

# Sea Level Rise Planning Horizons and Projections

CAC/TCC Meeting  
February 18, 2020



# Planning for Sea Level Rise

Conditions resulting from climate change have included higher temperatures, increased precipitation and/or severe drought, and an overall rise in sea level worldwide.

Florida is on the front lines of sea level rise & coastal inundation exposure:

- Nation's second-most extensive coastline (1,350 miles)
- Many highly developed coastal areas
- Many low-lying areas already subject to recurring tidal flooding



# Collaboration

To build resiliency against flooding and sea level rise, the River to Sea TPO partnered with the following agencies to assess impacts:

- East Central Florida Regional Planning Council
- Flagler County
- Florida Dept. of Environmental Protection
- Florida Dept. of Transportation
- Northeast Florida Regional Council
- University of Florida GeoPlan Center
- Volusia County



**NORTHEAST FLORIDA  
REGIONAL COUNCIL**



# Resiliency Directives

- FAST Act: expands the focus on the resiliency of the transportation system and requires strategies to reduce the vulnerability of existing transportation infrastructure to natural disasters [23 U.S.C. 134(d)(3)& (i)(2)(G)]
- Florida Statutes, Section 163.3178 includes sea level rise as one of the causes of flood risk that must be addressed in “redevelopment principles, strategies, and engineering solutions” to reduce flood risk

# Strategic Approaches

- Retreat - limits and discourages development in vulnerable areas and plans for relocation or removing existing structures
- Accommodation - continues development but requires new standards and regulations
- Protection - strategies that protect people, infrastructure and property from sea level rise impacts often implemented through engineering solutions

## GOAL

Increase the ability of local and regional stakeholders to implement resiliency and climate adaptation strategies across disciplines.



# Coastal Flooding/Surge Modeling Methods

## Coastal Flood Hazards Model

- Utilizes FEMA's methodology for developing Flood Insurance Rate Maps, where flood frequency and flood magnitude (or depth) are used to define flood hazard
- Relies on the 100-year Stillwater elevation and Stillwater depth to identify inland impacts of storm surge



## Coastal Surge Model

- Couples storm surge and wave modeling functionality
- Develops an overall estimate of combined coastal wind and flood losses for a single hurricane event

# Sea Level Rise Impacts



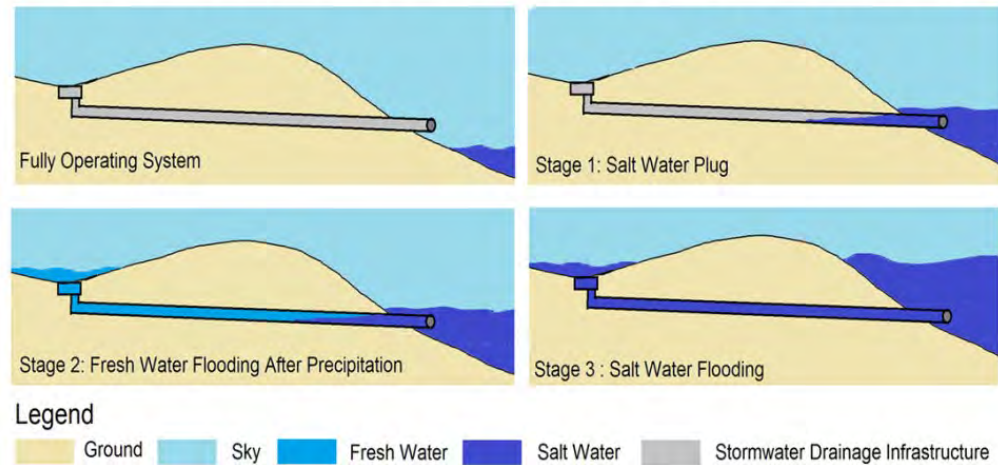
# Areas of Assessment

- Designated Evacuation Routes
- Major Roadway Network
- Transportation Facilities
- Parcel Infrastructure/Land Uses
- Public Works Facilities
- Fleet Storage Facilities
- Shelters
- Emergency Management Centers
- Sidewalks and Trails
- Other Critical Facilities

