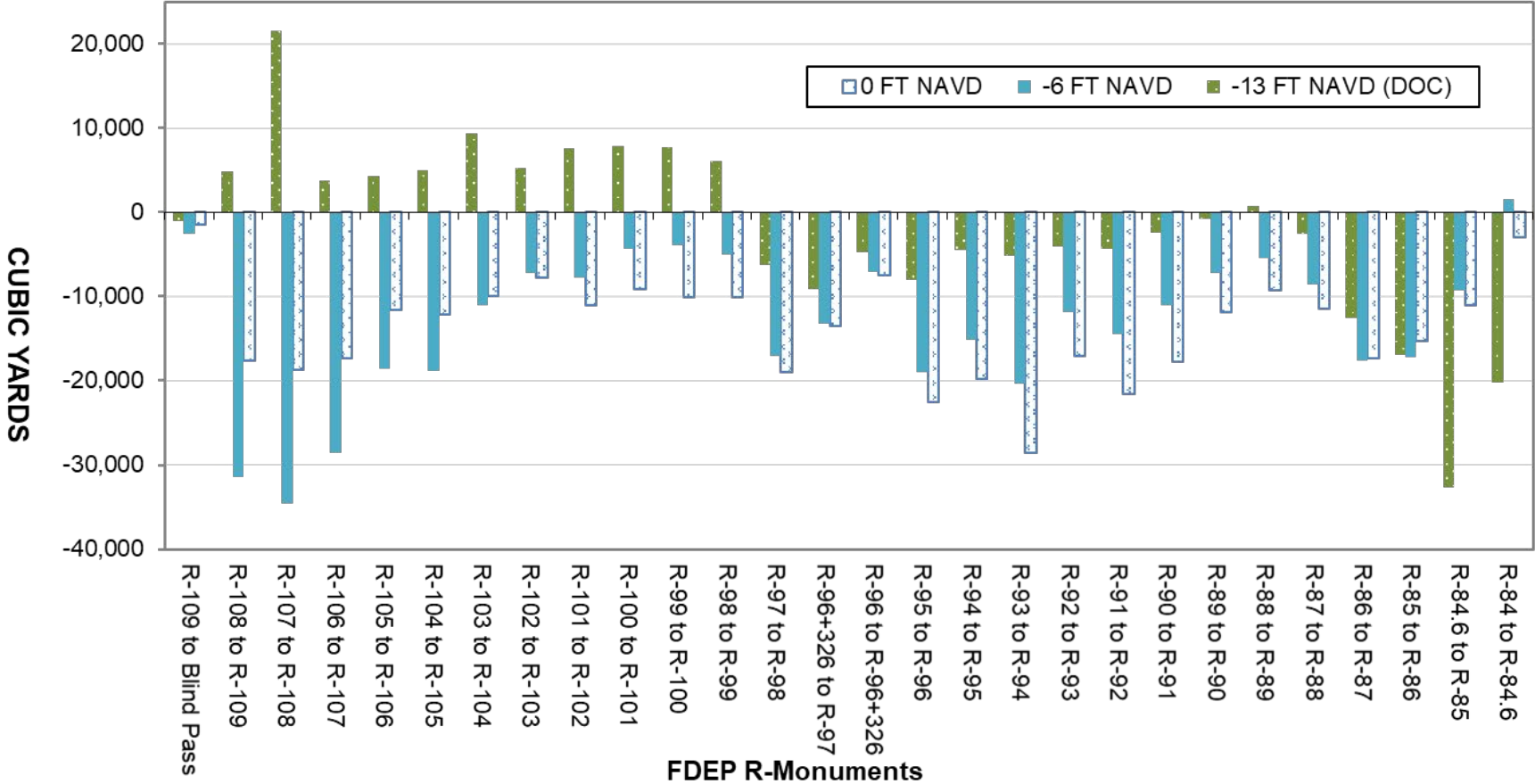
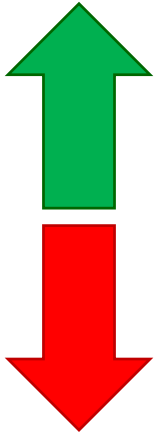


