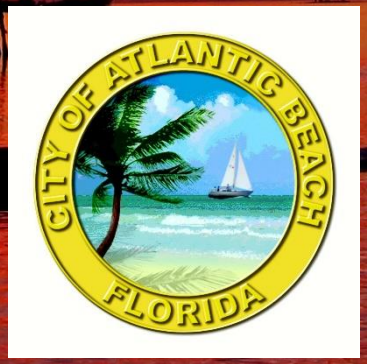
Coastal Vulnerability Assessment & Adaptation Plan Update

Commission Workshop Meeting

June 16, 2025



JonesEdmunds

Project Goals

- Update the City's Coastal Vulnerability Assessment to satisfy FDEP Resilient Florida Program guidelines and State Statutes (F.S. 380.093).
- Update future conditions tidal, storm-surge, and rainfall-driven flood mapping.
- Identify vulnerable critical community infrastructure.
- Complete a baseline survey of the City's coastal marsh.
- Update the City's Adaptation Plan base on updates to the VA

ably with risk when measuring hazard impacts. NOAA provides a useful definition of vulnerability that informs the follow-on actions described later in this chapter (2010):

"The potential for loss of or harm/damage to exposed assets largely due to complex interactions among natural processes, land use decisions, and community resilience." [6]

Why do you need a Vulnerability Assessment?

A Vulnerability Assessment helps a community determine which structural and social assets are likely to be impacted by future coastal flooding and sea level rise.

Fla. Dept. of Environment Protection = FDEP
Sea Level Rise = SLR
Vulnerability Assessment = VA

Grant Funding

Project is 94% Grant Funded

Community Development Block Grant – Mitigation Program - $87k

- Flood Mapping Updates
- Marsh Baseline Survey
- Public Meetings
- Adaptation Plan Updates

FDEP Resilient Florida Grant Program – Planning Grant - $65k

- Data Collection
- Flood Mapping Updates
- Sensitivity Analysis

F.S. 380.093 Overview

Current Established Requirements for FDEP Funded VAs

- Must encompass entire county or municipality.
- Must include all “critical assets” owned or maintained by applicant.
- Include depth of future high tide flooding.
- Include depth of current and future storm surge flooding (100-year event).
- Include depth of current and future rainfall-induced flooding (100-year & 500-year events).
- Use National Oceanic and Atmospheric Administration’s (NOAA) 2022 intermediate-low and intermediate sea-level-rise projections.
- Include 2050 and 2080 planning horizons.

Recap: 2019/2021 Coastal VA

- 100% Grant Funded by the Florida Resilient Coastlines Program
- Completed in June 2019 and Updated in April 2021
- 100-Year Storm Surge and Rainfall Driven Flooding for 2044, 2069, and 2119
- Nuisance Flooding (MHHW)
- Used NOAA 2017 Intermediate-High Sea-Level-Rise Projections
- **Completed Prior to F.S. 380.093 and Resilient Florida Grant Program Guidelines/Requirements (RFGP)**

