

MELBOURNE BEACH VULNERABILITY ASSESSMENT (VA) PUBLIC WORKSHOP

APPLIED ECOLOGY, INC.

November 5, 2025





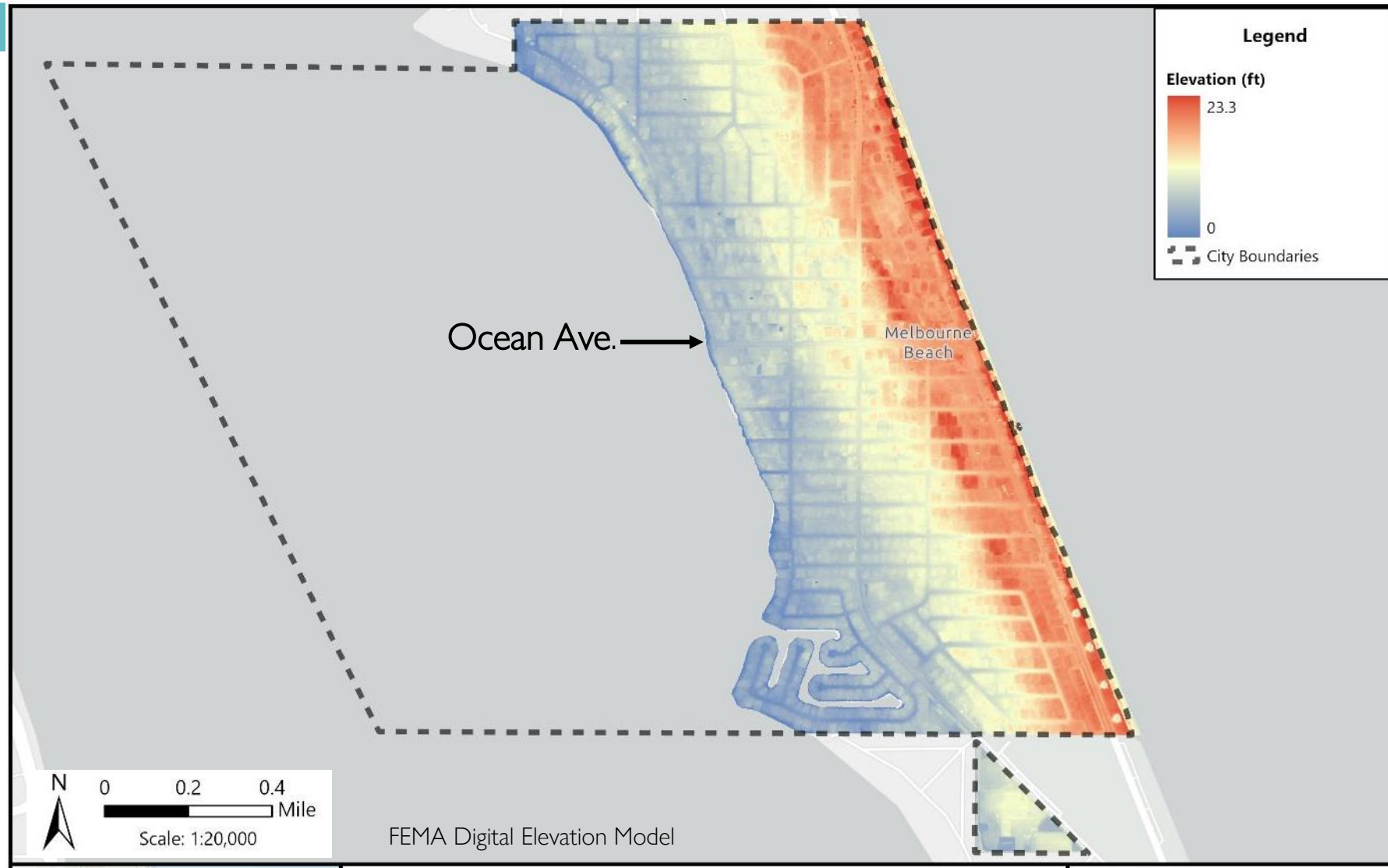
WHY IS THIS IMPORTANT?

- Identify current and future risks of climate change impacts
- Prioritize Capital Improvement Projects
 - Wastewater infrastructure
 - Stormwater/drainage improvements
 - Structural hardening
 - Water Quality (Help the Indian River Lagoon!)
- FDEP Resilient Florida Implementation Grant eligibility is contingent on completing a Vulnerability Assessment (F.S. 308.093)