# Sea Level Rise Impacts to Stormwater Systems

- Increased flooding of transportation infrastructure (tidal and heavy rainfall)
  - Loss of roadway capacity
  - Loss of evacuation routes
  - Degradation of infrastructure
  - Loss of utilization/access to facilities
- Compromised stormwater systems
  - Limited stormwater storage (ponds and groundwater)
  - Malfunctioning canals and drainage

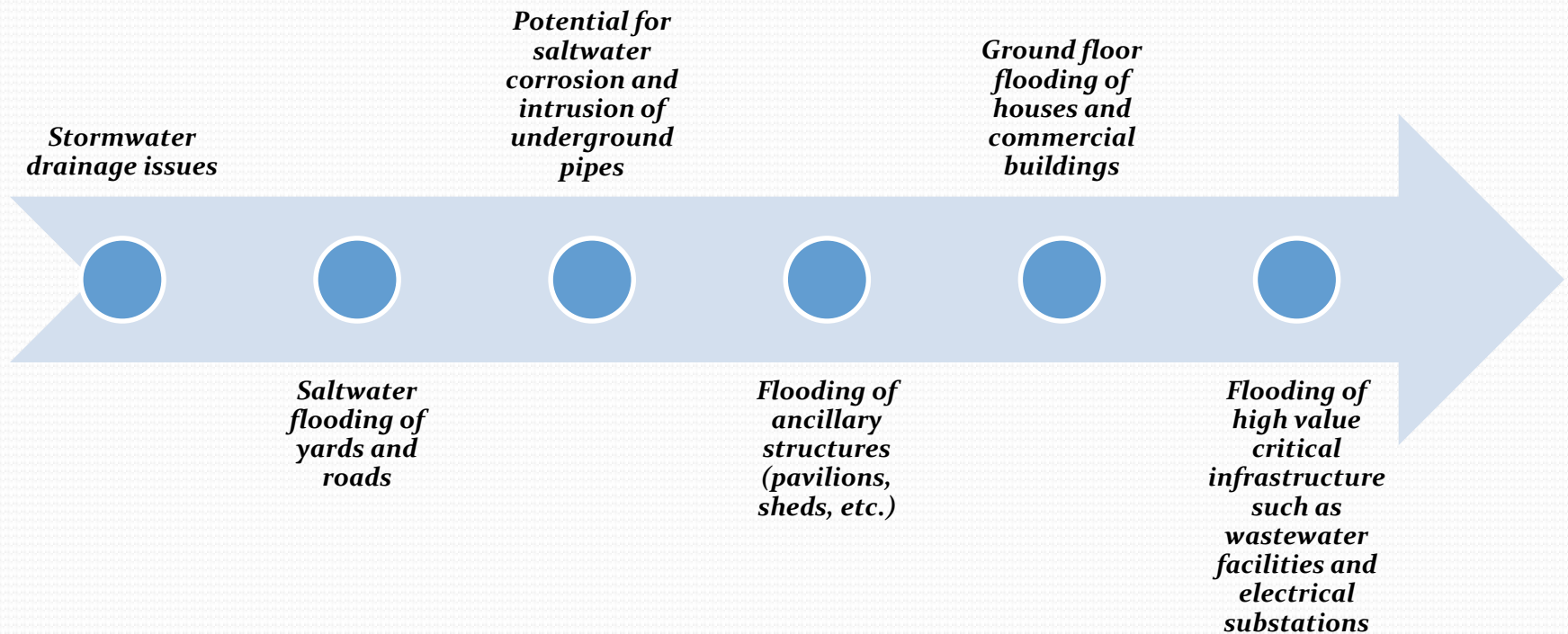
Figure 1: Stages of Stormwater Infrastructure Failure due to Sea Level Rise



**Planning and solutions take time!**



# General Timeline of Sea Level Rise Impacts on the Built Environment



# Financial Exposure

## Assessed Value Exposure of Flooding By Scenario



This table includes all parcels, built and unimproved

# Implementation: Policies and Procedures

Incorporate Policies and procedures for addressing SLR and future flooding into 2045 LRTP and other plans

Adopt a planning horizon and projection rate curve for the 2045 LRTP

Ensure policies, procedures and plans of TPO and County/City Transportation are in line with federal agencies' resiliency requirements to receive funding

Collaborate with local and regional stakeholders to implement resiliency strategies