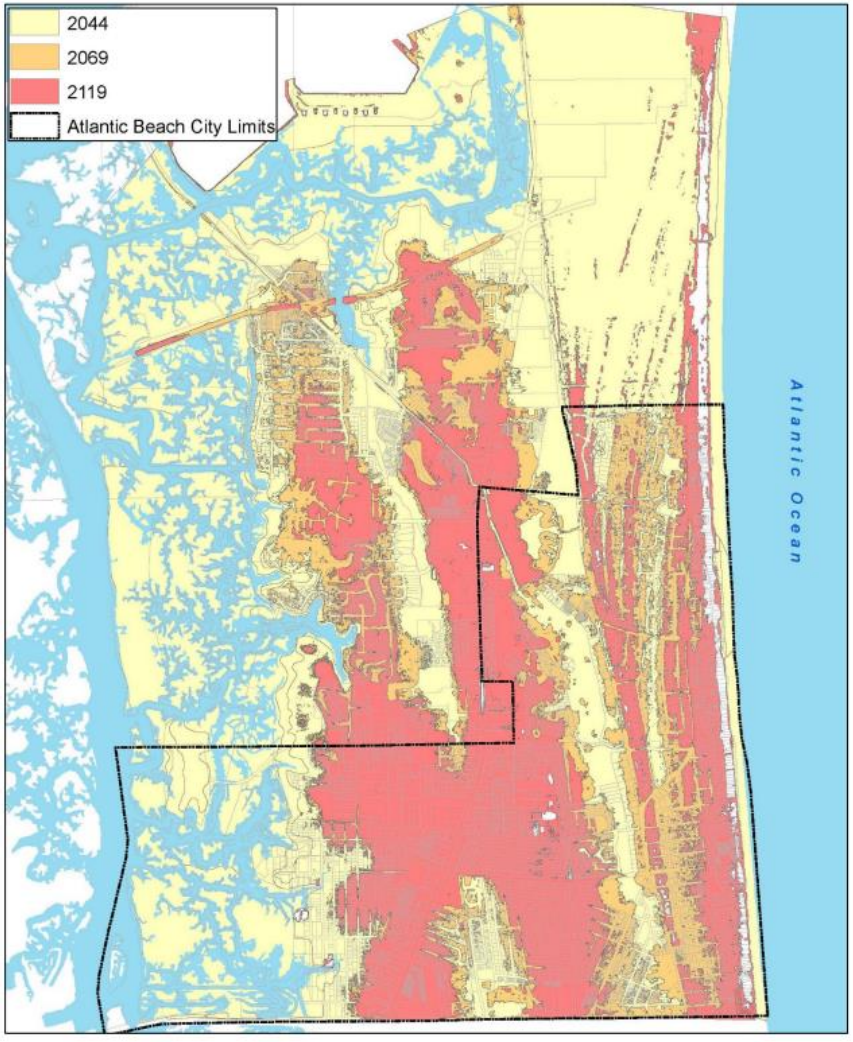


Figure 3-3 – Projected 100-Year Event Storm Surge

Major Differences

2019 and 2021 VA

- 2044, 2069 and 2119 planning horizons
- Intermediate-high NOAA 2017 SLR projections
- Critical asset inventory
- 2007 LiDAR imagery

2025 Update

- 2050 and 2080 planning horizons
- Intermediate-low and intermediate NOAA 2022SLR projections
- Expanded critical asset inventory
- 2018 LiDAR imagery

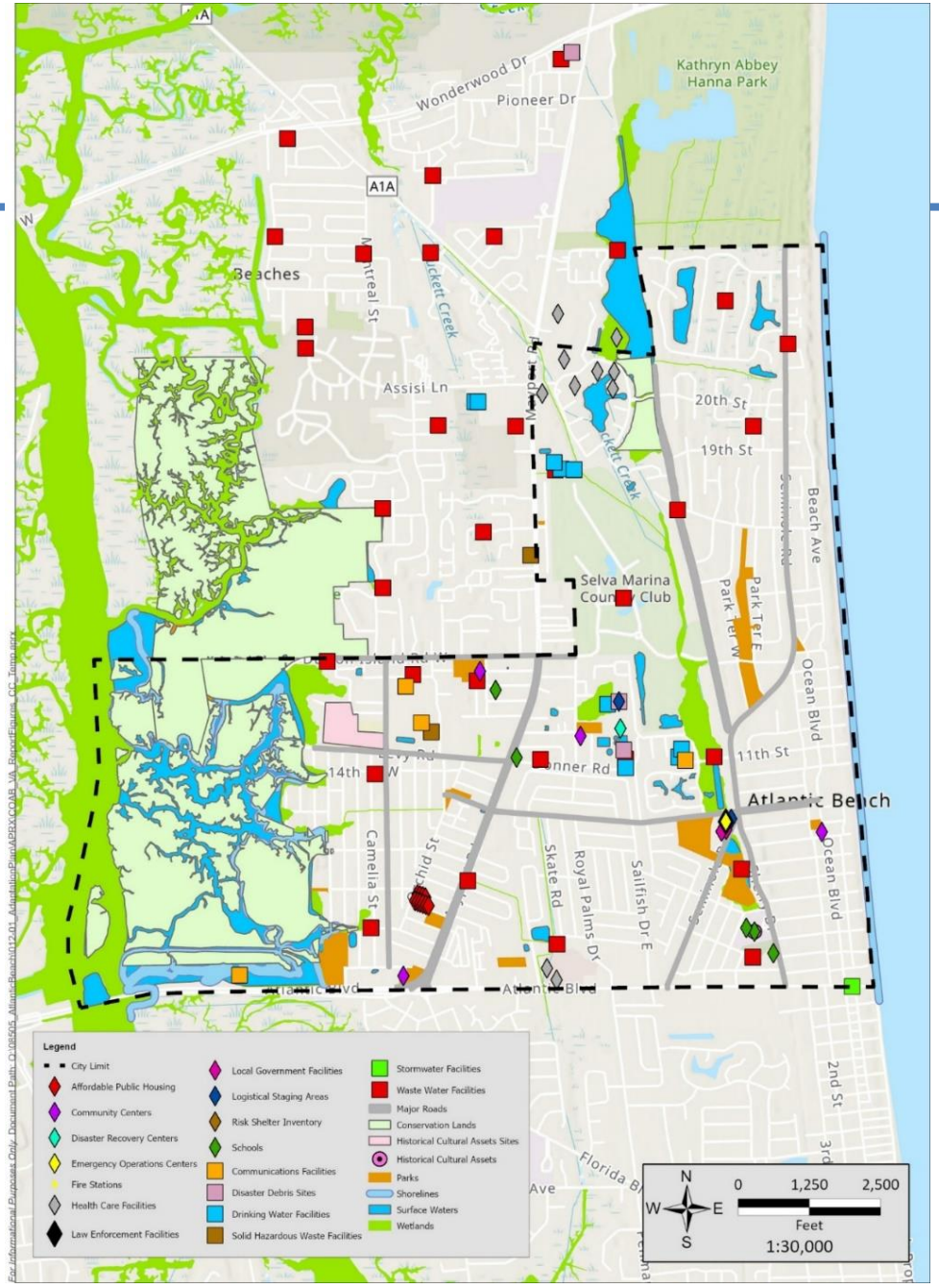
Data Collection: Critical Community Assets