- ▶ MHW = 0.28 ft-NAVD
- ▶ Avg. loss = -19.3 ft
- ▶ Largest loss of 58.8 ft at R-107

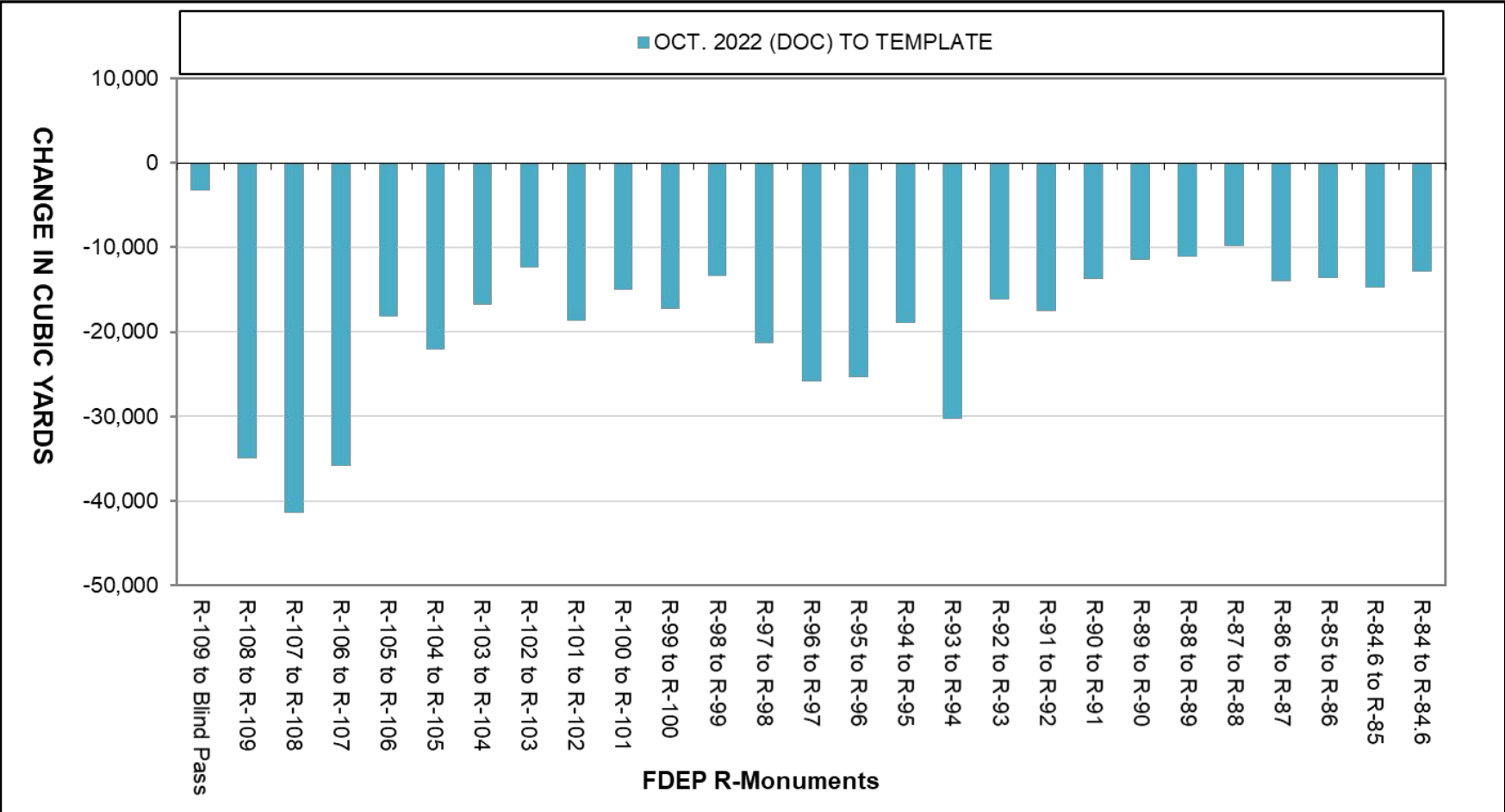
FDEP R-Monuments



VOLUME CHANGE