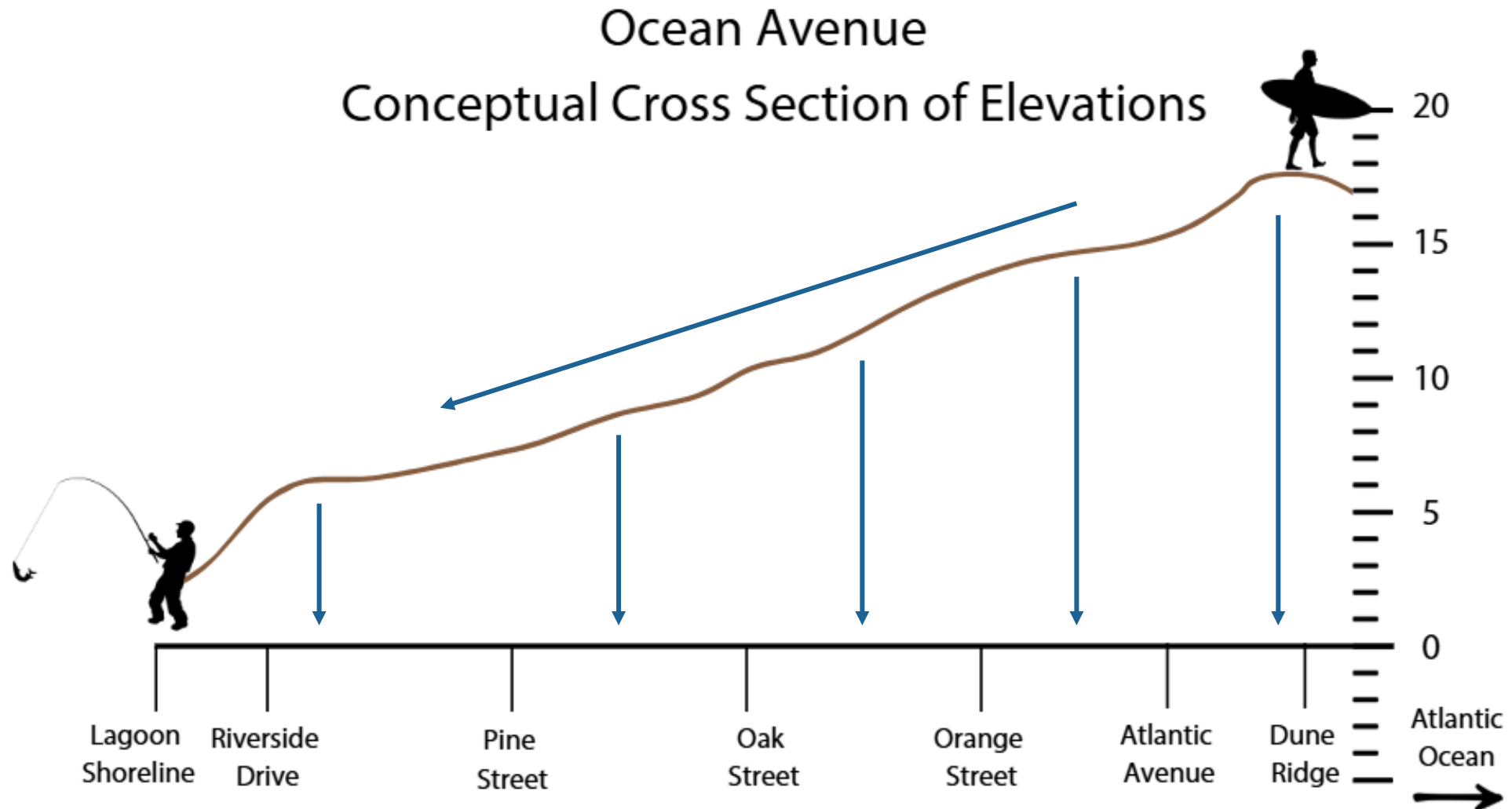


Photo Credit: Craig Bailey, Florida Today

ELEVATION



ELEVATION & STORAGE CAPACITY



PREPARE FOR CHANGE



SEA LEVEL RISE



STORM SURGE



INCREASING
RAINFALL

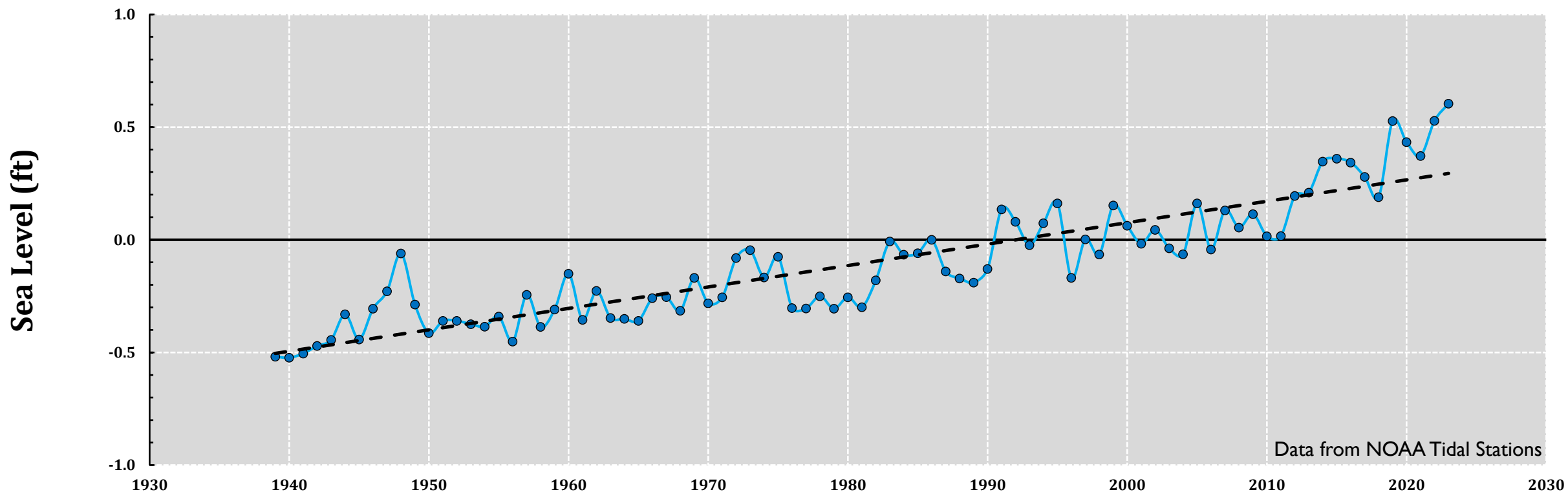




SEA LEVEL RISE

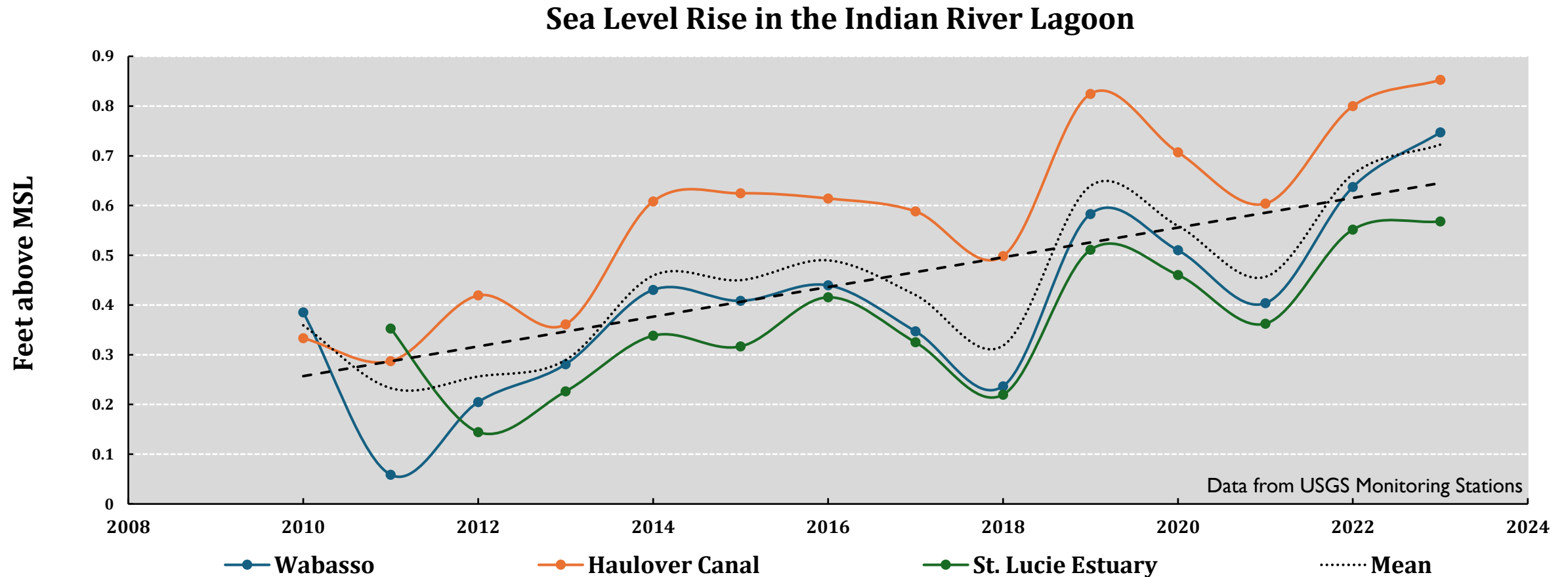
MEAN SEA LEVELS

Annual Mean Sea Levels along Florida's Atlantic Coast



Trident Pier at Port Canaveral measured a ~7.5" increase since 1940

LAGOON WATER LEVELS



Indian River Lagoon at Haulover Canal measured a ~6.1" increase since 2010

A satellite image of a tropical storm, likely a typhoon, over the Pacific Ocean. The storm features a well-defined eye and a dense, swirling cloud structure. A semi-transparent blue banner is overlaid across the center of the image, containing the text "STORM EVENTS" in white, bold, sans-serif capital letters. The background shows the dark blue of the ocean and the white and grey of the storm clouds.

STORM EVENTS

STORM SURGE

- Tremendous force (fetch)
