

COCOA BEACH VULNERABILITY ASSESSMENT PUBLIC WORKSHOP

Cocoa Beach Country Club Ballroom

March 5, 2025

6:00-7:30 PM

Agenda

- Introductions
- Vulnerability Assessment Process
- Pin-pointing Flooded Areas



COCOA BEACH CLIMATE ADAPTATION VULNERABILITY ASSESSMENT (VA)

APPLIED ECOLOGY, INC.

March 5, 2025



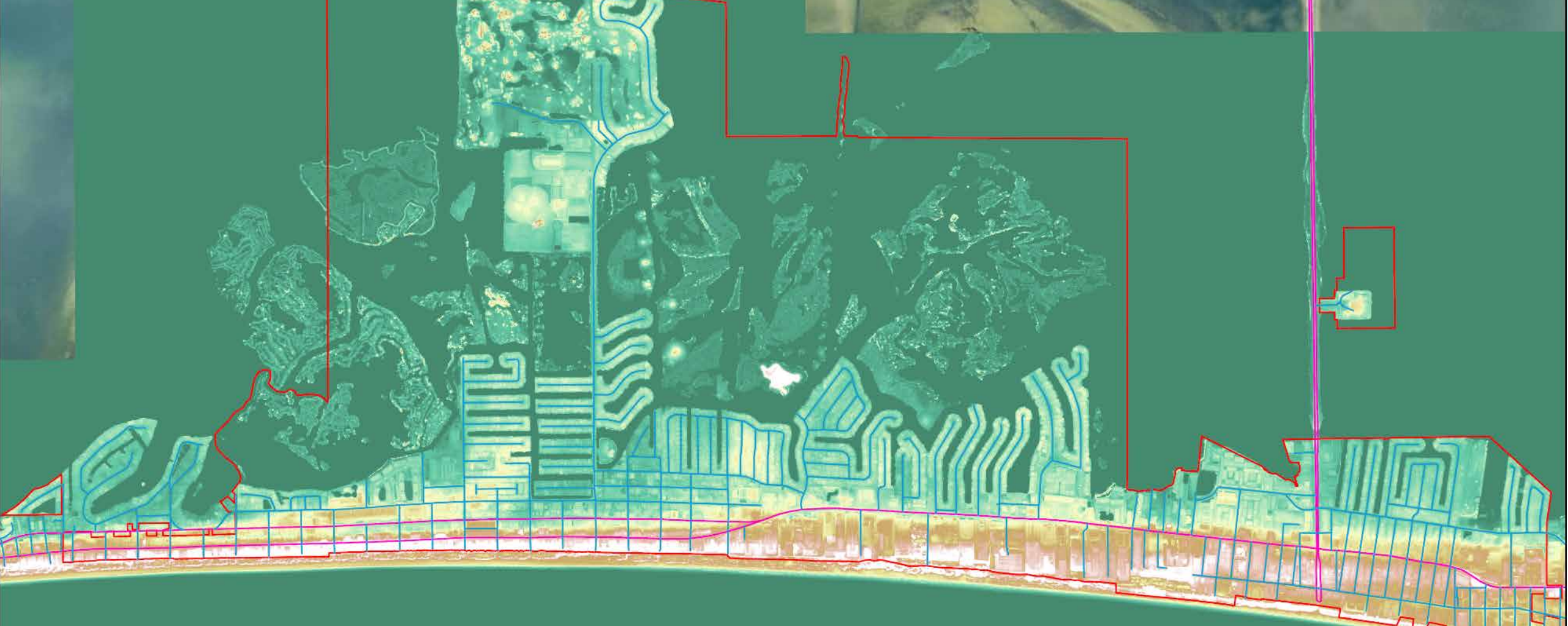
WHY IS THIS IMPORTANT?

- Reduce current and future flooding impacts
 - 88% of residents surveyed experienced some sort of flooding
 - 27% of those experienced a great deal of flooding
- Prioritize Capital Improvement Projects
 - Wastewater infrastructure
 - Stormwater improvements
 - Drainage
 - Water Quality (Help the Indian River Lagoon!)
- Fund flood mitigation & climate adaptation projects
 - State grants contingent on completing a Vulnerability Assessment