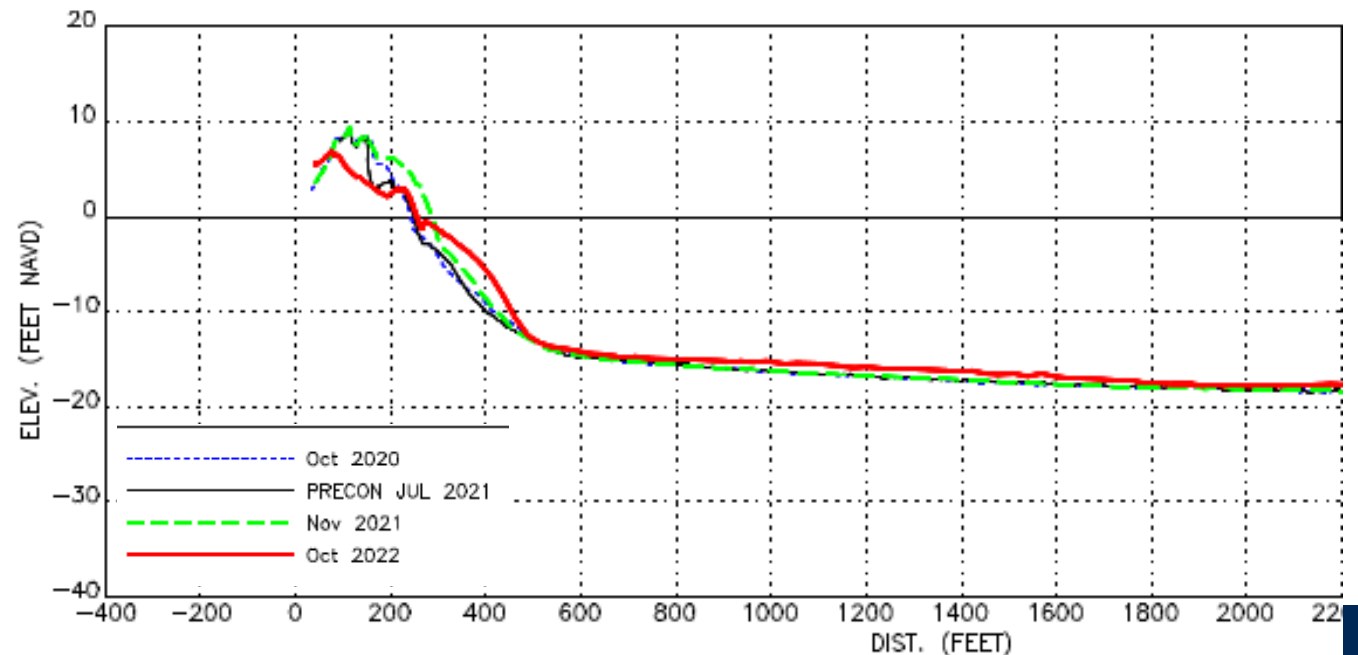
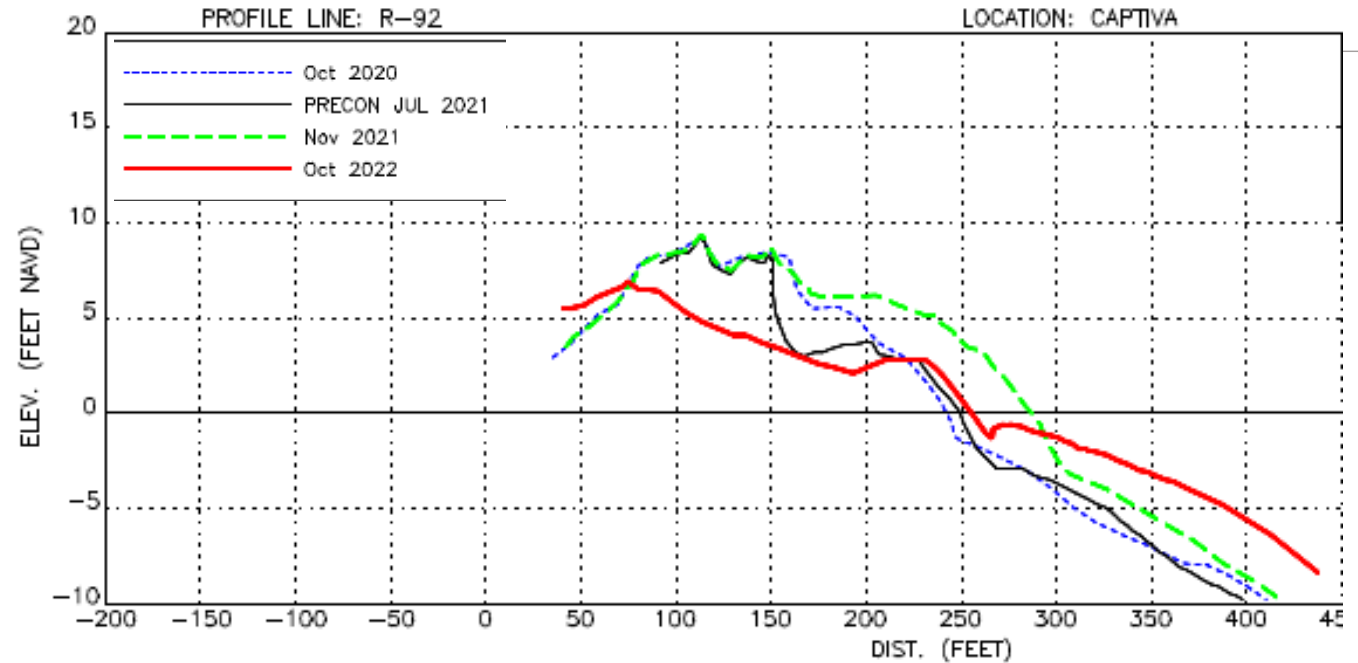