- Wind-driven seawater pushed onto the shore and up tributaries
- Most costly damage and greatest loss of life
- Inland and upstream flooding
- Sand loss and beach escarpment, which can undermine & collapse structures
- Physical pressure that moves heavy objects from their foundations.



INCREASING RAINFALL



24-hr Storm Interval	% Chance Occurrence in Given Year	Rainfall Depth (Inches)
5-year	20%	6.14
*10-year	10%	7.46
25-year	4%	9.46
50-year	2%	11.20
100-year	1%	13.00
200-year	0.5%	15.00
500-year	0.2%	17.90

*Current design standard

1

ESTABLISH CONTEXT

- ☒ Assemble Internal Committee
- ☒ Establish Service Area
- ☒ Public Outreach

2

VULNERABILITY ASSESSMENT

- ☒ Asset Inventory
 - ☐ Exposure/Sensitivity Analysis
 - ☐ Prioritize Focus Areas
- COMING SOON**

ADAPTATION PLANNING PROCESS

3

ADAPTATION PLANNING

- ☐ Assess Adaptive Capabilities
- ☐ Integrate into CIPs / Plans
- ☐ Identify Funding Sources

4

IMPLEMENTATION

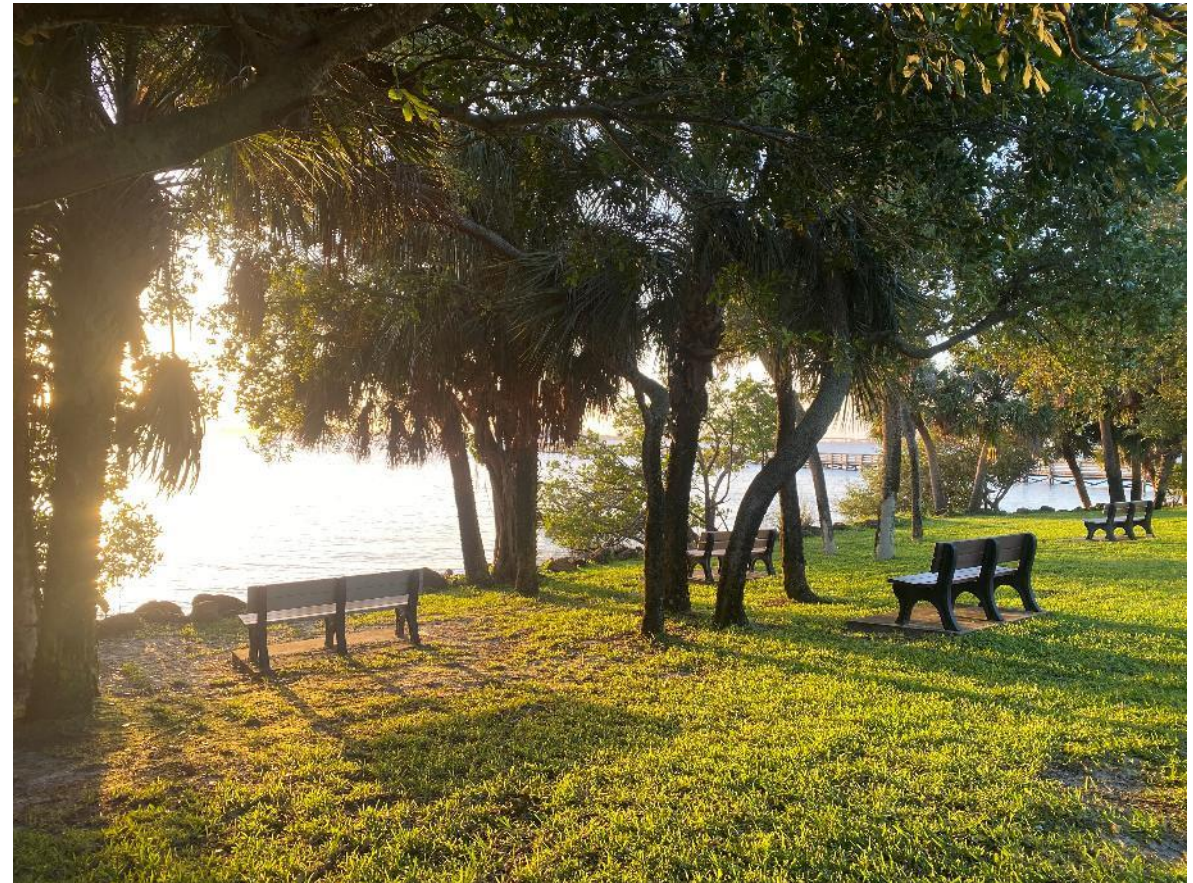
- ☐ Assess Capacity
- ☐ Create CIP Schedule
- ☐ Allocate/Acquire Funding