Cocoa Beach, c. 1951

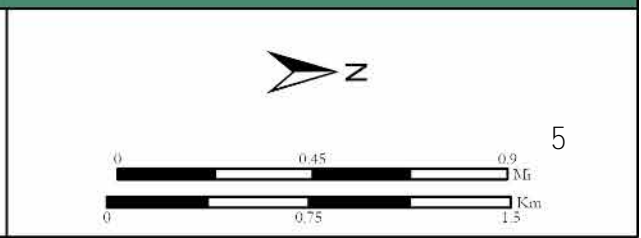




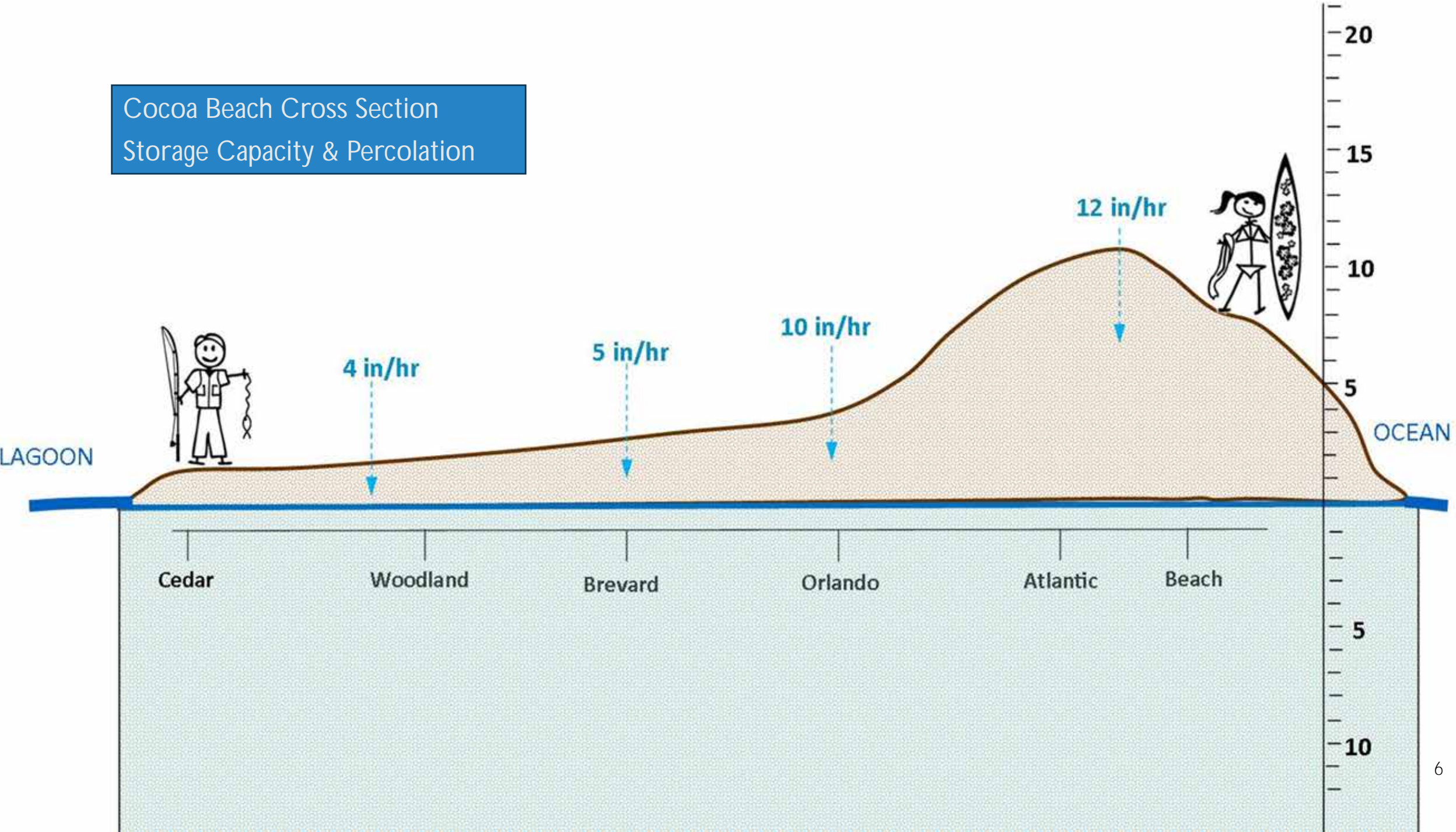
City of Cocoa Beach Elevation (NAV88)
 -13.49 to 20.79 ft AMSL



City of Cocoa Beach
 Vulnerability Analysis
 NOAA 2022 Indian River Lagoon
 LiDAR



