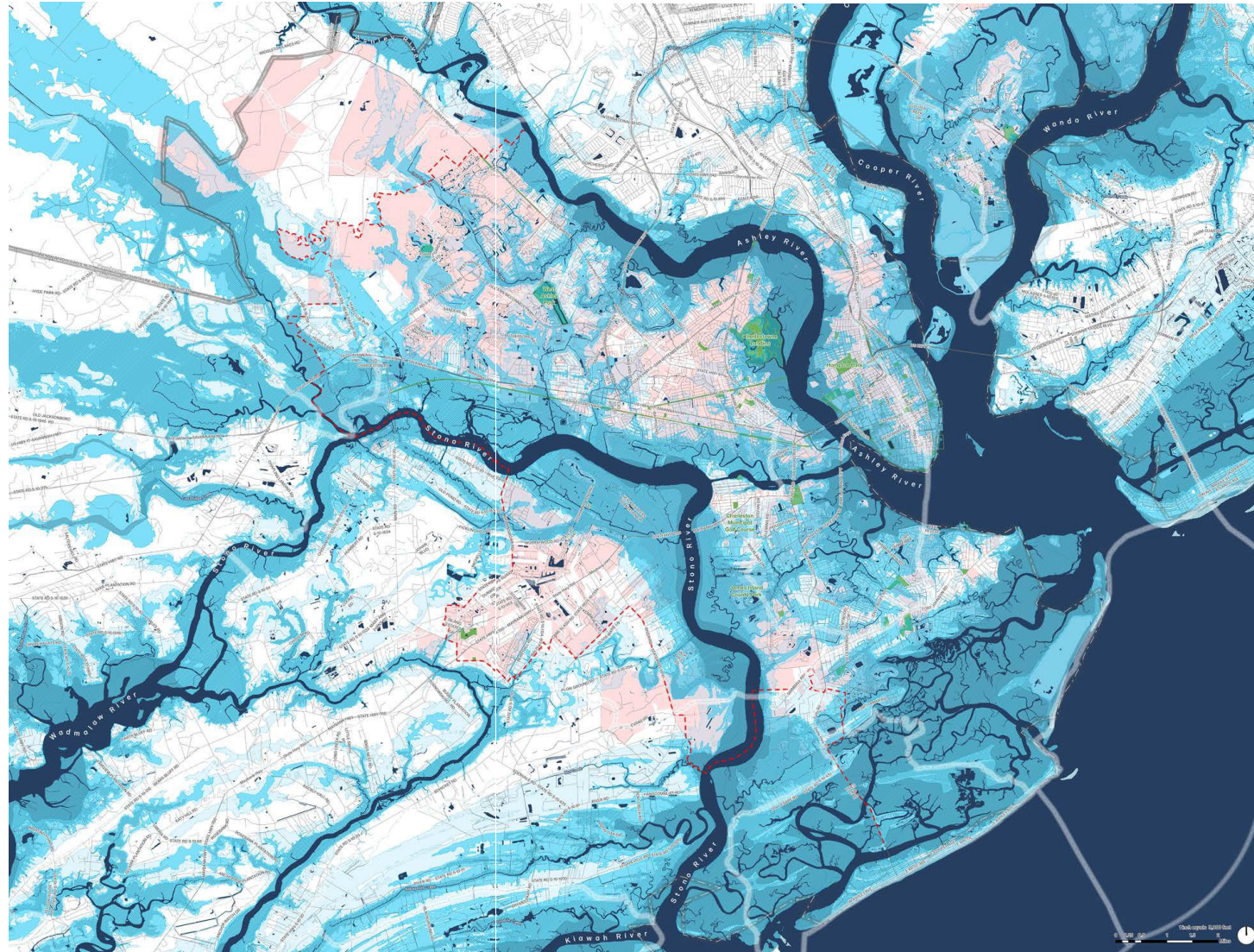
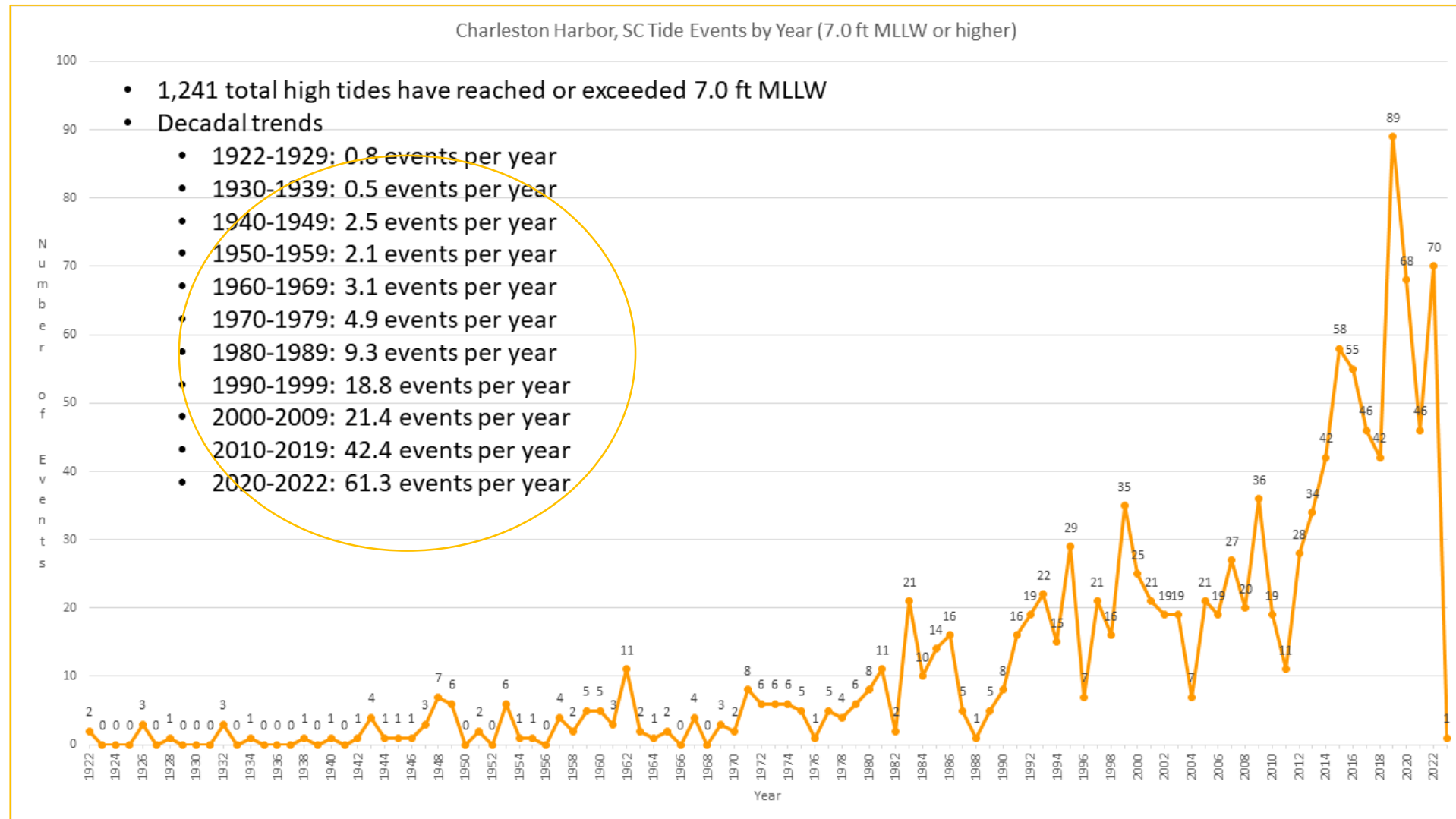