VULNERABILITY ASSESSMENT

- Assess the risk to town assets brought on by climate related changes
 - Sea level rise
 - Storm surge
 - Increasing rainfall
- Identify critical assets in Melbourne Beach
- Evaluate various flood scenarios
- Prioritize and focus adaptation strategies



Funding provided by a FDEP Resilient
Florida Planning Grant



CRITICAL ASSET INVENTORY



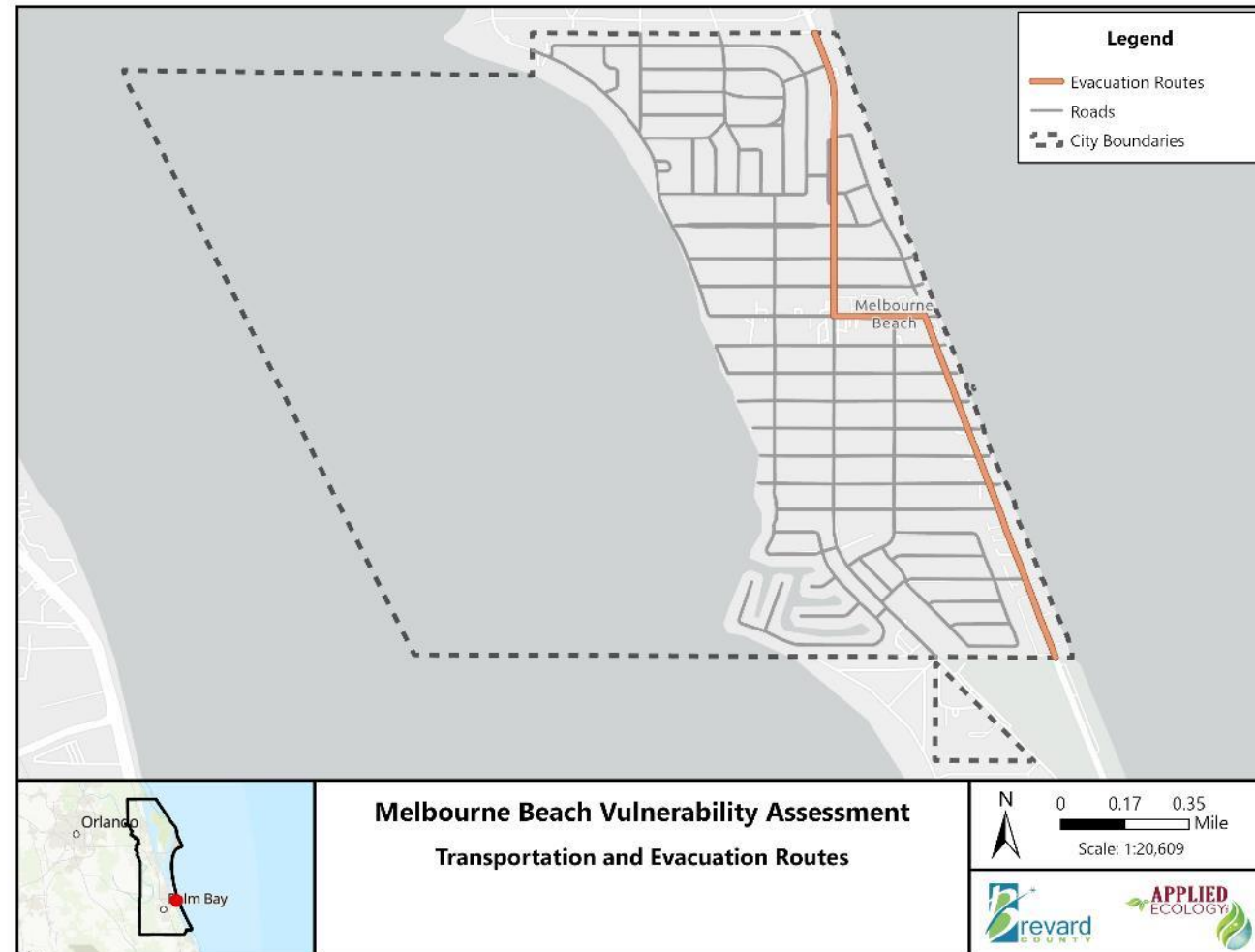
- Transportation Assets & Evacuation Routes
- Critical Infrastructure
- Community and Emergency Facilities
- Cultural and Natural Assets