Cocoa Beach Cross Section
Storage Capacity & Percolation



PREPARE FOR CHANGE

SEA LEVEL
RISE

STORM
SURGE

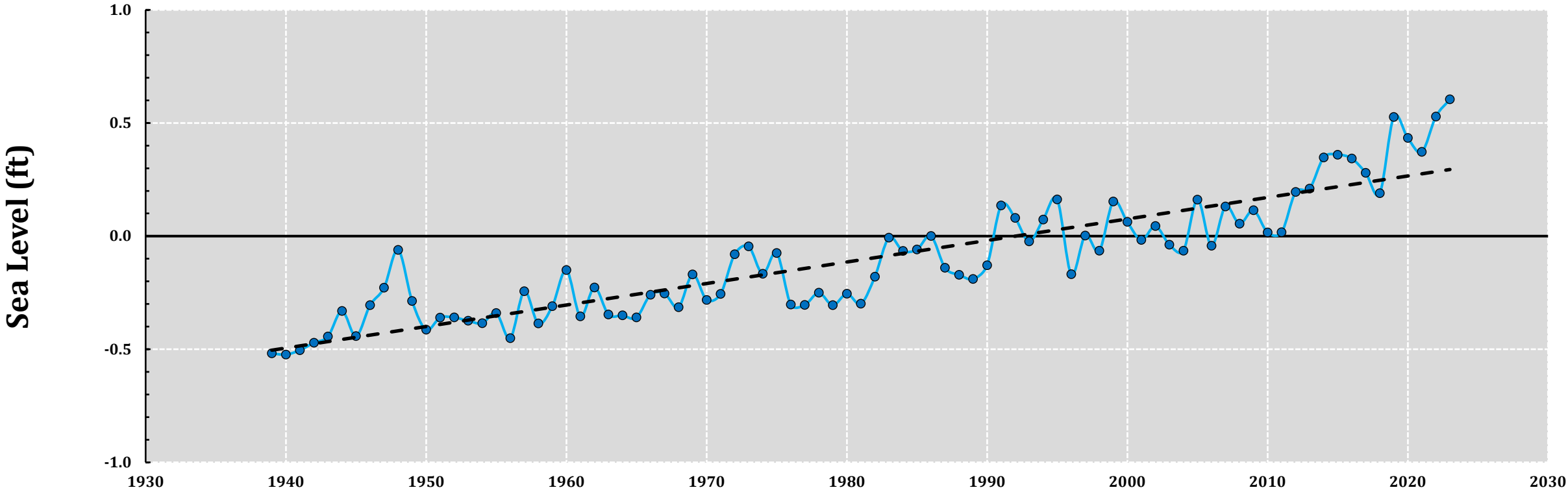
INCREASING
RAINFALL



SEA LEVEL RISE



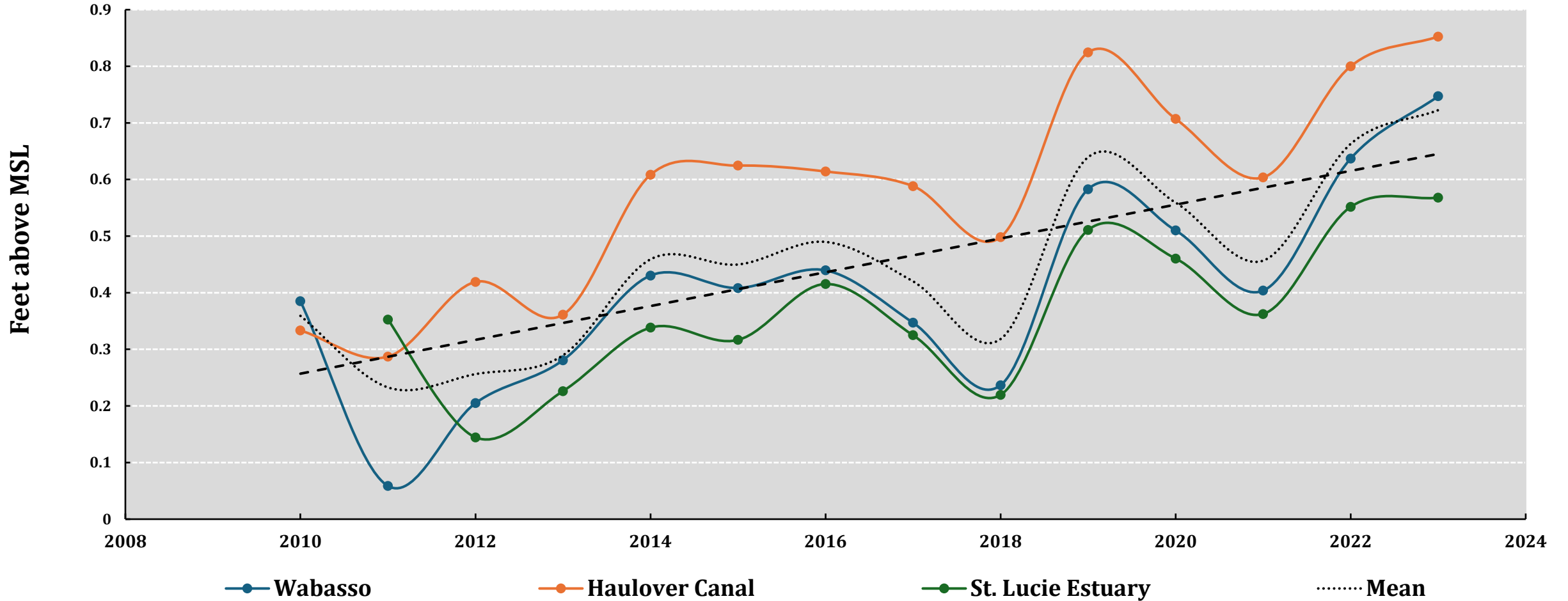
Annual Mean Sea Levels along Florida's Atlantic Coast



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

* NOAA Tidal Stations

Sea Level Rise at USGS Monitoring Stations in the Indian River Lagoon



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

An aerial satellite-style image of a tropical storm system over the ocean. The storm features a distinct eye and spiral cloud bands. A semi-transparent dark blue rectangular overlay covers the center of the image, containing the text 'STORM EVENTS' in white, uppercase, sans-serif font.

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 & houses from their foundations.



