



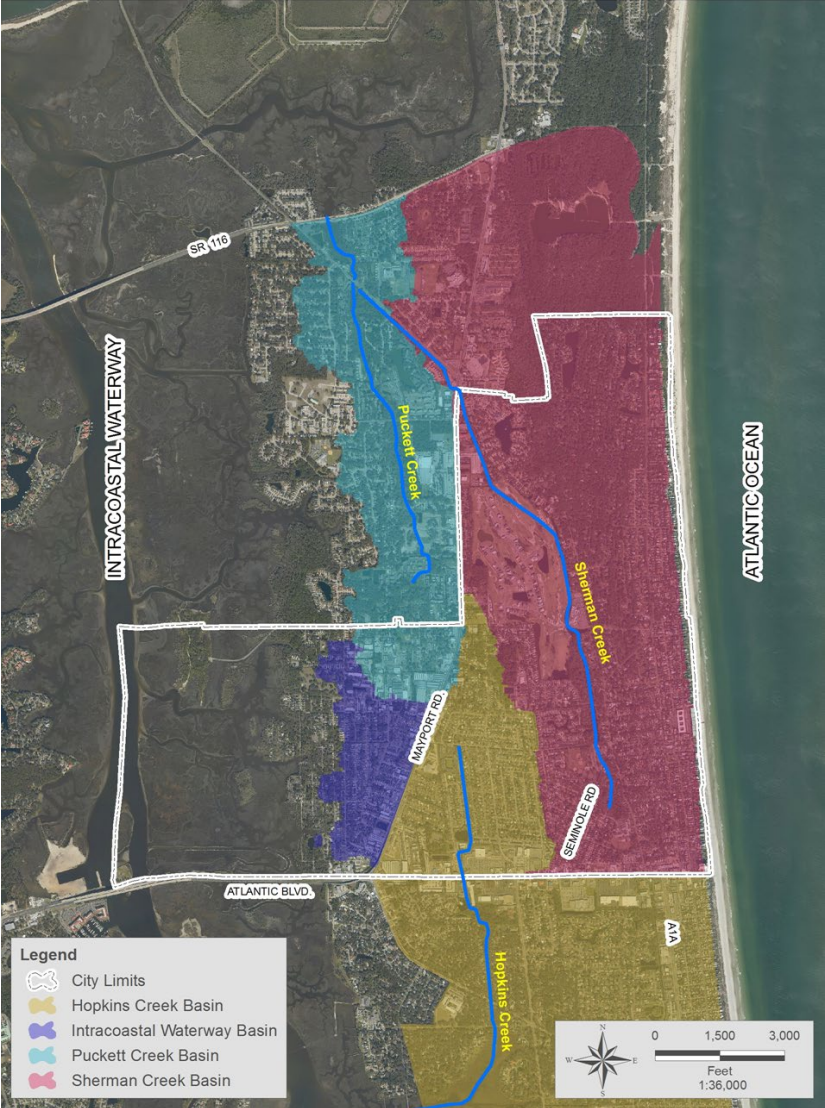
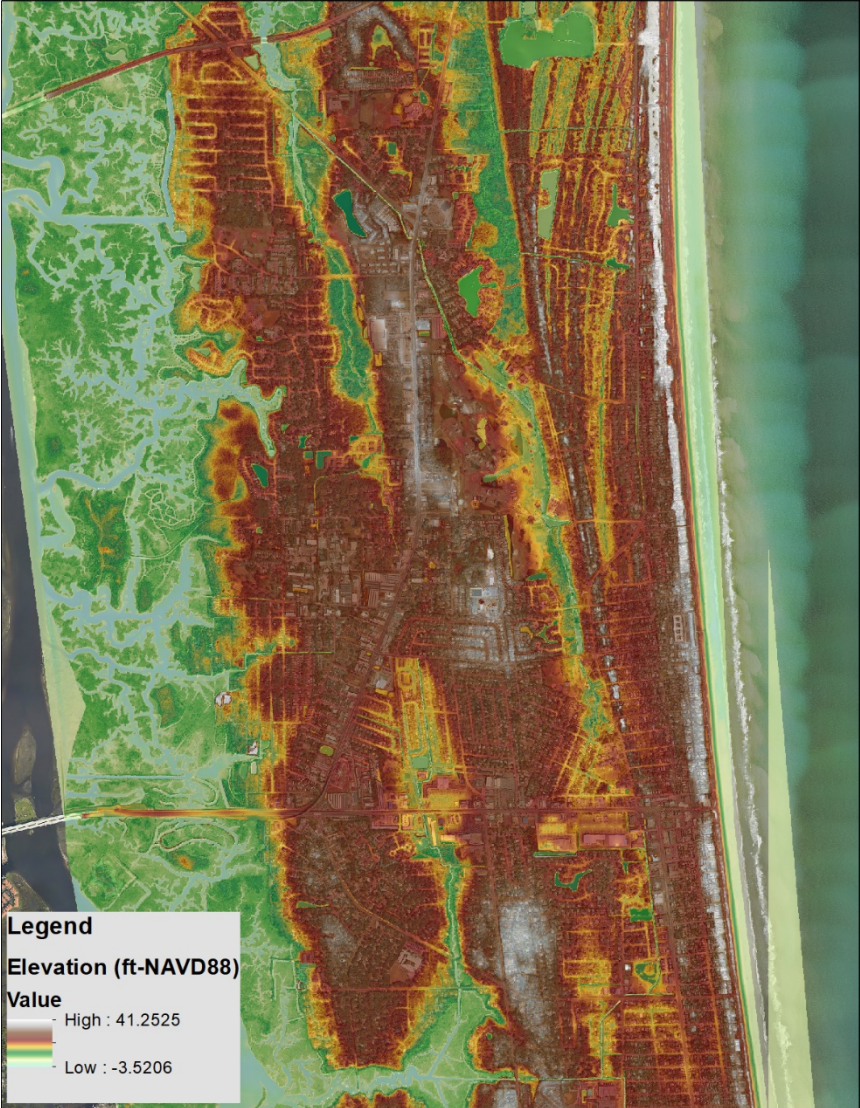
Climate Change and Coastal Resilience