TRANSPORTATION & EVACUATION ROUTES

- Bus Stops
- Airports
- Bridges
- Bus terminals
- Ports
- Roadways ✓
- Marinas
- Rail facilities
- Railroad bridges

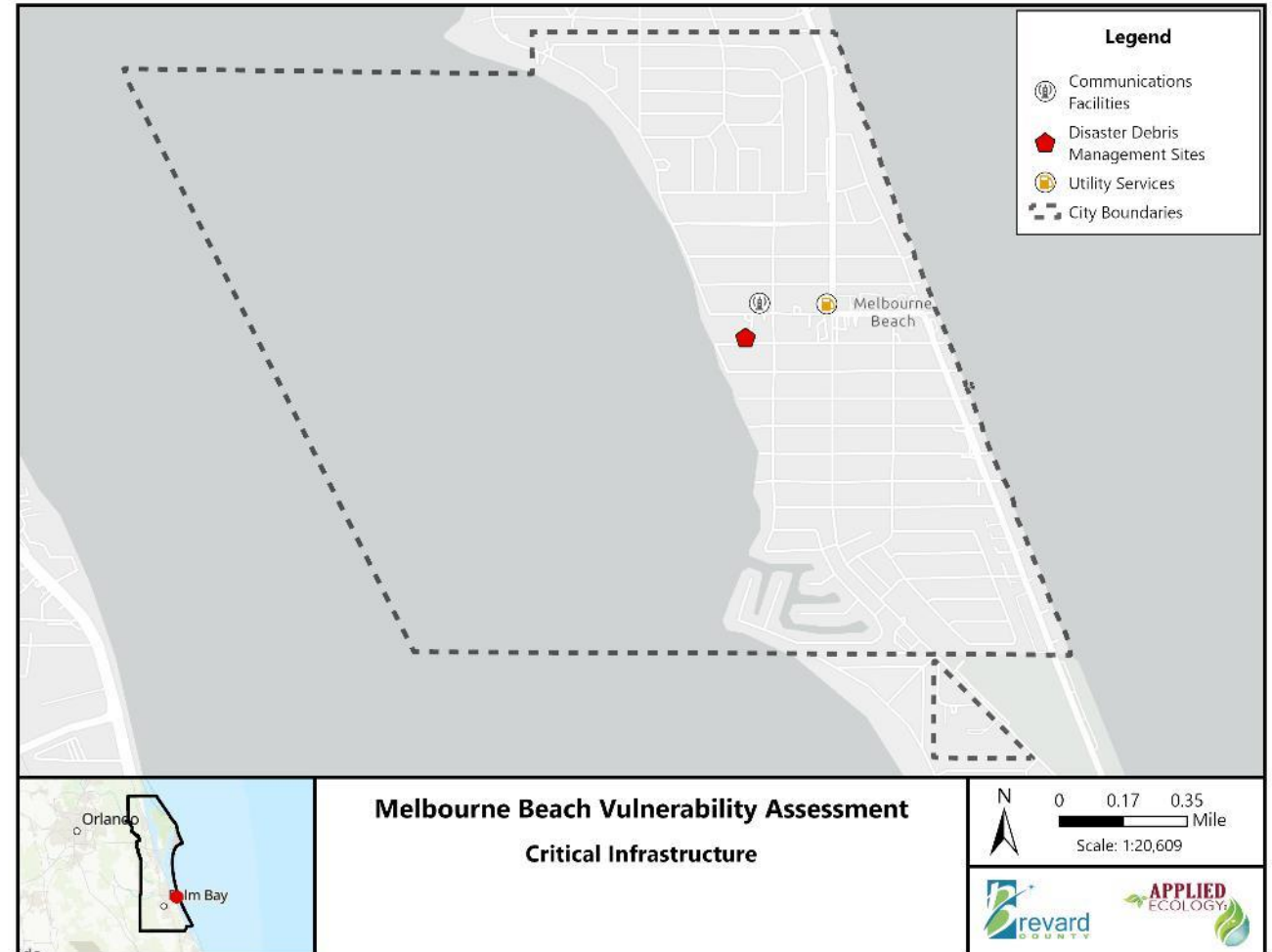


Photo Credit: Julian Leek for Hometown News



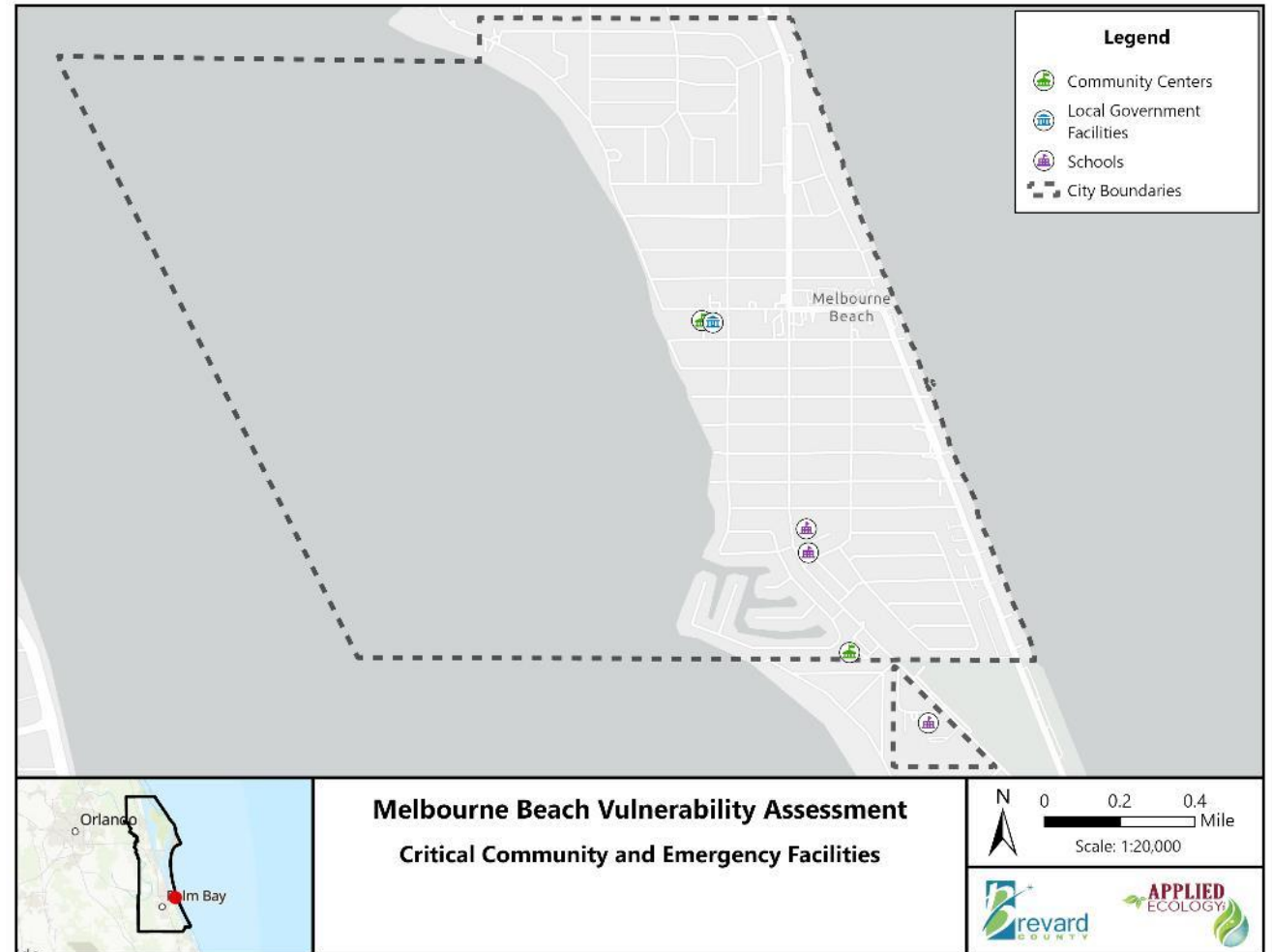
CRITICAL INFRASTRUCTURE

- Stormwater Treatment Facilities
- Wastewater Treatment Facilities
- Drinking Water Facilities / Conveyance
- Electric Production / Supply Facilities
- Solid / Hazardous Waste Facilities
- Military Installations