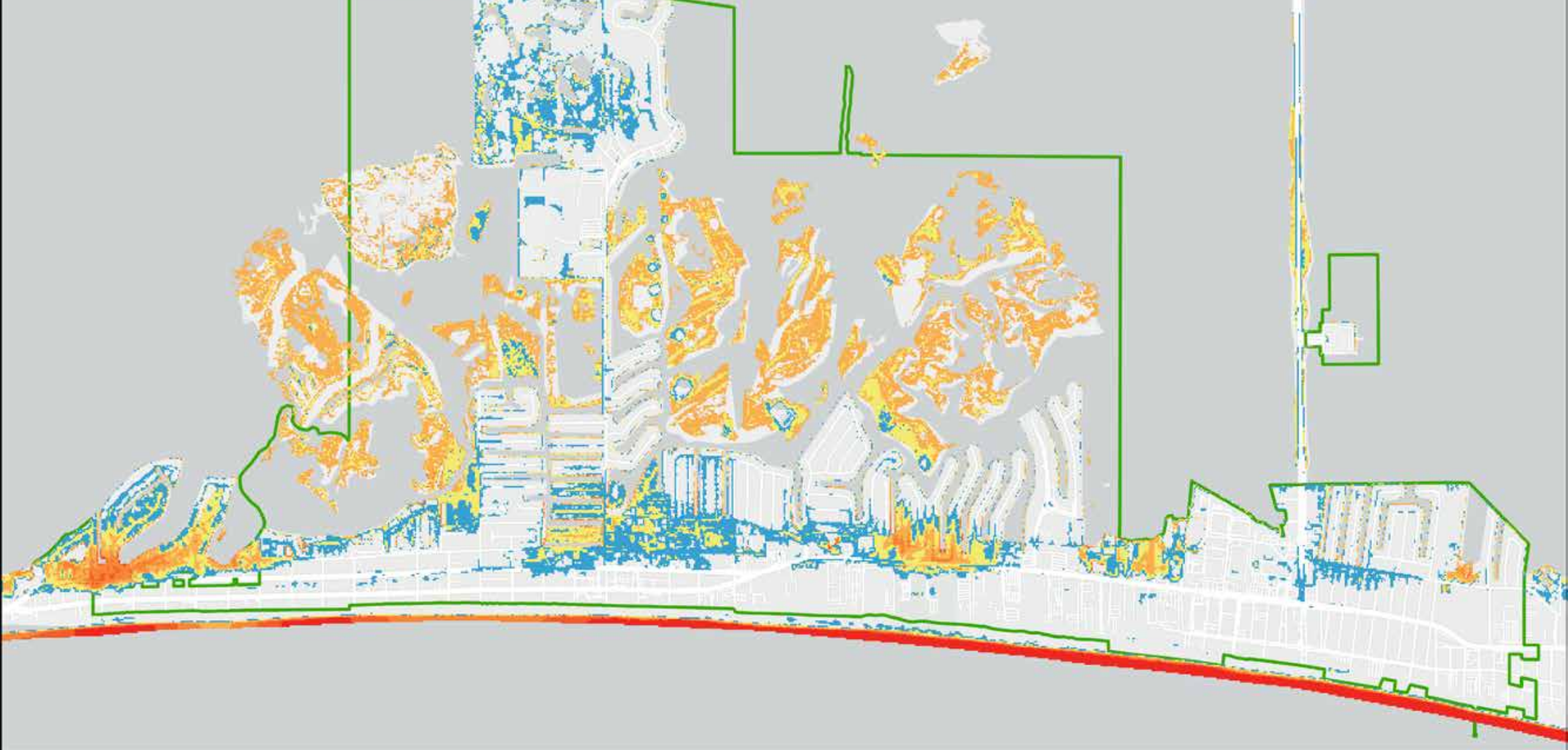


INCREASING RAINFALL

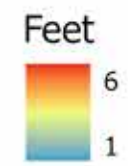
24-hr Storm Interval	Rainfall Depth (Inches)
5-year	6.15
*10-year	7.49
25-year	9.54
50-year	11.30
100-year	13.20
200-year	15.30
500-year	18.20

* Current design standard
Bolded storm scenarios will be modeled.

*NOAA Atlas data downloaded from
https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html?bkmrk=fl



City of Cocoa Beach
 Vulnerability Analysis
 NOAA 2022 SLOSH
 Category 1 Hurricane



City Limits



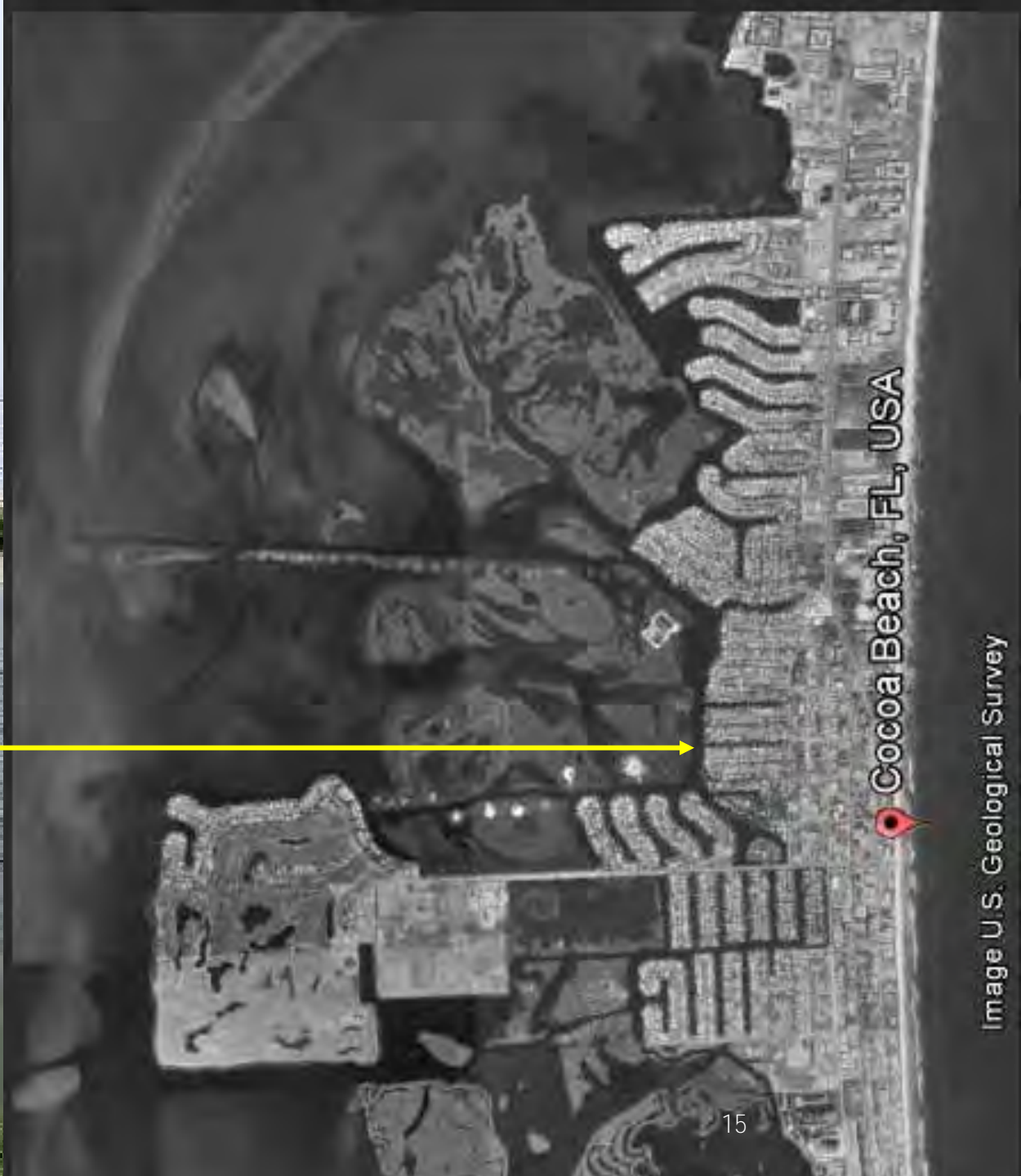


Image U.S. Geological Survey

VULNERABILITY ASSESSMENT

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



Funding provided by a FDEP Coastal Resiliency Program Grant



CLIMATE ADAPTATION PLANNING GUIDE (FDEP)