Asset Type	
Affordable Public Housing	10
Airports	0
Bridges	0
Bus Terminals	0
Colleges and Universities	1
Communications Facilities	0
Community Centers	4
Conservation Lands	5
Correctional Facilities	0
Day Cares	2
Disaster Debris Management Sites	3
Disaster Recovery Centers	1
Drinking Water Facilities	0
Electric Production and Supply Facilities	0
Emergency Medical Service Facilities	0
Emergency Operation Centers	1
Fire Stations	1
Health Care Facilities	10
Historical and Cultural Assets	1
Hospitals	0
Law Enforcement Facilities	1
Lift Stations	33

Asset Type	
Local Government Facilities	3
Logistical Staging Areas	2
Major Roadways	83
Marinas	0
Military Installations	0
Parks	16
Ports	0
Radio Communications Towers	4
Rail Facilities	0
Railroad Bridges	0
Risk Shelter Inventory	1
Schools	3
Shorelines	1
Solid and Hazardous Waste Facilities	2
State Government Facilities	0
Stormwater Treatment Facilities and Pump Stations	0
Surface Waters	38
Wastewater Treatment Facilities and Lift Stations	3
Water Utility Conveyance Systems	0
Wetlands	109

Data Collection: Critical Community Assets

- Mined from County, City, State, and Federal data sources.
- Inventory includes ~350 critical community assets.



Updated Flood Mapping: Requirements

Scenarios/Planning Horizons

- Existing, 2050, and 2080 planning horizons
- Intermediate-low and Intermediate Sea-Level-Rise (SLR) Projections

Tidal/Sunny Day Flooding

- Existing and future high tide flooding
- Number of expected tidal flood days

Current and Future Storm Surge Flooding

- Use existing storm surge data
- Include 100-year flood event at a minimum

Current and Future Rainfall Induced Flooding

- Include 100-year and 500-year rainfall event
- Vary future boundary conditions based on SLR projections