February 26, 2020

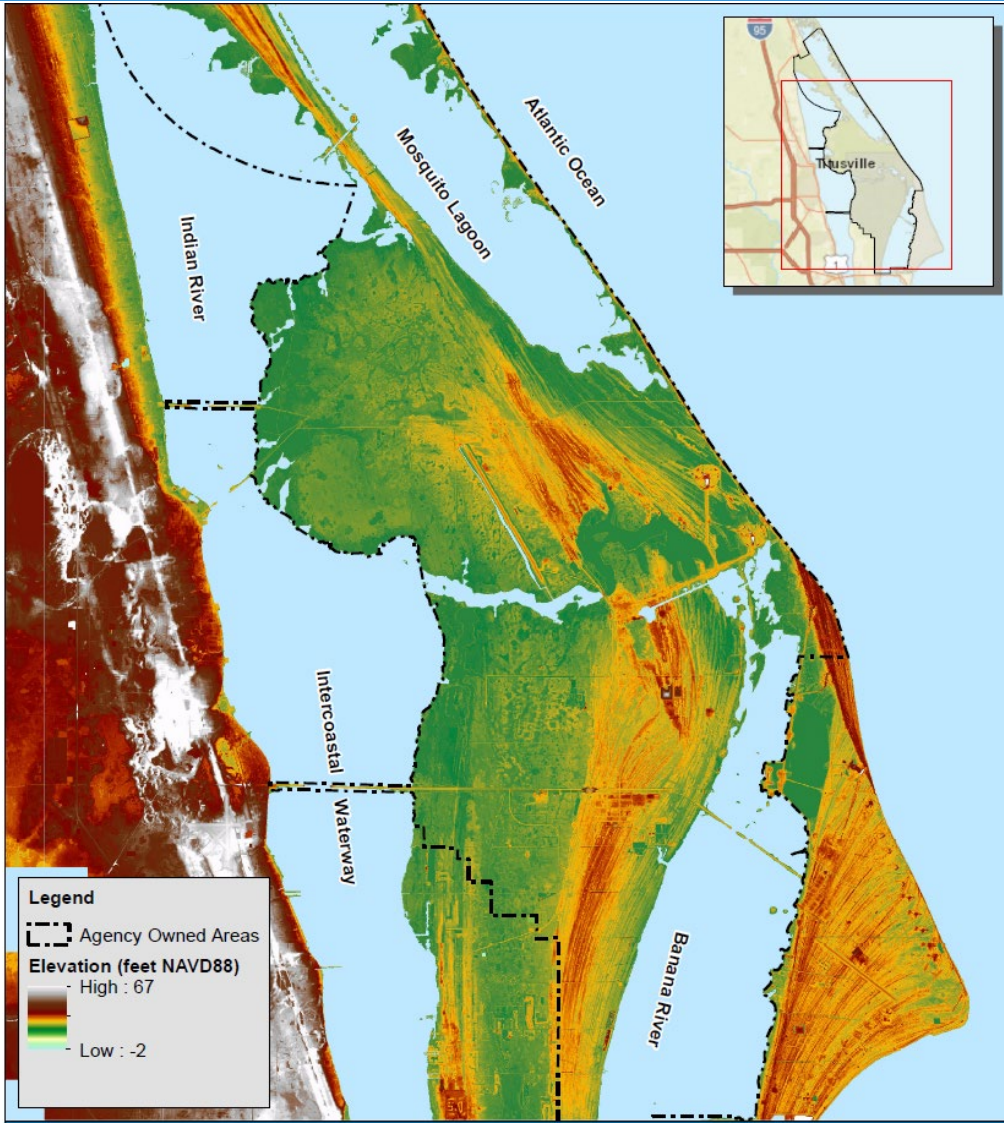


Coastal Resiliency Planning





Kennedy Space Center



- Build on previous work
- Collect & Summarize Climate Data
- Present Climate Projections
 - Projection timeframes 2029, 2059 and 2089
- Develop a Climate Adaptation Plan

Technical Approach

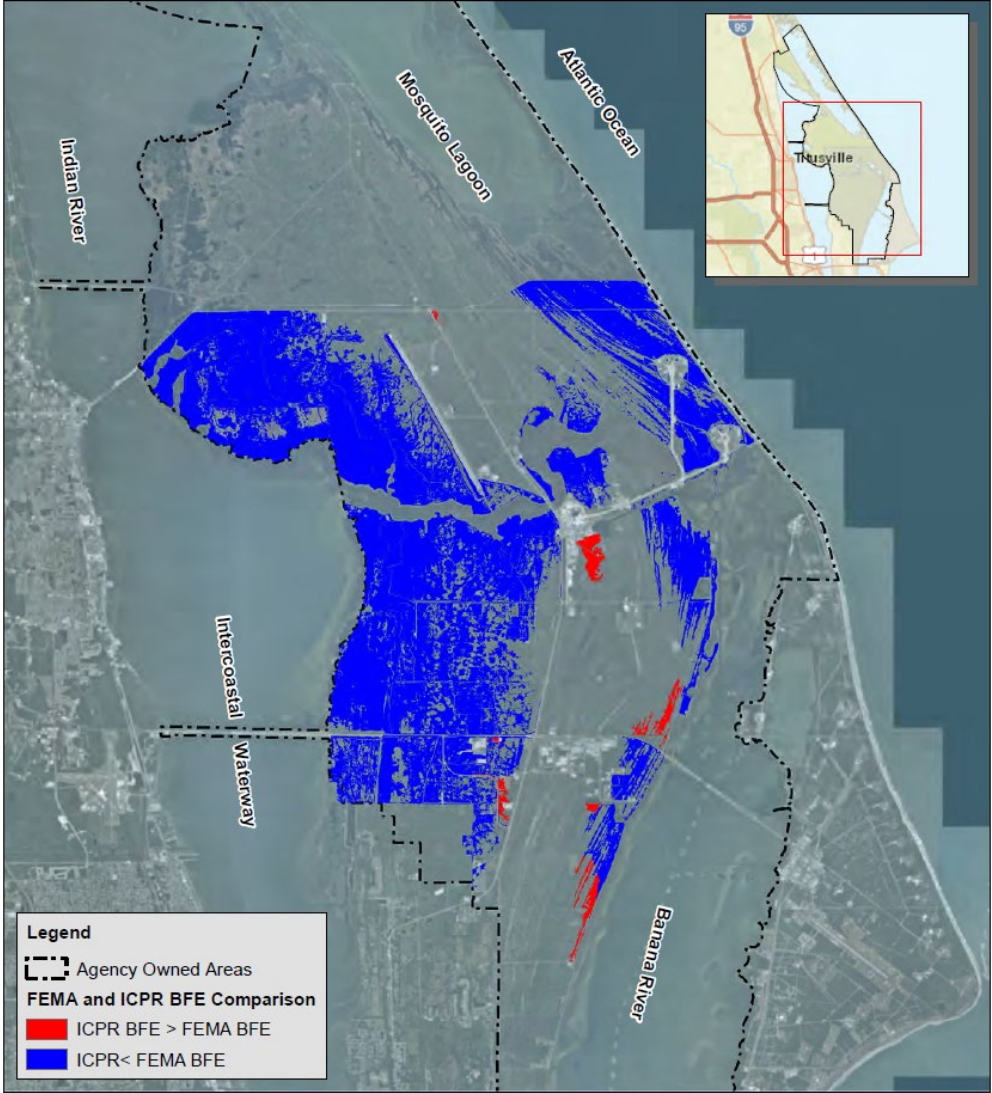
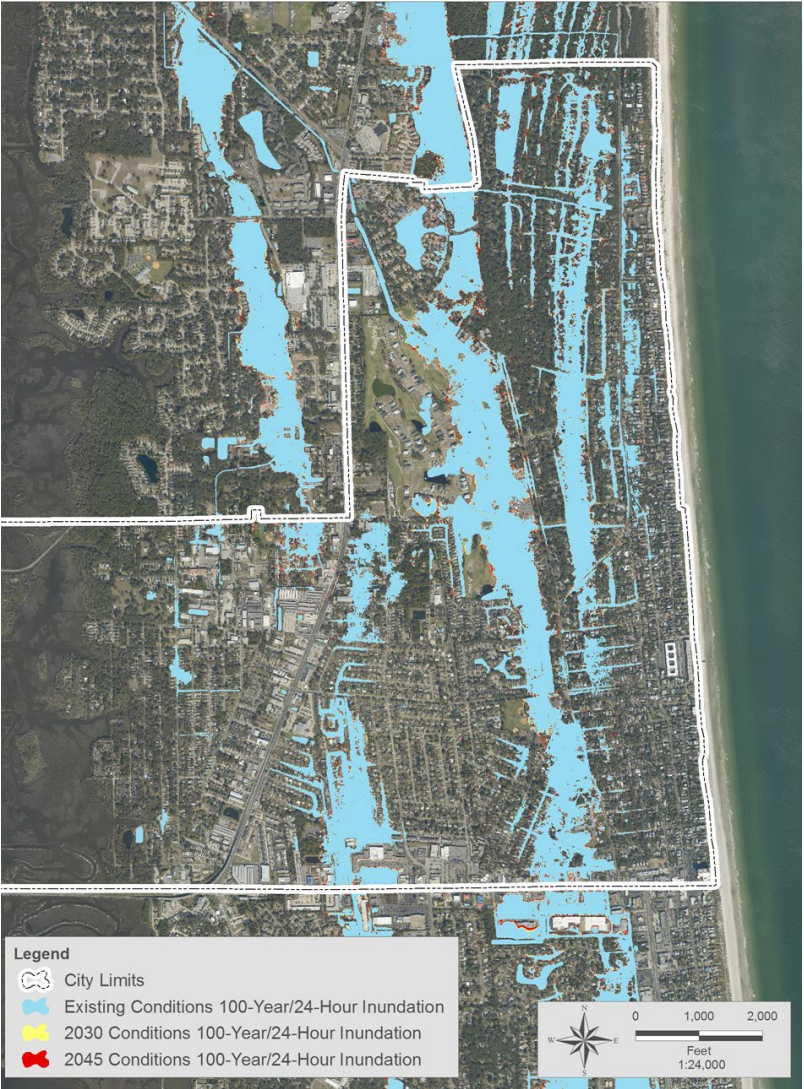
- 1) Develop Planning Horizons
- 2) Estimate Sea Level Rise
- 3) Assess Extent of Future Nuisance or “Sunny Day” flooding
- 4) Model Future Extreme Event Storm Surge/Wave & Rainfall Flooding
- 5) Assess Exposure, Vulnerability, and Risk
- 6) KSC only – Develop Climate Adaptation Plan