Context

- Assemble steering committee
- Set guiding principles
- Establish planning area and geographic context
- Define public outreach

Adaptation Strategies

- Assess adaptive capacities
- Prioritize adaptation needs
- Identify adaptation strategies
- Integrate into existing plans



Vulnerability Assessment

- Conduct an exposure analysis
- Conduct a sensitivity analysis
- Assign focus areas

Implementation Strategies

- Assess implementation capabilities
- Create a schedule of activities, actions, and actors

CRITICAL ASSETS



- Neighborhoods
- Transportation Assets
- Infrastructure
- Emergency Facilities
- Cultural and Natural Assets

LAND USE / LAND COVER



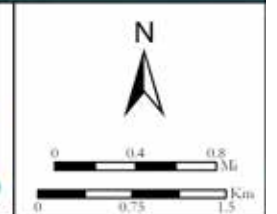
Residential



Commercial / Industrial

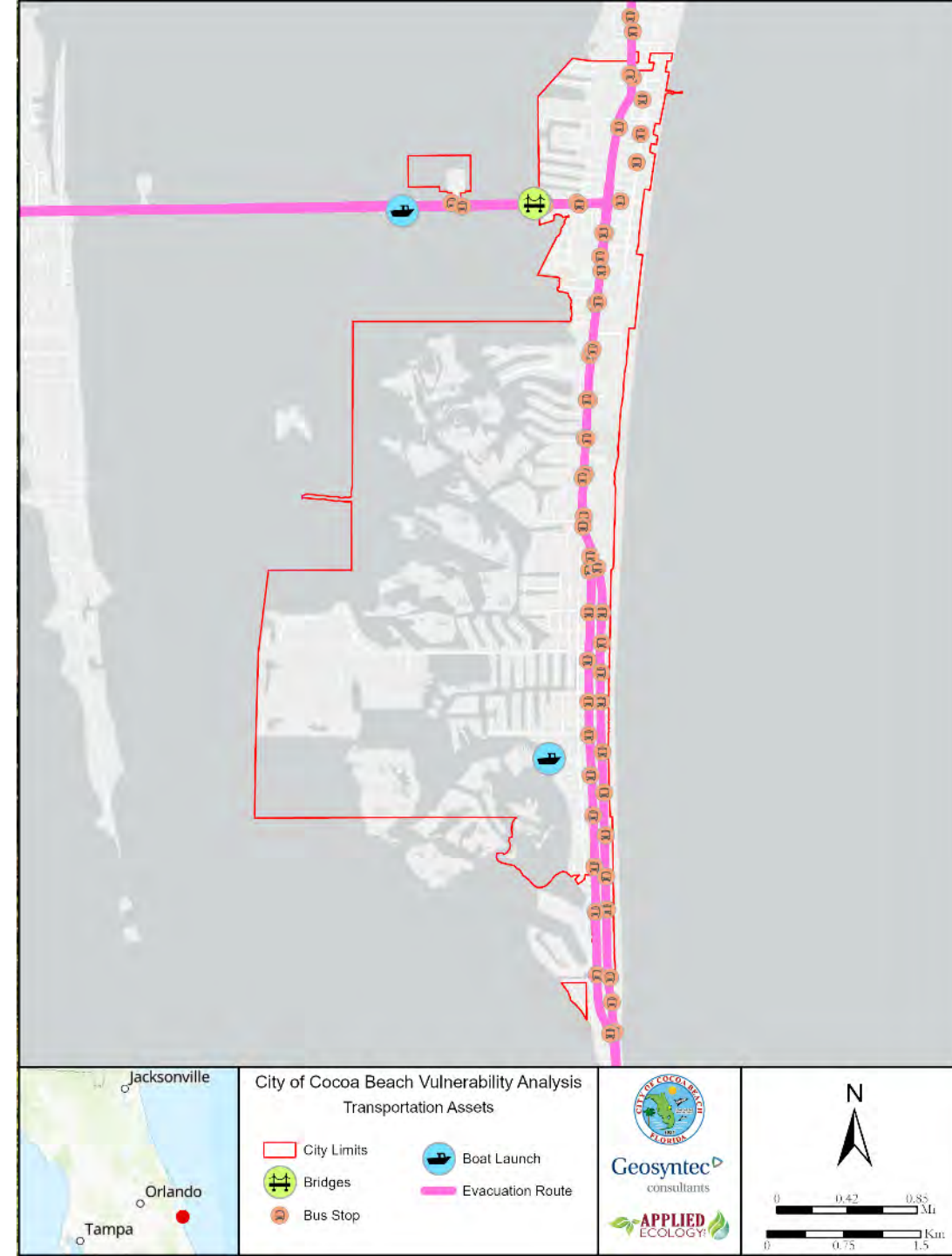


Institutional



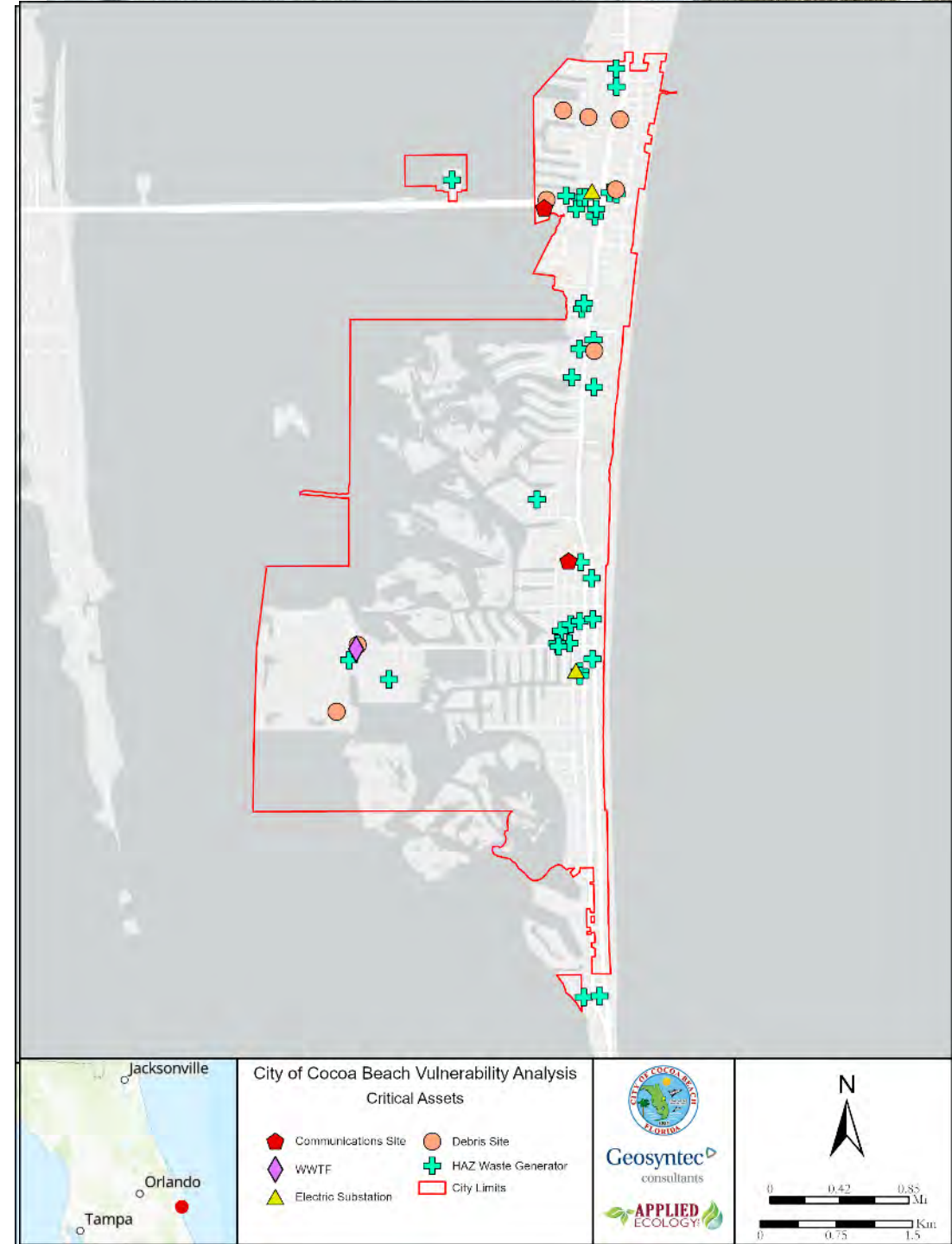
TRANSPORTATION ASSETS

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



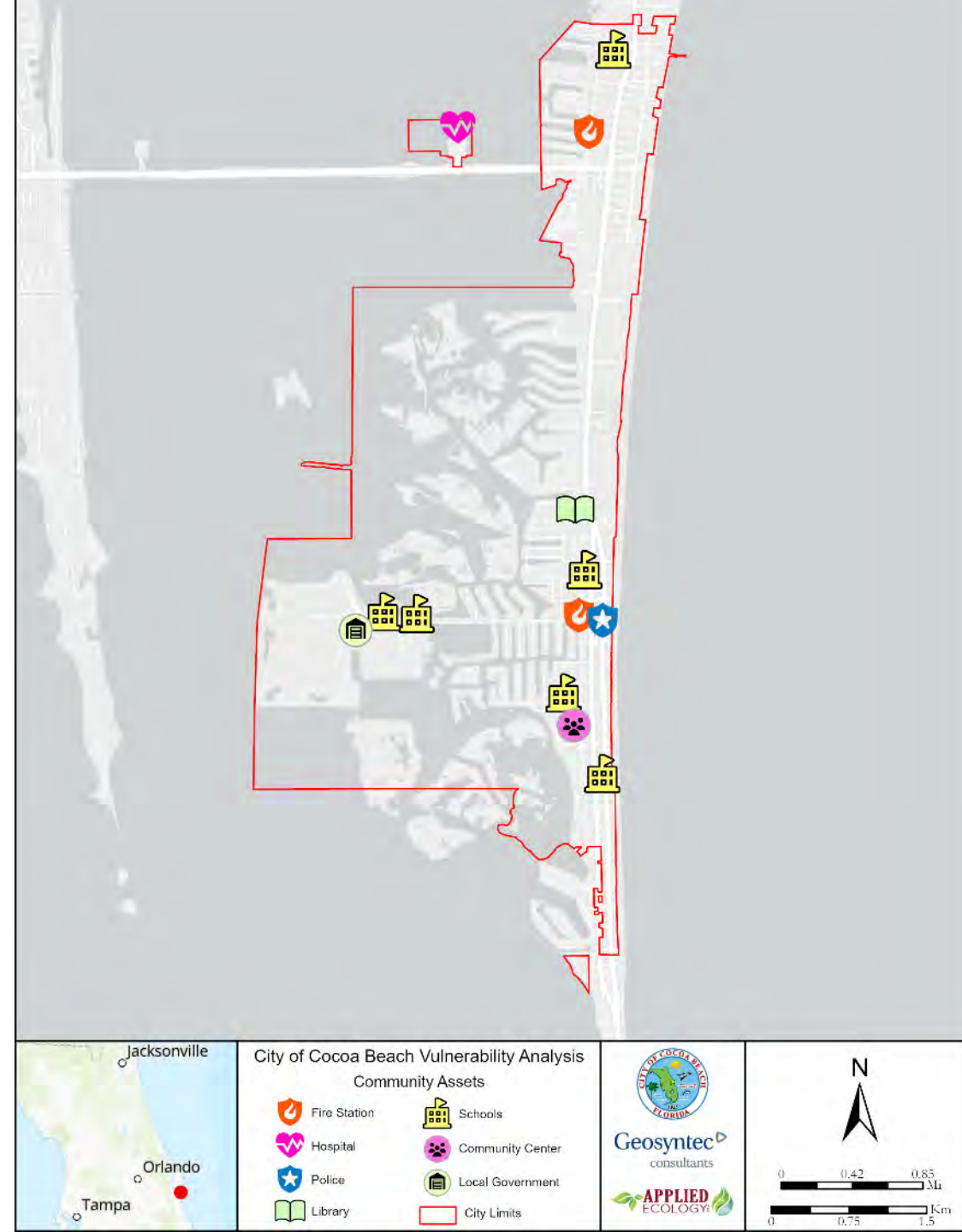
CRITICAL INFRASTRUCTURE

- Stormwater treatment facilities / pump stations
- Wastewater treatment facilities / lift stations
- Drinking water facilities / conveyance
- Electric production / supply facilities
- Solid / hazardous waste facilities
- Military installations
- Communications facilities
- Disaster debris management sites



COMMUNITY & 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



NATURAL, CULTURAL, & HISTORICAL ASSETS

- Conservation lands
- Parks
- Shorelines
- Surface waters
- Wetlands
- Historical and cultural assets