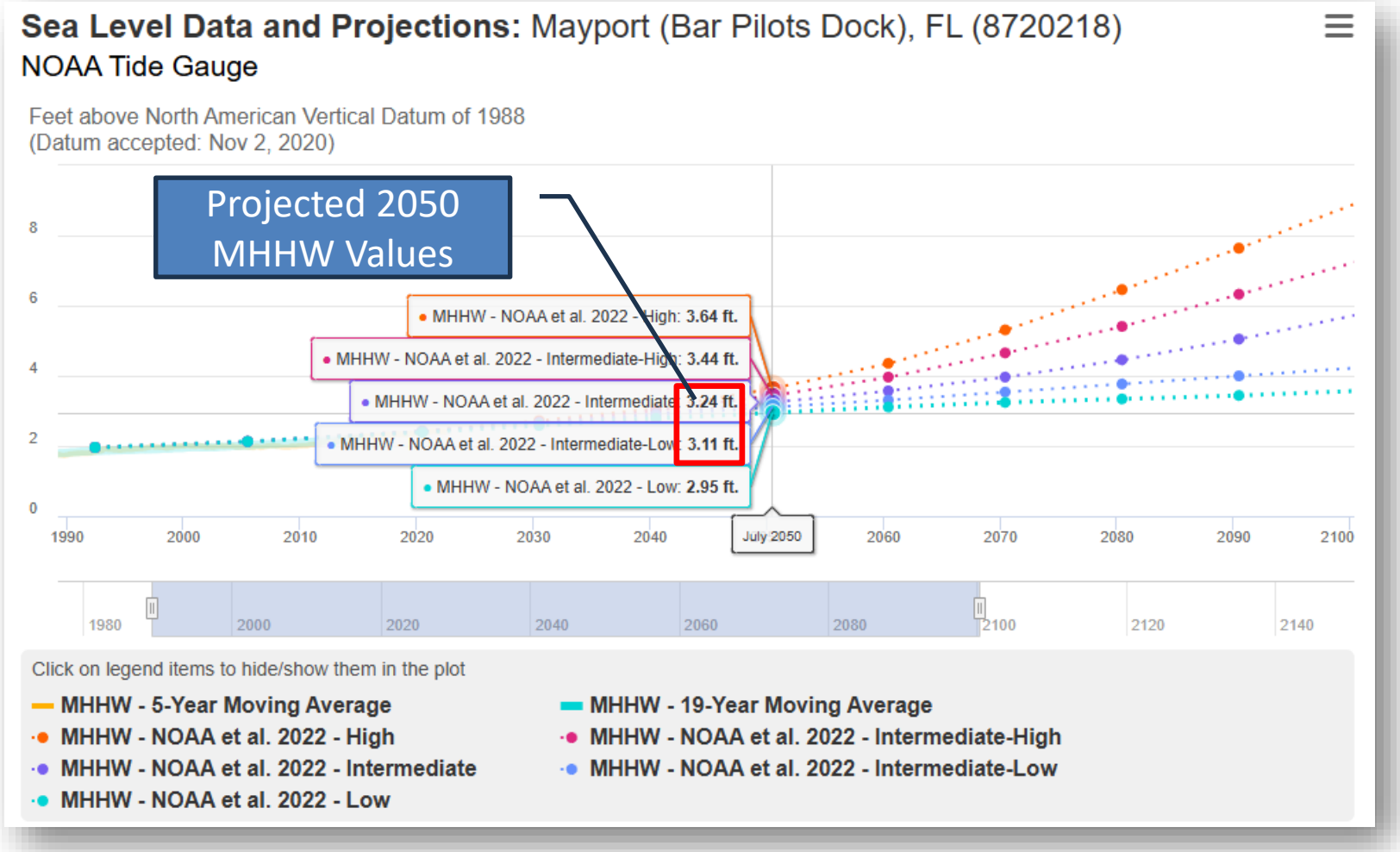
Updated Flood Mapping: Scenarios

- 20 scenarios are required by State Statute.
- City also chose to map combined surge and rainfall flooding for the 100-year event.

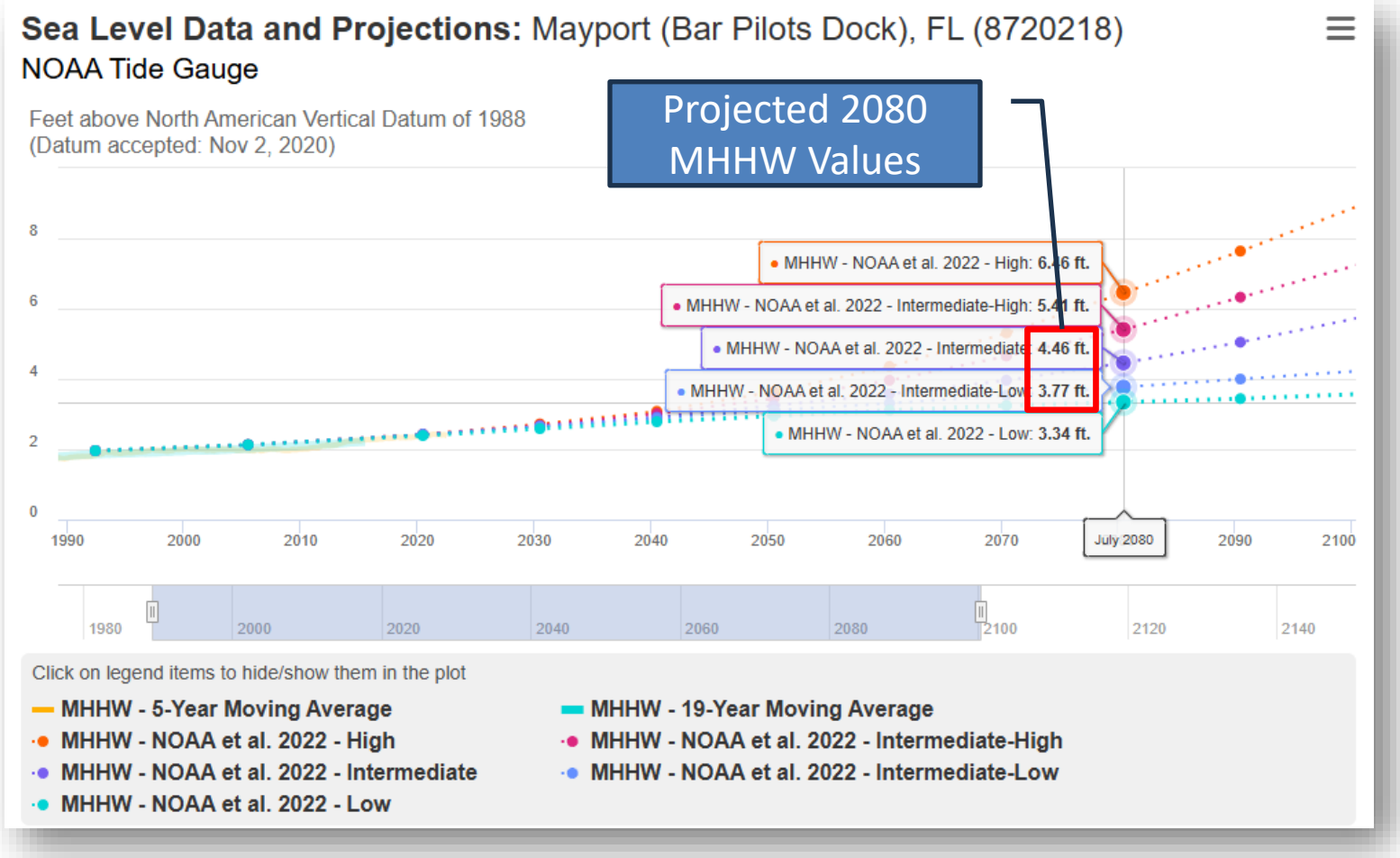
Flooding Type	MHHW+2’	100-Year	500-Year
Tidal/Sunny-Day Flooding			
Existing	X		
2050 Int-Low	X		
2080 Int	X		
2080 Int-Low	X		
2080 Int	X		
Rainfall Induced Flooding			
Existing		X	X
2050 Int-Low		X	X
2080 Int		X	X
2080 Int-Low		X	X
2080 Int		X	X
Storm Surge Flooding			
Existing		X	
2050 Int-Low		X	
2080 Int		X	
2080 Int-Low		X	
2080 Int		X	