Changing Watershed Conditions

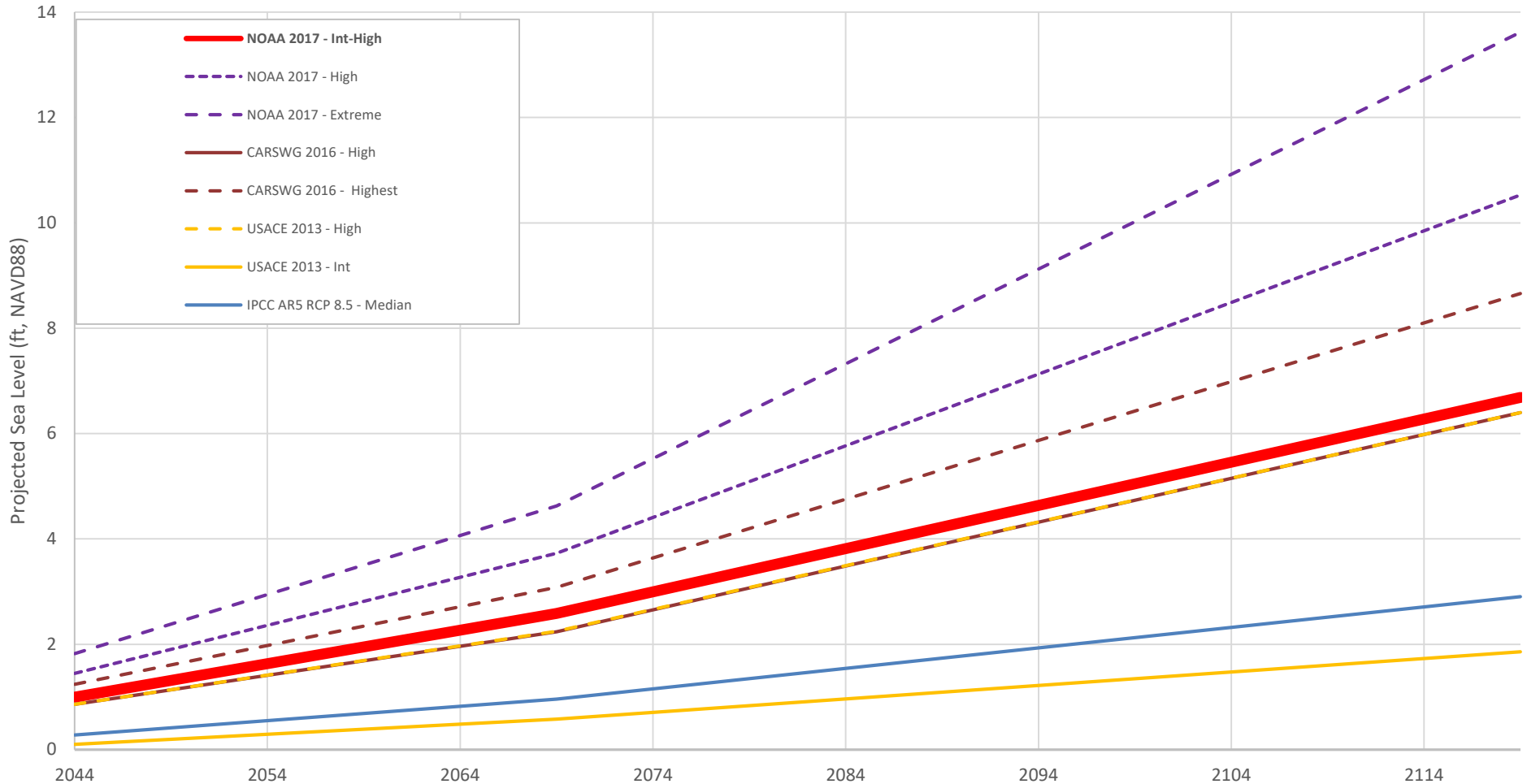
- Boundary Conditions
- Initial Conditions
- Soil Storage/Water Table
- Rainfall
- Redevelopment