**MODELING
FLOOD
EXPOSURE AND
SENSITIVITY**

Model 2050 and 2080 sea level rise projections

Model two storm scenarios – 100-yr and 500-yr, 24-hr storms

Exposure refers to the asset's exposure to flood waters

Sensitivity refers to the depth of the water that covers the asset

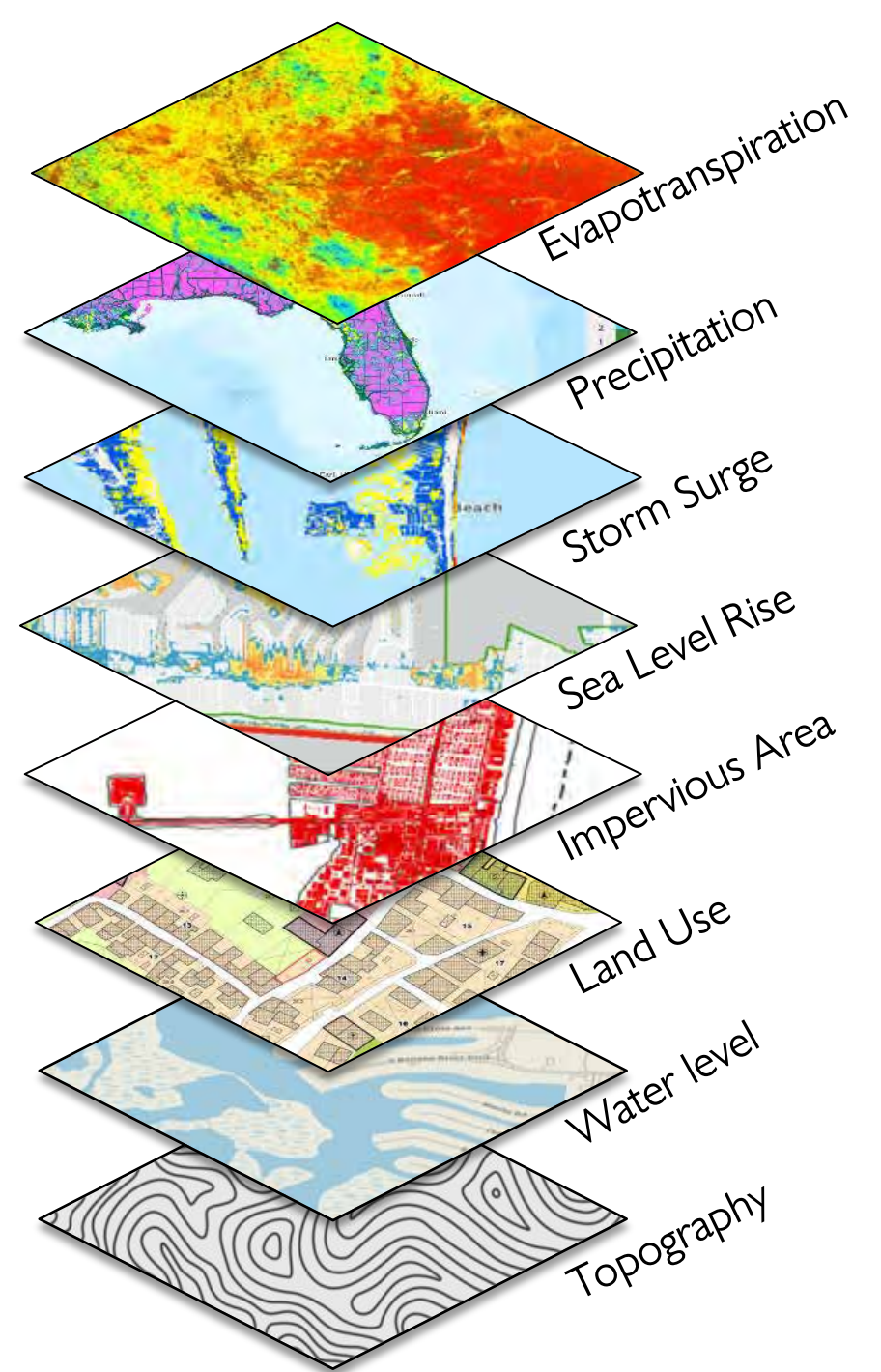


MODELING FLOOD EXPOSURE & SENSITIVITY

Custom designed, multidimensional model of flood scenarios with spatial datasets including:

- Elevation (Topography & Water)
- Land Use / Land Cover
- Impervious Area
- Sea Level Rise
- Storm Surge
- Precipitation
- Evapotranspiration

Assign risk category to each asset