- Communications Facilities
- Disaster Debris Management Sites
- Utility Services



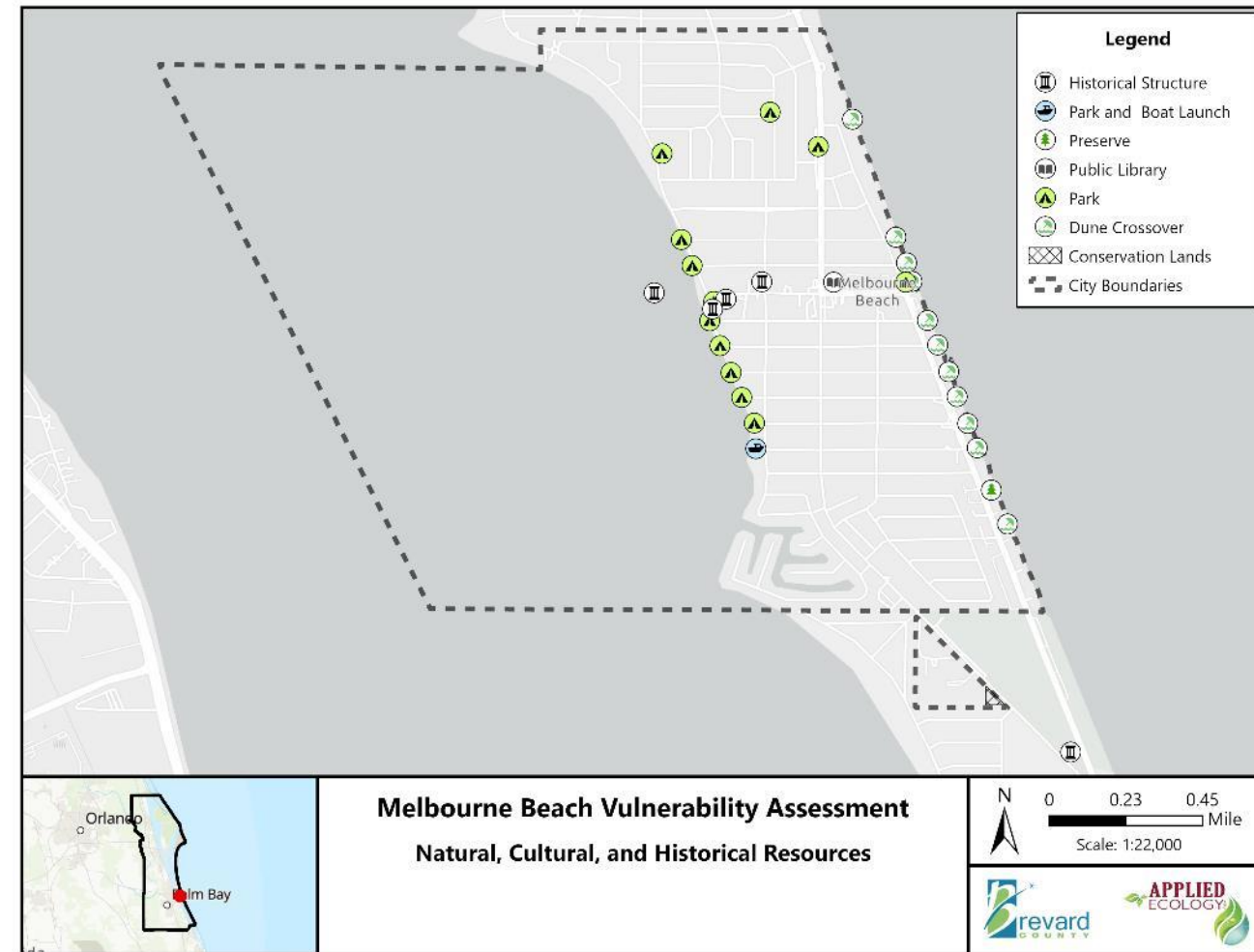
COMMUNITY AND EMERGENCY FACILITIES

- Fire stations
- Schools, colleges & universities
- Community centers
- Local / state government facilities
- Healthcare facilities / Hospitals
- Disaster recovery centers
- Emergency operation centers
- Law enforcement facilities
- Logistical staging areas
- Affordable public housing
- Correctional facilities
- Risk shelter inventory