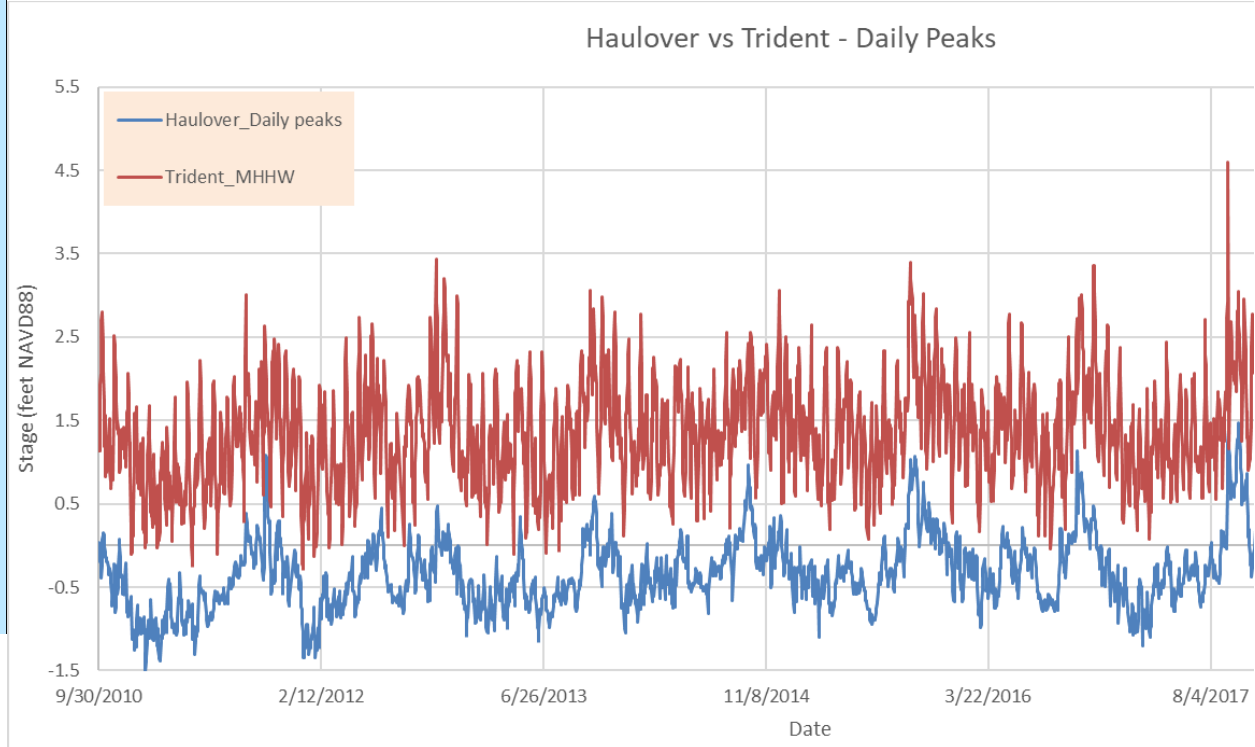
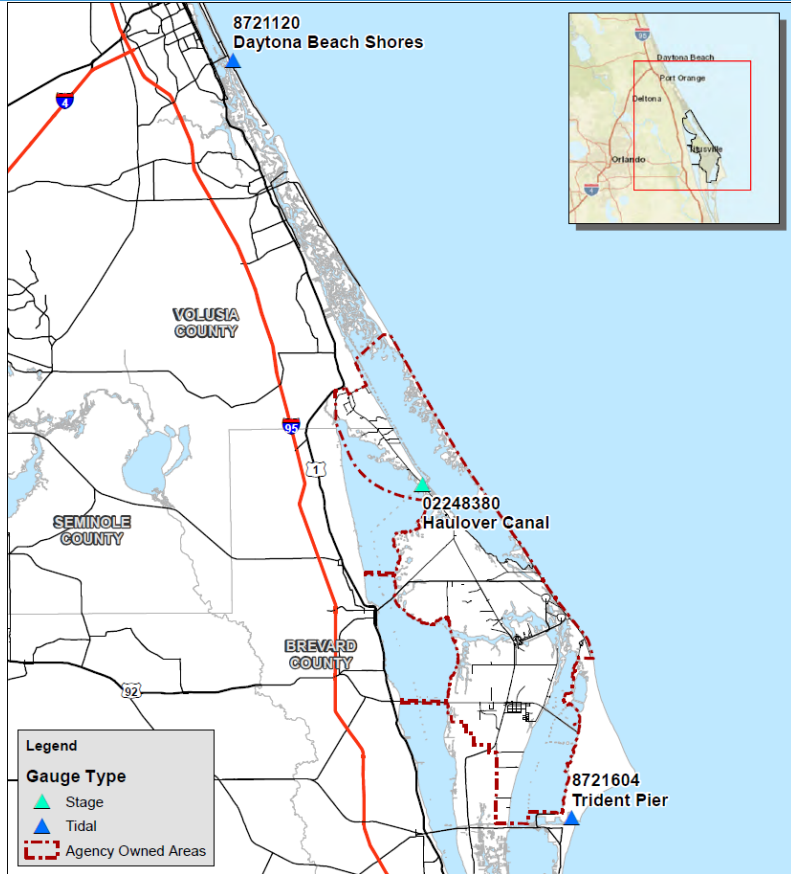
Increases in Stormwater Flooding Vulnerability