Prioritize focus areas for climate adaptation strategies
Get FDEP funding to implement!



Thank You!



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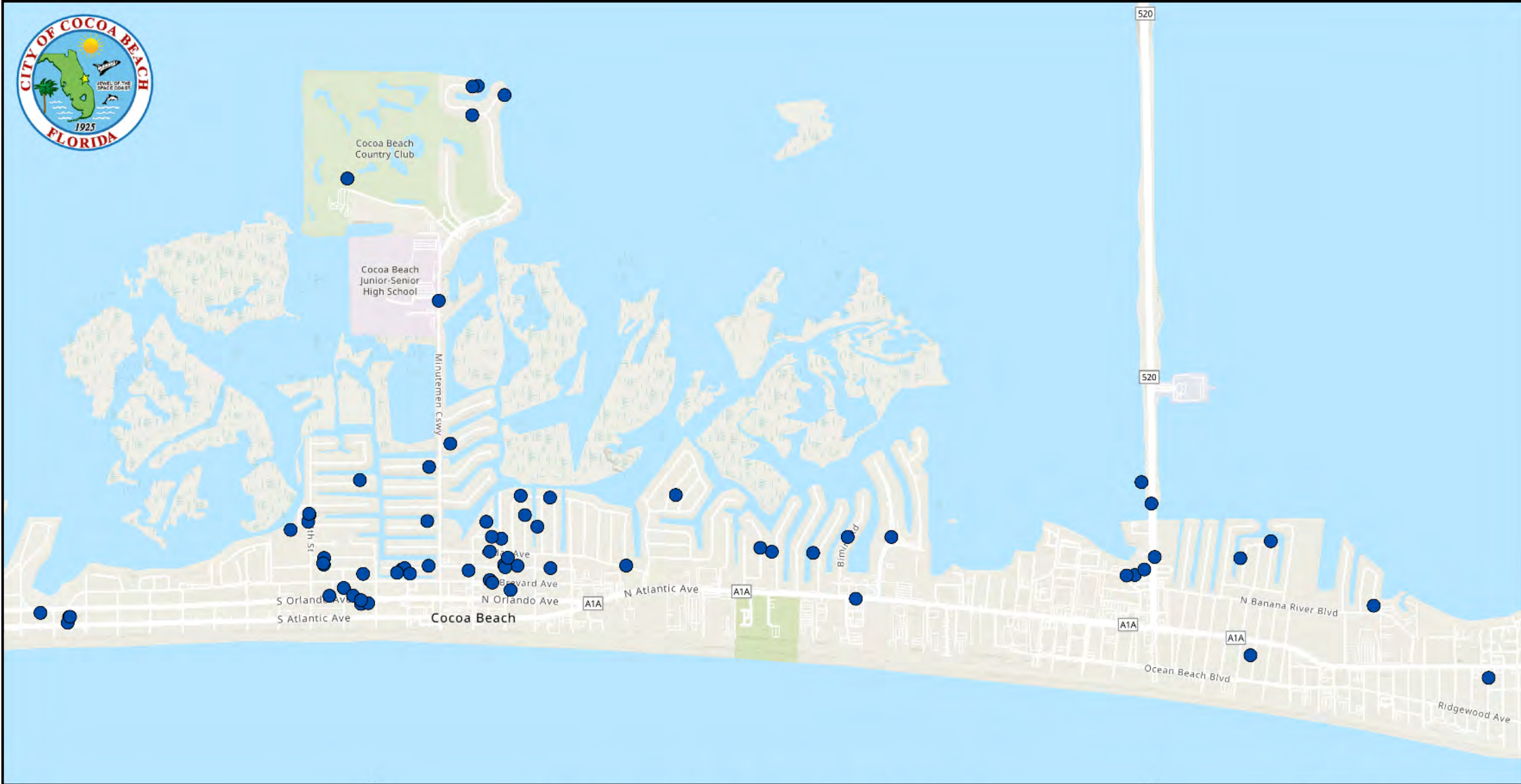
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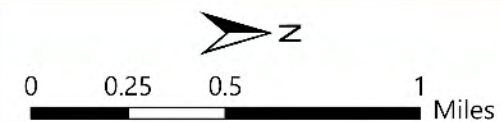


Questions?
Mapping Exercise to Come!!



● Flood Locations

Cocoa Beach Flood Survey Data



MAPPING EXERCISE

MAPS

Sets of maps of the city in three locations so break up

LOCATE

Locate a road, parking lot, or building where you have experienced flooding

DOT

Make 1 DOT on the road where flooding occurs
DO NOT CIRCLE THE ENTIRE AREA!