CULTURAL AND NATURAL RESOURCES

- Conservation Lands
- Parks
- Shorelines
- Libraries
- Surface Waters
- Wetlands
- Historical and Cultural Assets



CRITICAL ASSET SUMMARY

Asset Type	Number
Boat Ramps	1
Communication Facilities	1
Community Centers	2
Historical Structures	5
Dune Crossovers	11
Libraries	1
Local Government Facilities	1
School	3
Stormwater Infrastructure	646
Parks	10
Wastewater Infrastructure	590

1,277 Total Critical Assets



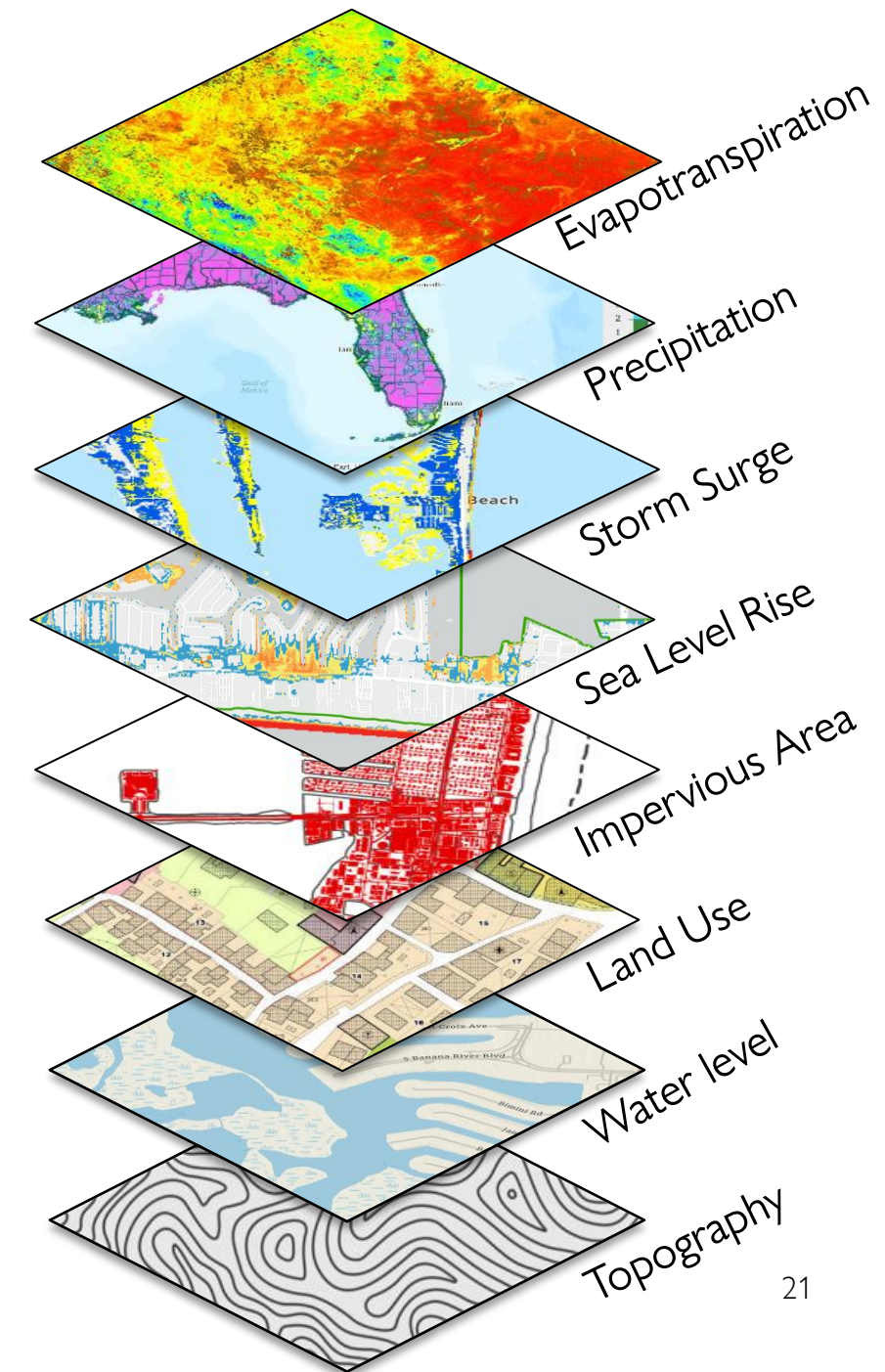
MODELING FLOOD EXPOSURE & SENSITIVITY

- Modeling will include:
 - 2050 and 2080 sea level rise projections
 - 100-yr and 500-yr, 24-hr storms
- Exposure refers to if the asset will be touched by water
- Sensitivity refers to the depth of the water that covers the asset