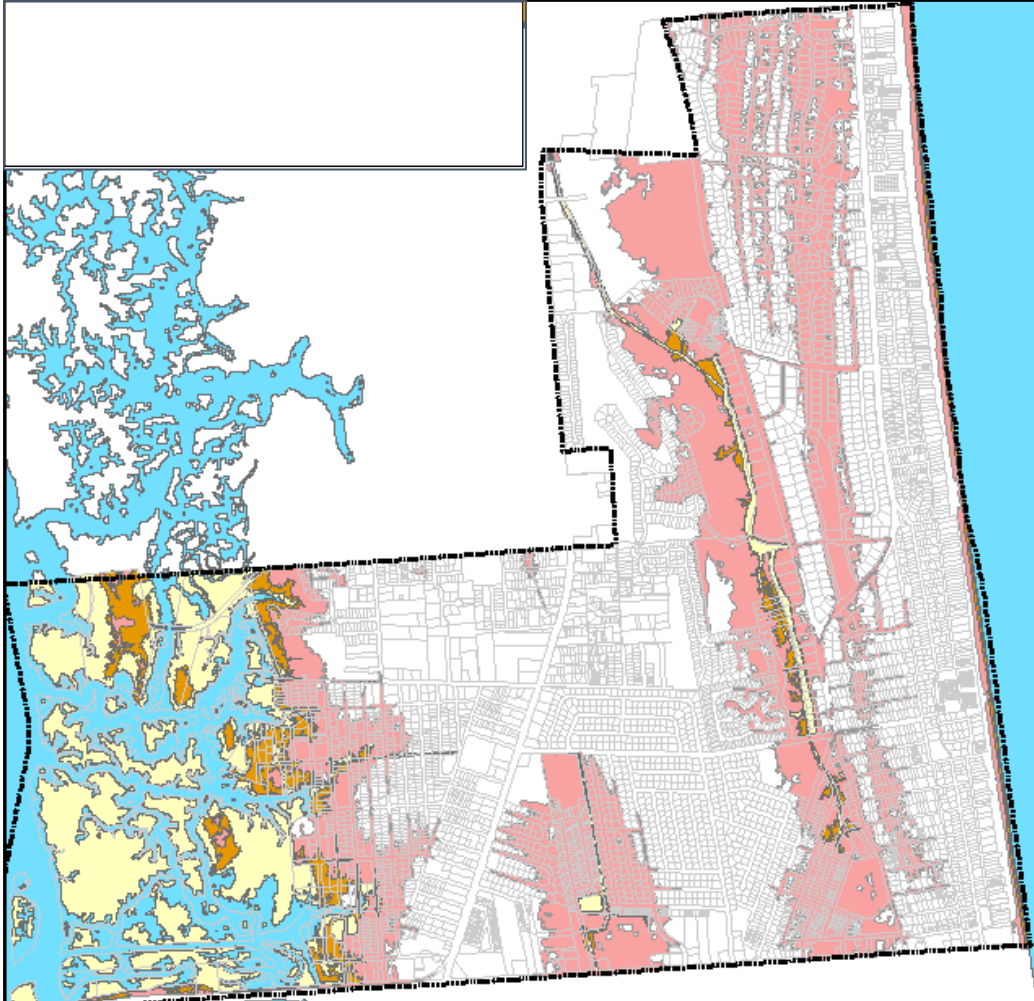
NOAA 2017 Intermediate High



Adjust for Lagoon Conditions

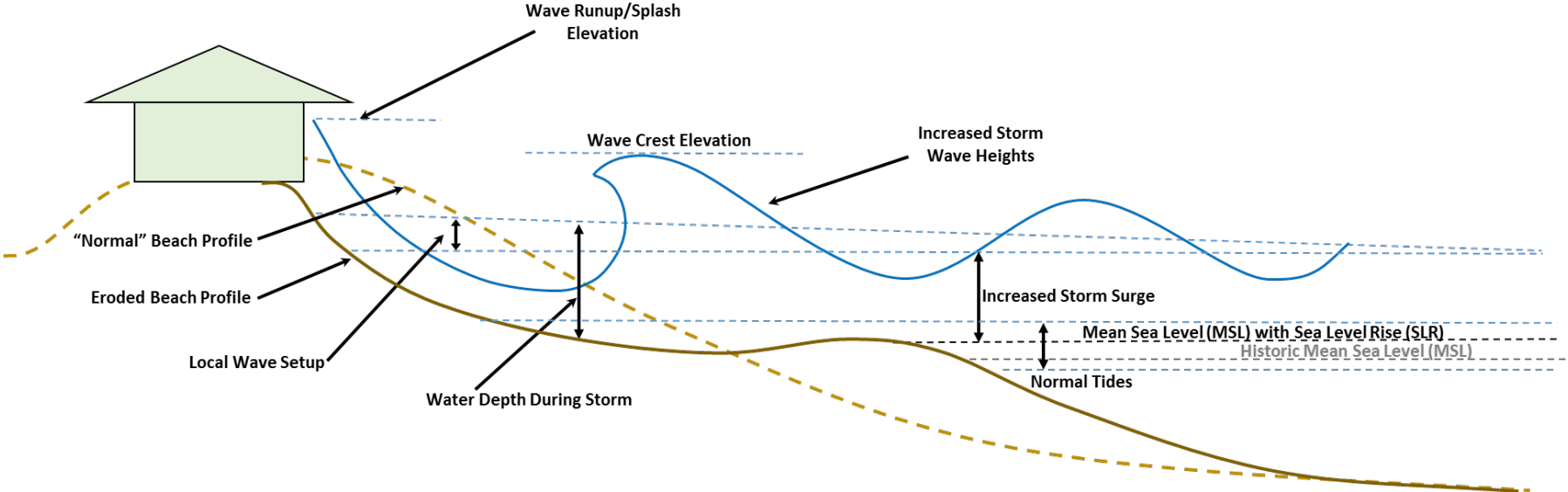


Sunny-Day Vulnerabilities