VOLUME CHANGE

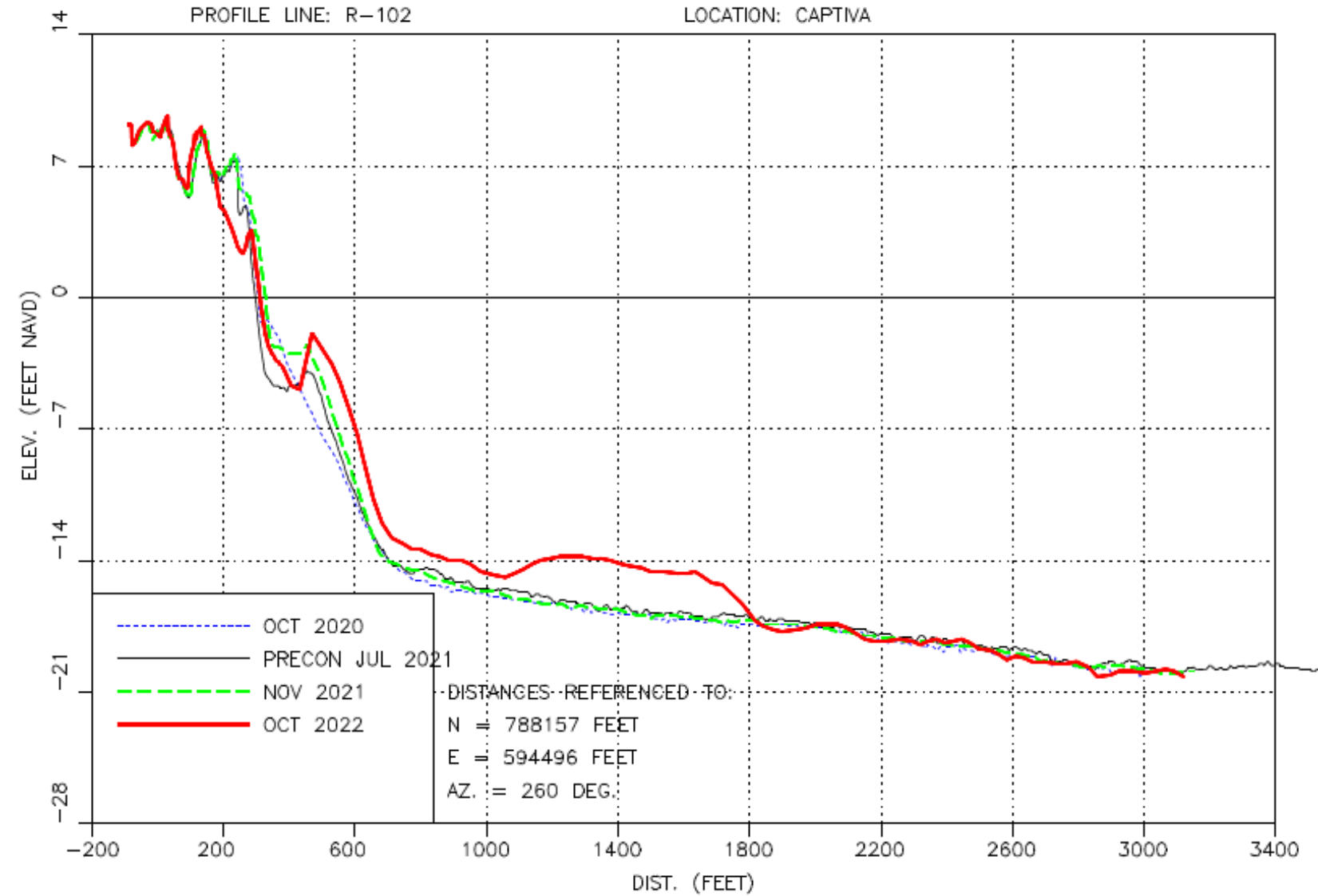


VOLUME CHANGE

- ▶ Total beach profile volume change (most landward point of dune to depth of closure at -13 ft-NAVD):
 - ▶ -51,700 CY
- ▶ Volume lost above MHW (+0.28 ft-NAVD):
 - ▶ -377,700 CY
- ▶ Total volume lost under 2021 construction template:
 - ▶ 505,900 CY



PROFILE CHANGE

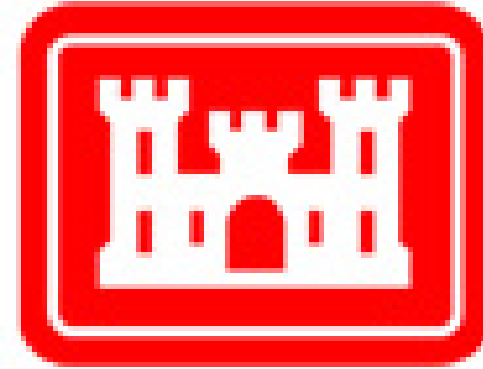


NEXT STEPS



COORDINATION WITH FUNDING PARTNERS

- ▶ Federal Funding
 - ▶ US Army Corps of Engineers (USACE)
 - Reconsidering eligibility for assistance
 - ▶ FEMA
 - Captiva beaches have been historically eligible for Category G funding
 - Obtain funding for emergency project (75% Fed/25% Local (State, County, CEPD))
 - ▶ Develop Project Worksheet (PW)
- ▶ FDEP
 - ▶ Historic cost-sharing partner post-storm
 - ▶ Provided special appropriation in most recent legislative sessions



FEMA



CONCLUSIONS

- ▶ Scheduled beach management/maintenance is key!
- ▶ Beach project was effective in providing storm damage reduction benefits
- ▶ Designed to absorb wave energy and protect upland infrastructure
- ▶ Minimal loss of beachfront infrastructure along Captiva Island



QUESTIONS?



Expect the Extraordinary.

NICOLE SHARP, P.E.
nicole.sharp@aptim.com
561.361.3150

DANIEL MUNT
dmunt@mycepd.com
239.472.2472