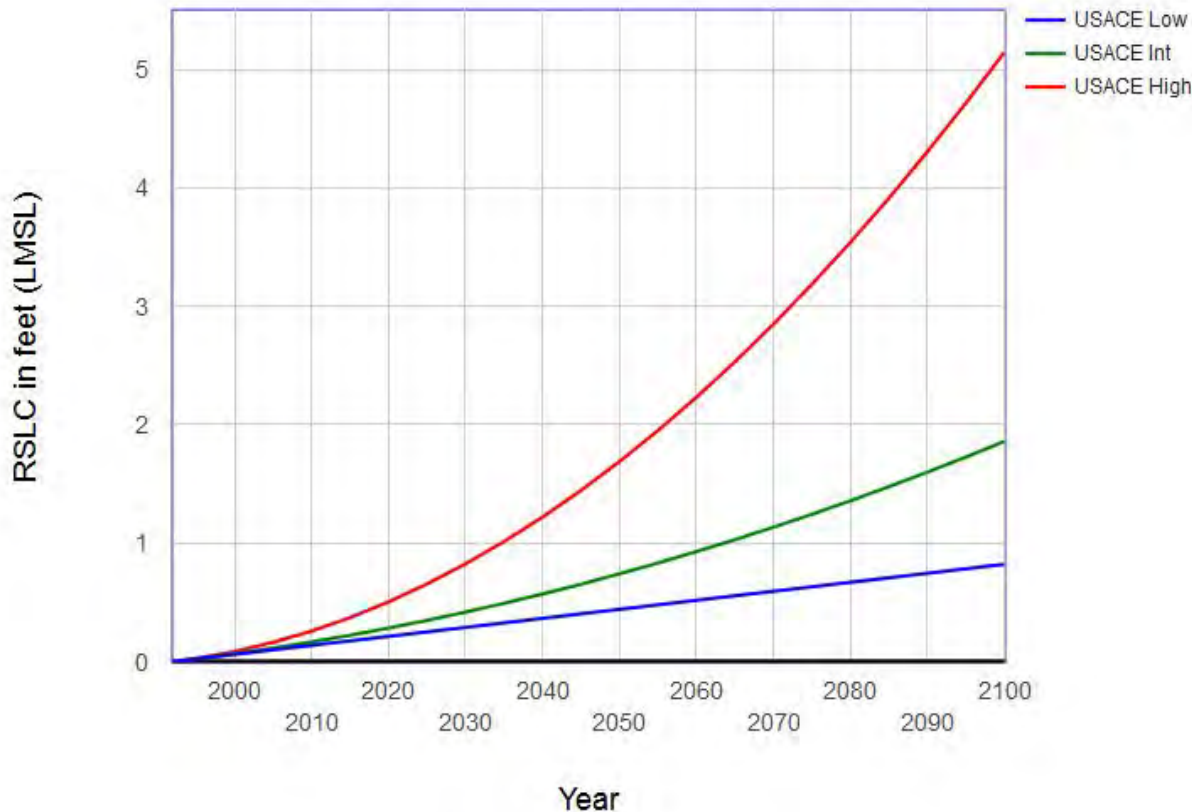
# Planning Horizons

- Resilient Volusia County and Resilient Flagler County Assessments were based on Sea Level Rise Planning Horizons (parameters) of 2040, 2070, and 2100
- The River to Sea TPO is focusing on the 2040 Planning Horizon to align with the 2045 Long Range Transportation Plan (LRTP), which also addresses future transportation needs for a 20 year period

# Sea Level Rise Projections

8721120, Daytona Beach Shores, FL  
NOAA's Published Rate: 0.00761 feet/yr

Relative Sea Level Change Projections - Gauge: 8721120, Daytona Beach Shores, FL (05/01/2014)



USACE SLR Projections  
Feet of RSLR (relative to MSL)  
Daytona Beach Shores, FL

	Low	Intermediate	High
2040	0.37 ft	0.57 ft	1.22 ft
2070	0.59 ft	1.14 ft	2.85 ft
2100	0.82 ft	1.86 ft	5.15 ft



# Next Steps

- Adopt Sea Level Rise Planning Horizon and Projection Rate Curve in March 2020
- Incorporate in 2045 Long Range Transportation Plan (LRTP)