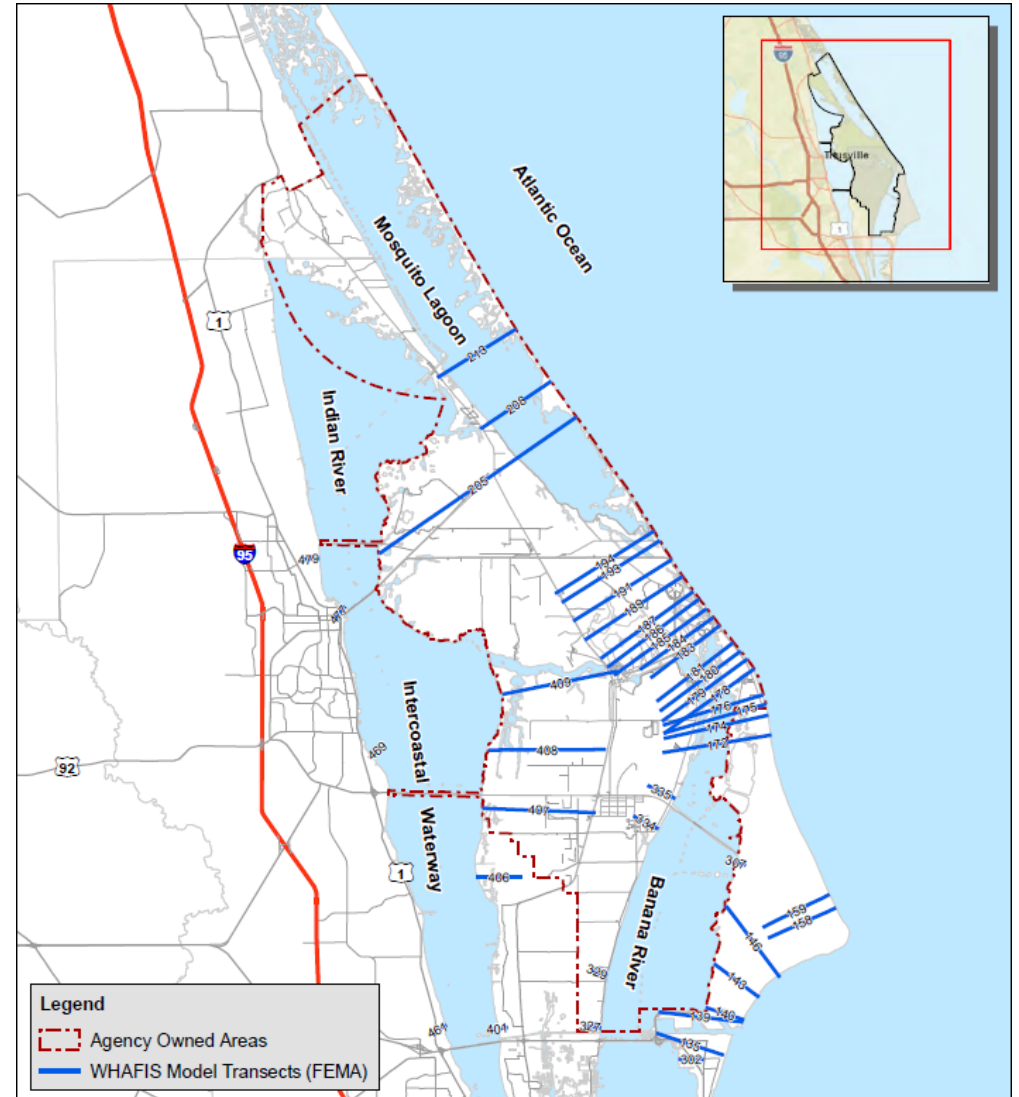
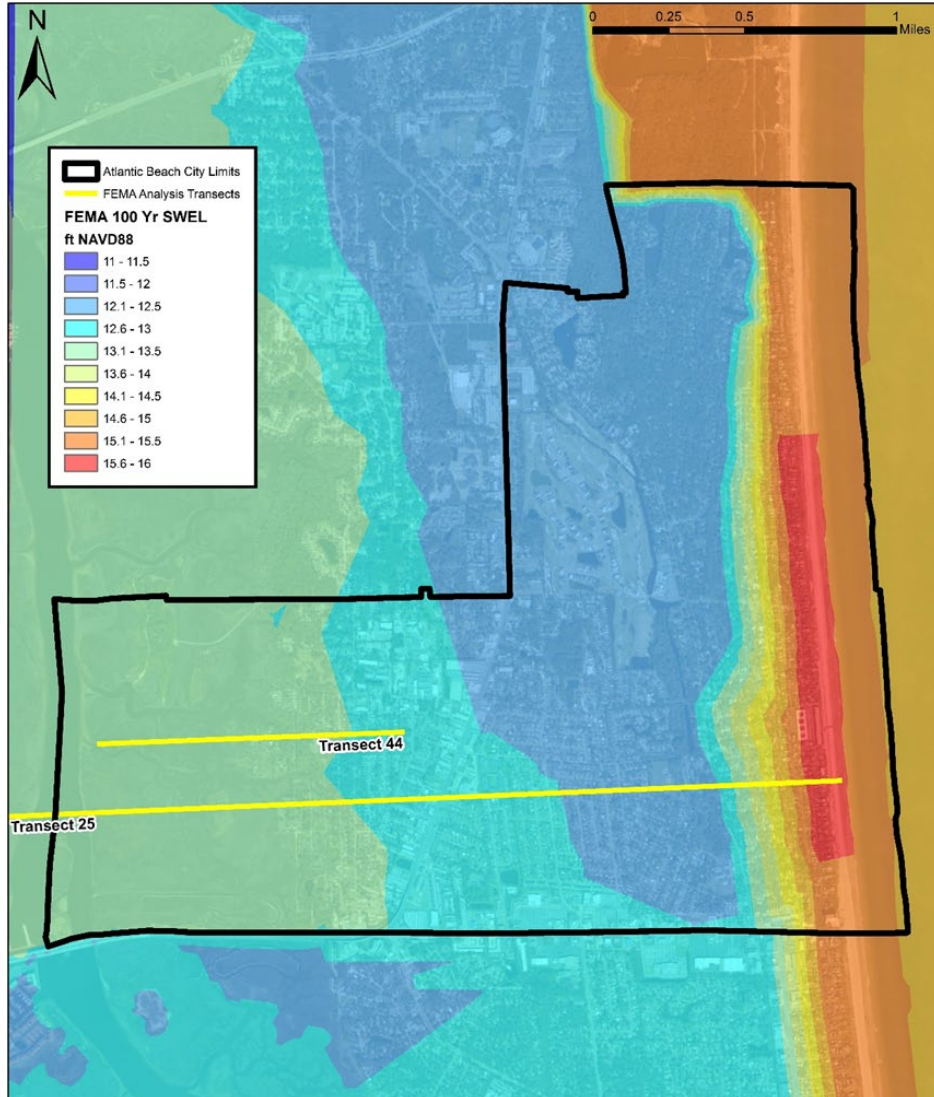
- For KSC, sunny-day vulnerabilities are mostly to low road bases