Notes: **Orange** highlighted cells indicate required scenarios.
MHHW = Mean Higher High Water

Sea-Level-Rise Projections - 2050



Sea-Level-Rise Projections -2080



Modeling/Mapping Approaches

Rainfall-Induced Flooding

- Use City's Existing Stormwater Model
- 100- and 500-year/24-Hour Design Storm Events
- Modify Rainfall Depths for Future Conditions
- Modify Boundary Conditions for SLR
- Modify Runoff Parameters for Future Growth

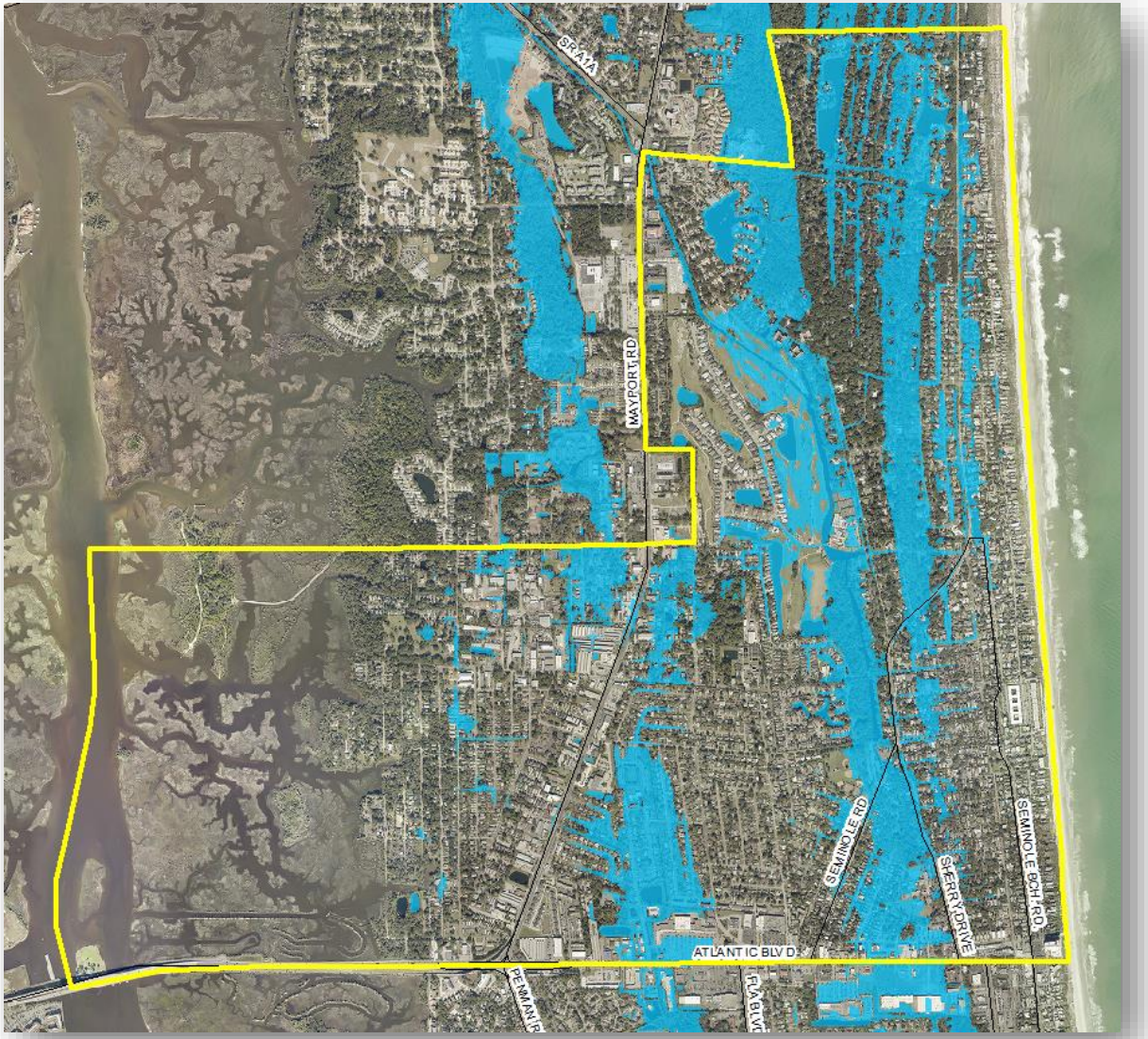
Storm Surge Flooding

- Use City's Modified FEMA Model
- Adjust Stillwater Elevations (SWELs) to Account for SLR
- Add Wave Action