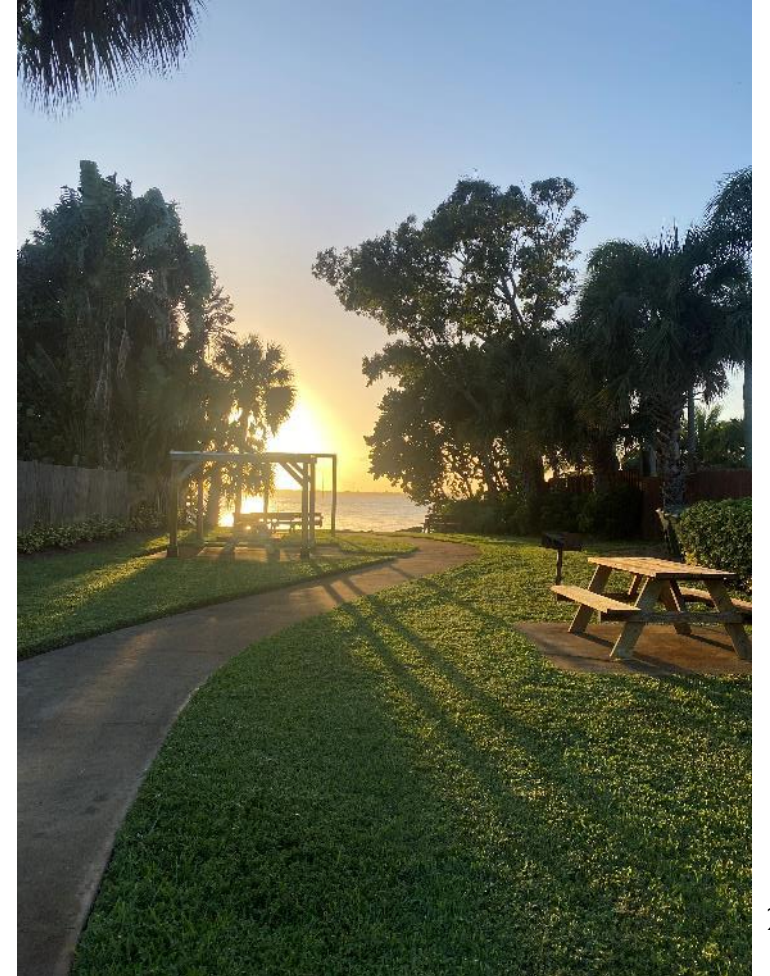
MODELING SCENARIOS

Flood Risk Scenario	Event Frequency	Planning Year	SLR Projection
Coastal Tidal Flooding	N/A	Current 2050 2080	Intermediate-Low & Intermediate
Storm Surge Flooding	20 Year Storm 100 Year Storm 500 Year Storm	Current 2050 2080	Intermediate-Low & Intermediate
Rainfall-Induced Flooding	20 Year Storm 100 Year Storm 500 Year Storm	Current 2050 2080	Intermediate-Low & Intermediate

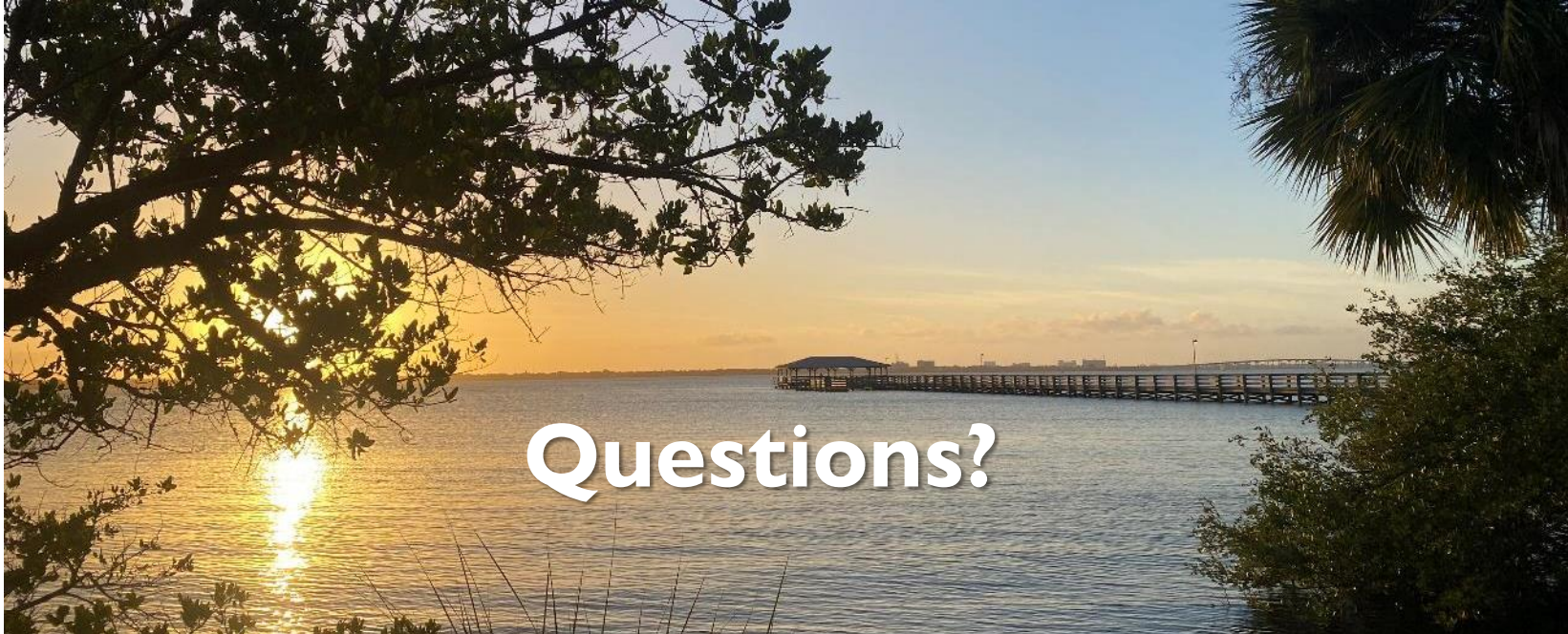


PREPARING FOR THE FUTURE

- Assign risk to each critical asset
- Prioritize areas for climate adaptation strategies
- Plan capital improvements
- Request FDEP funding to implement!
- Reduce current and future flooding impacts



Thank You!



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