Components of Coastal Risk Assessment

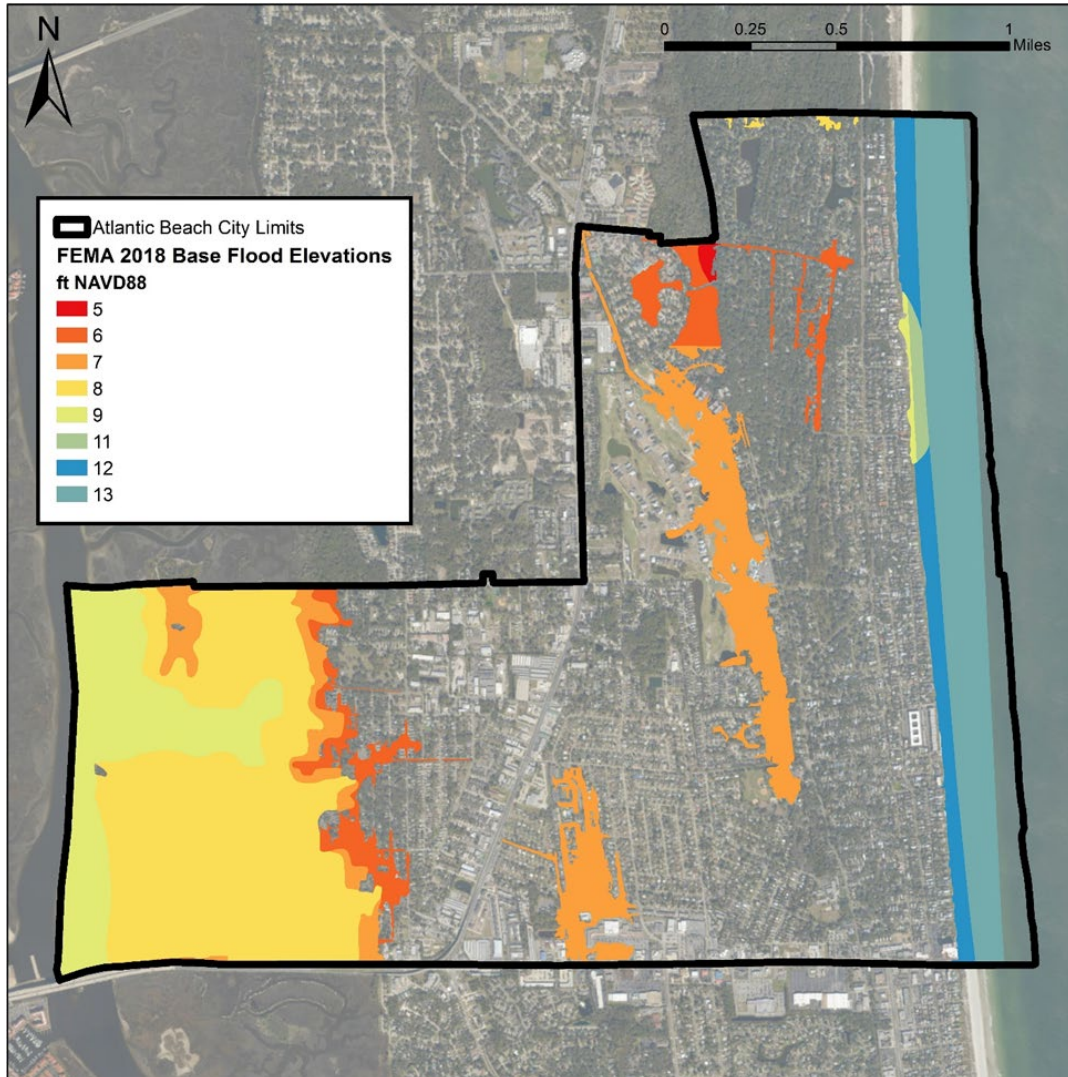


EFFECTS FROM:
Sea Level Rise
Storm Beach Erosion
Storm Surge
Wave Setup
Wave Runup/Splash

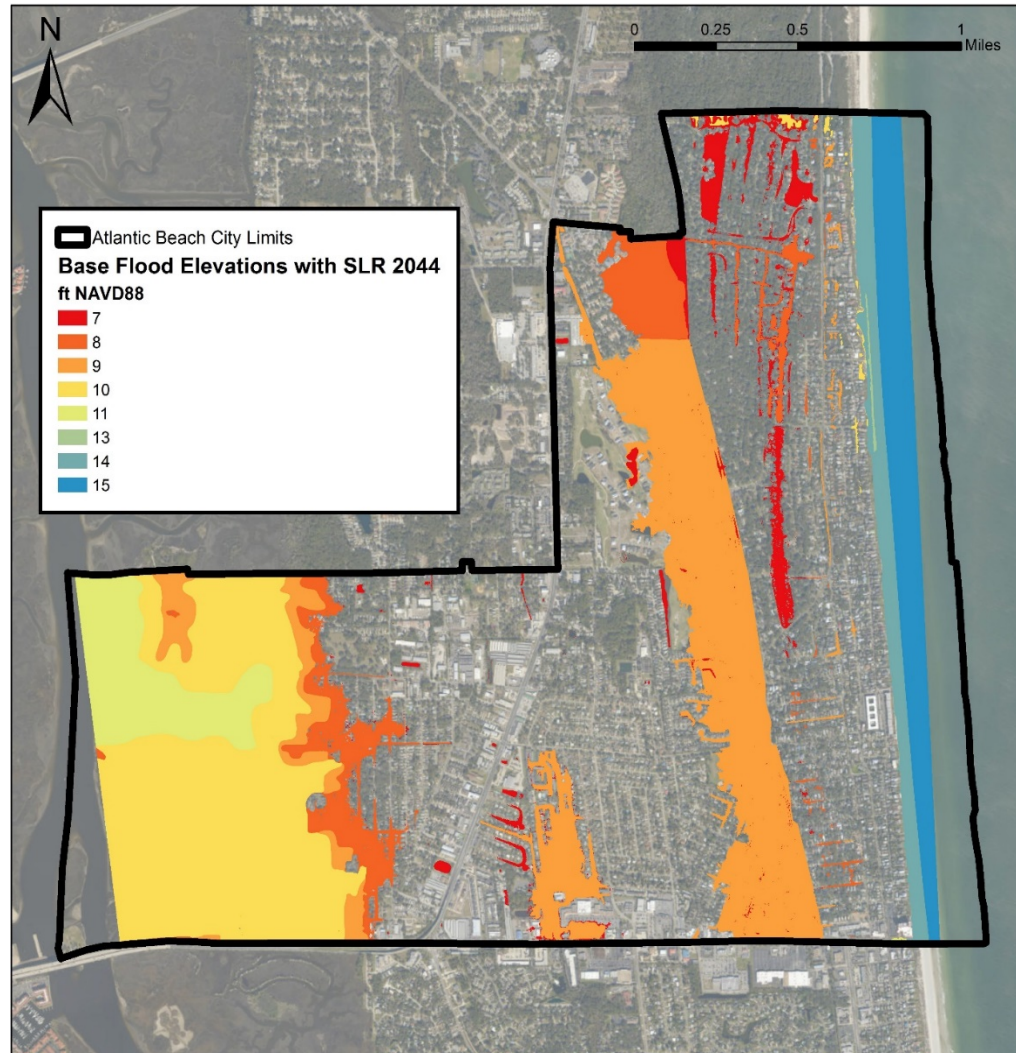
FEMA 100-Year SWEL and FIS Analysis Transects