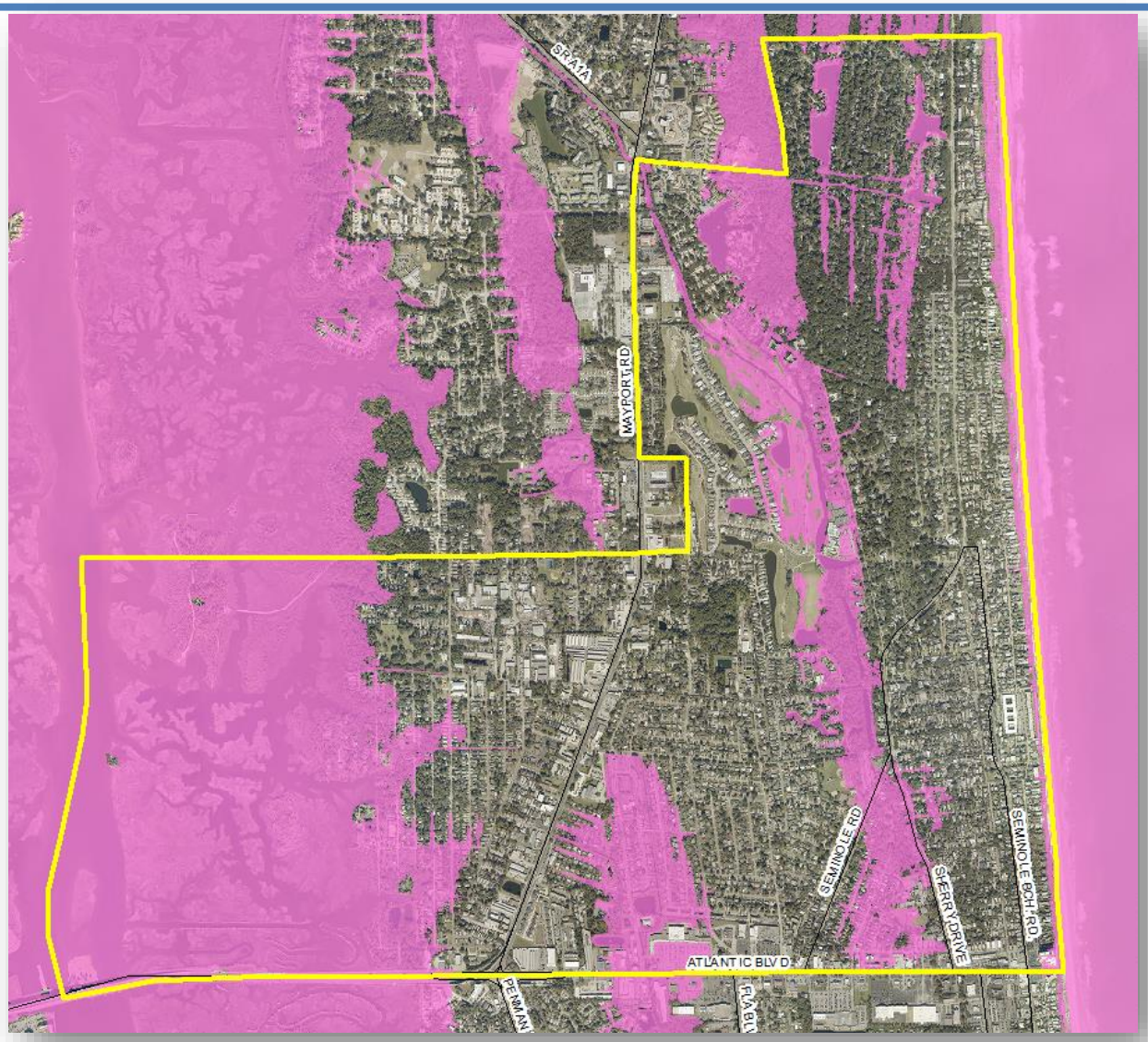
Tidal Flooding

- MHHW Elevation + 2-feet

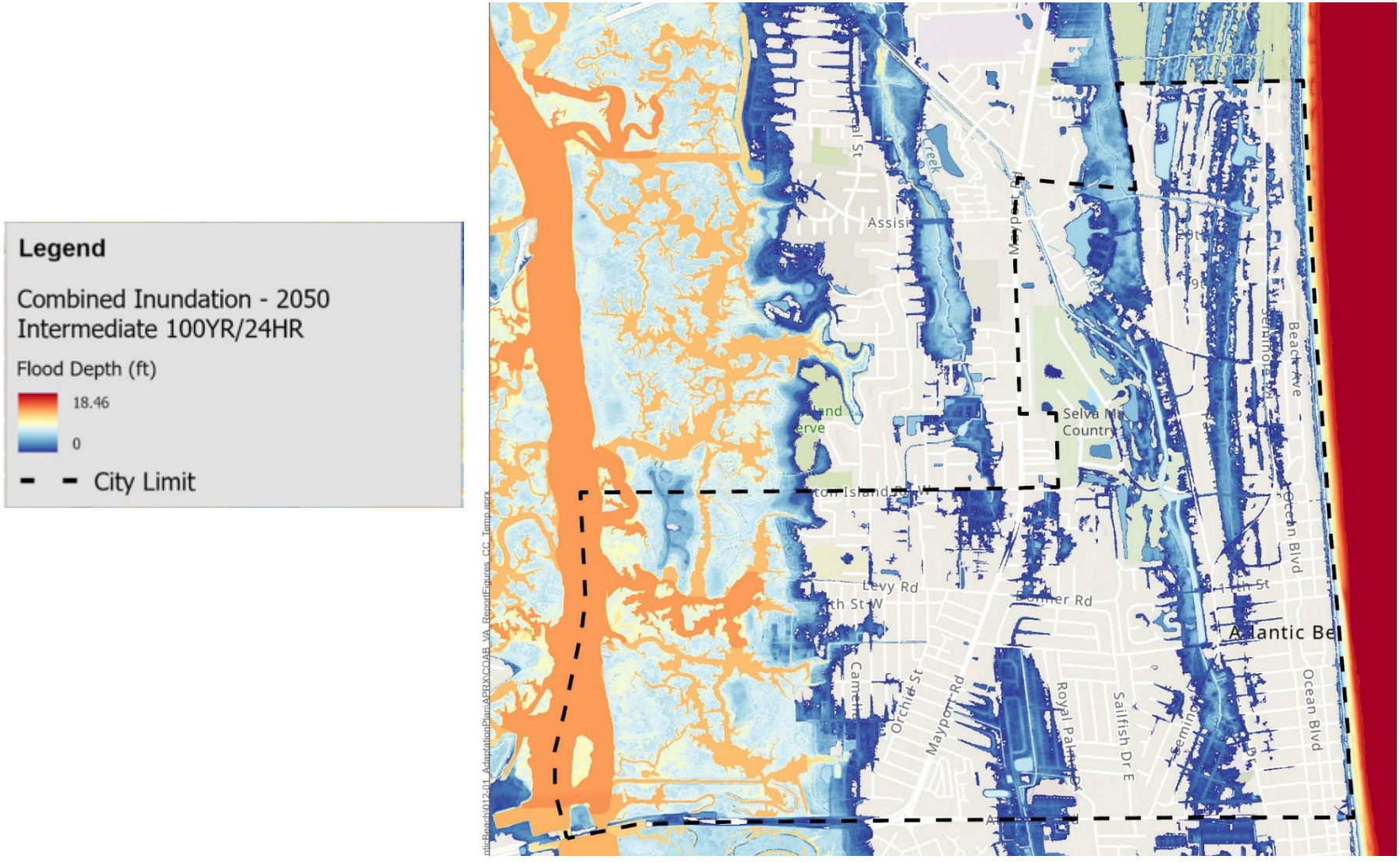
100-Year/2050/Int Rainfall Flooding



100-Year/2050/Int Storm Surge Flooding



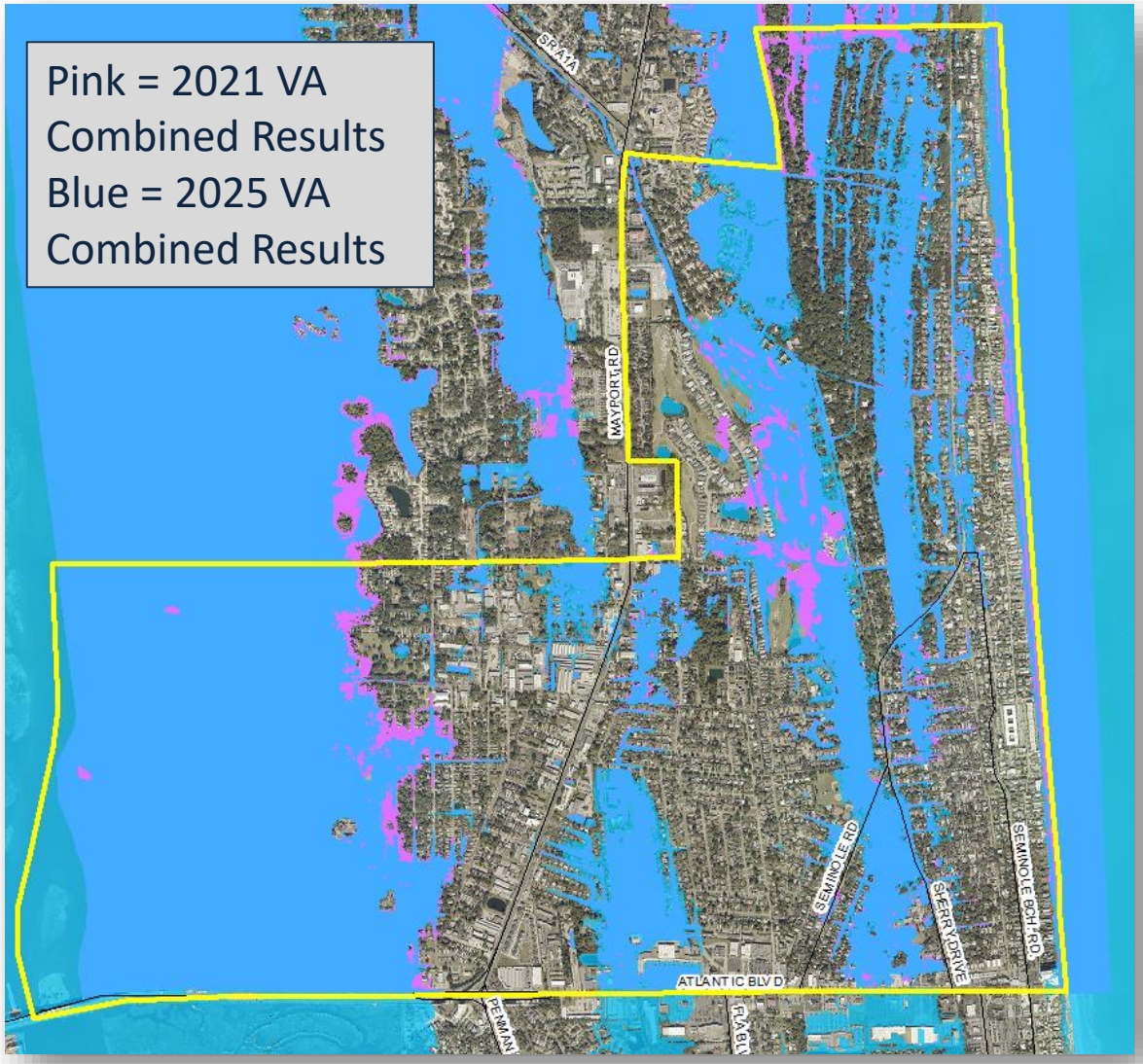
100-Yr/2050/Int Combined Flooding



Comparison to Previous Results

Key Differences

- 2007 vs. 2018 FDEM LiDAR for Inundation Mapping
- 2044 Intermediate-High NOAA 2017 vs. 2050 Intermediate NOAA 2022 = Slightly Reduced Surge Inundation Extent
- Rainfall Change Factors Not Used Previously = Expanded Rainfall Inundation Extent



Marsh Baseline Survey

Purpose/Reason

- Monitor marsh extents over time to quantify impacts from sea-level-rise.
- The City's marsh provides critical habitat as well as flood protection during tropical storms and hurricanes.

Methodology

- High-resolution (3-cm) RGB aerial imagery collected.
- High-resolution multispectral imagery collected.
- Primary marsh habitats mapped using ArcGIS

Marsh Baseline Survey

Mapped 6 Primary Habitats

- Water – 164 ac.
- Juncus Gerardii – 94 ac.
- Saltgrass – 2 ac.
- Spartina – 126 ac.
- Juncus and Spartina Mix – 56 ac.
- Wooded / Non-Marsh Grass Areas – 130 ac.

Adaptation Plan Update

Purpose/Reason

- Identify goals and strategies to best minimize risks and establish a process to implement those strategies

Proposed Updates

- Used updated modeling from VA to identify the exposure and sensitivity of critical assets
- Expanded adaptation strategies for focus areas

Focus Areas

City Wide

- No changes

Areas West of Mayport Road

- Proposed raising road segments above the projected flooding and surge areas

Major Drainageways

- Proposed backflow prevention systems and stormwater pond locations along Hopkins Creek and Sherman Creek

Focus Areas

Critical Utility Infrastructure

- Identified 10 vulnerable lift stations with high priority ratings to prioritize in adaptation efforts

Critical Public Facilities

- City Hall, Commission Chambers, and Public safety building identified as a priority for adaptation needs

Next Steps

- Complete the Vulnerability Assessment and Adaptation Plan updates
- Public Meeting #2 – June 25, 2025 at 5:30 p.m.
- Bring to Commission for approval on July 14, 2025

Questions?