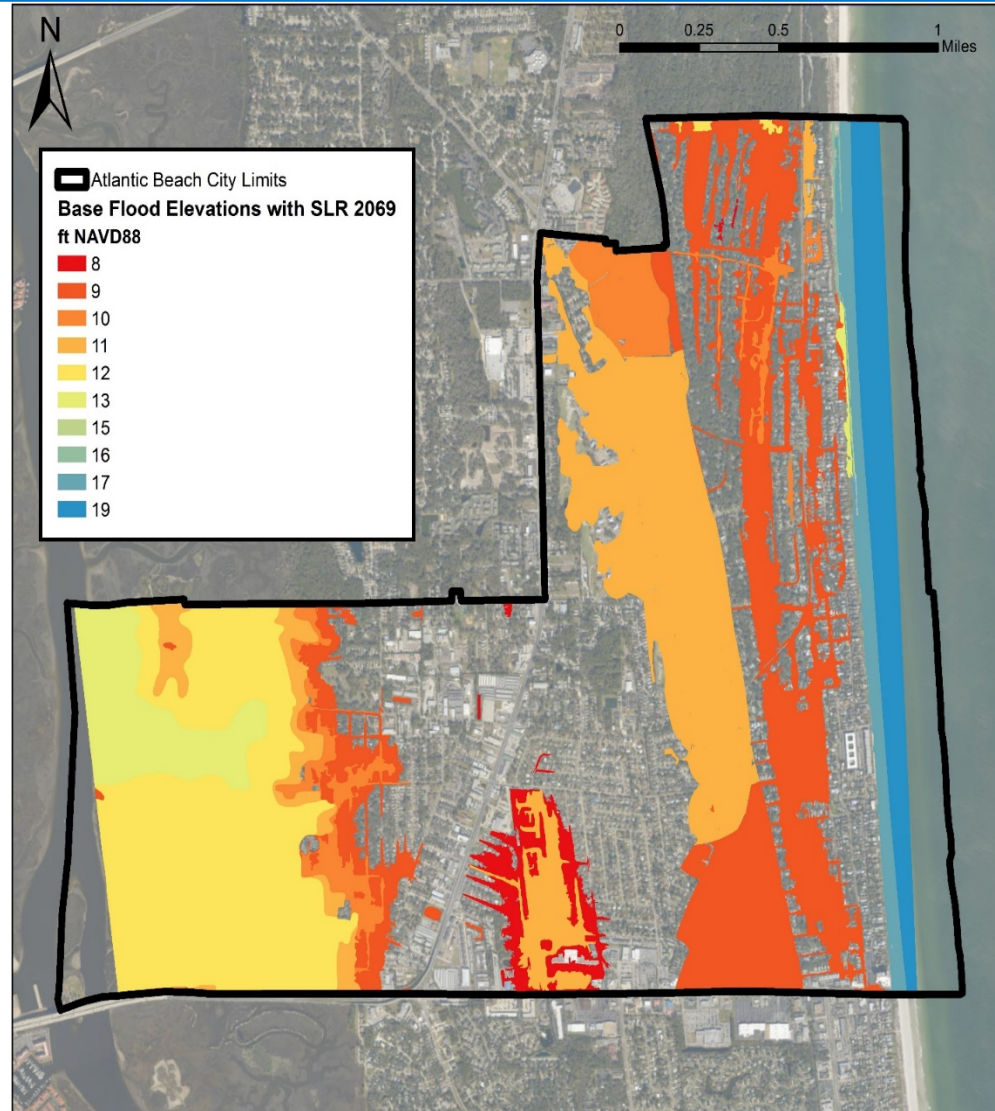
Atlantic Beach FEMA Base Flood Elevation



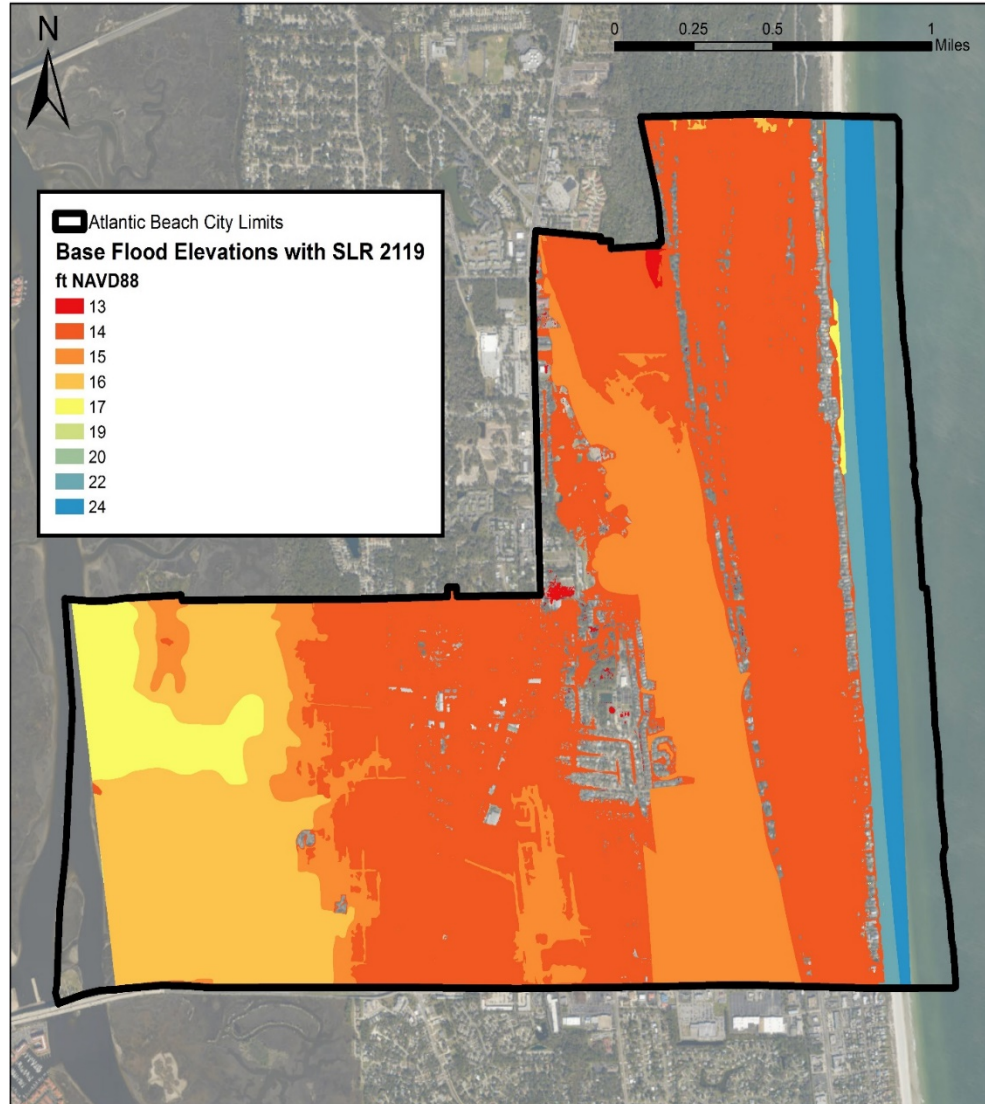
Atlantic Beach BFE Inundation with SLR Year 2044



Atlantic Beach BFE Inundation with SLR Year 2069



Atlantic Beach BFE Inundation with SLR Year 2119



KSC Vulnerabilities

- Facilities
 - 2029: Minimal
 - 2059: Moderate
 - 2089: Moderate
- Road Base Degradation
 - 2029: Minor
 - 2059: Moderate
 - 2089: High
- Major Arterial Flooding
 - 2029: Moderate
 - 2059: High
 - 2089: High

Takeaways

- Screen to determine the primary vulnerabilities
- Wave setup/runup is usually more important
- Adaptation measures
 - Less expensive – decade(s) of protection
 - More expensive – additional decades of protection
 - Retreat/very expensive