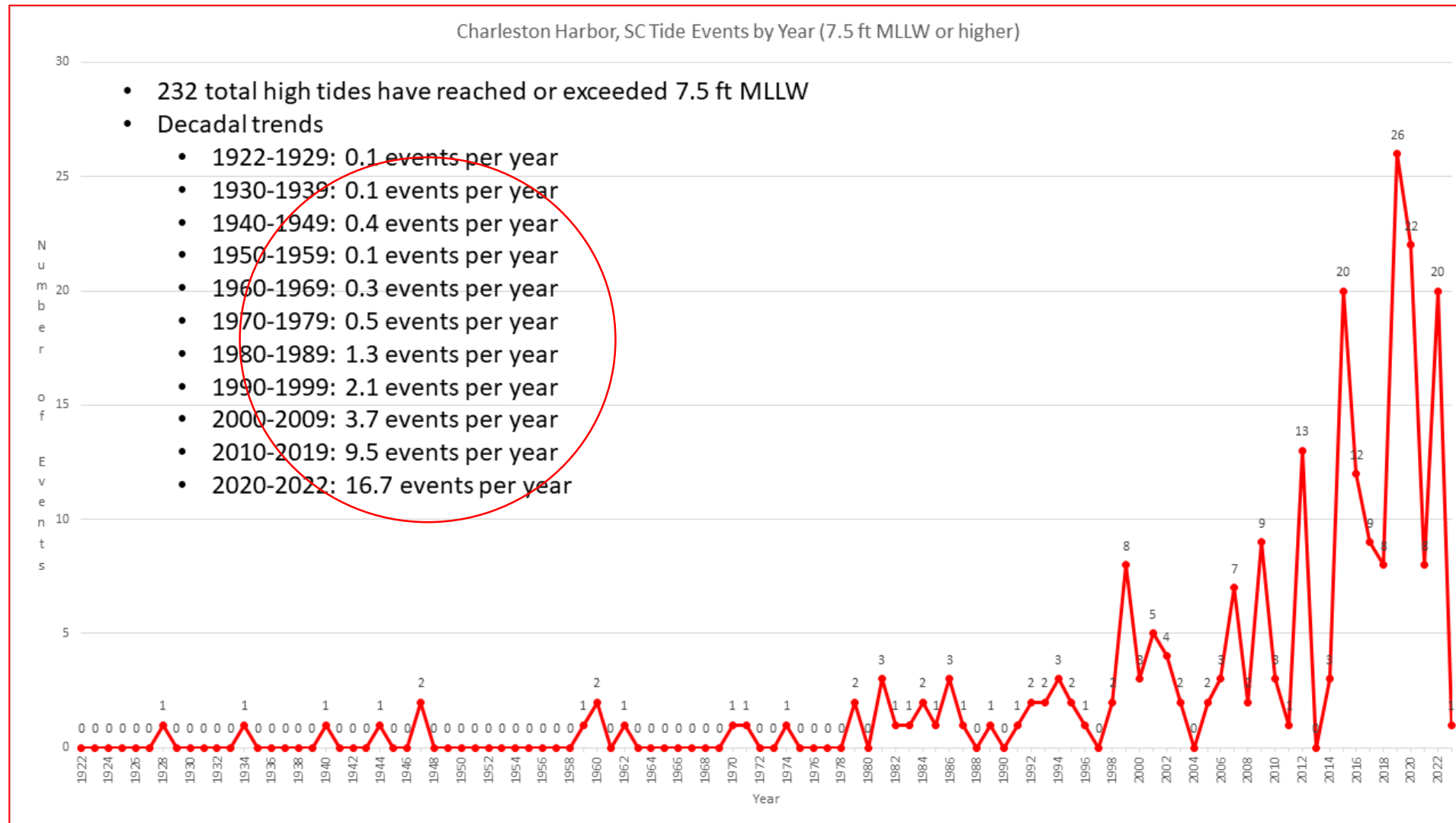
**Charleston: 155 sq miles, 57% of City in floodplain, all flood hazards (coastal, fluvial, pluvial, groundwater, compound). SLR?**



# Minor tidal flooding

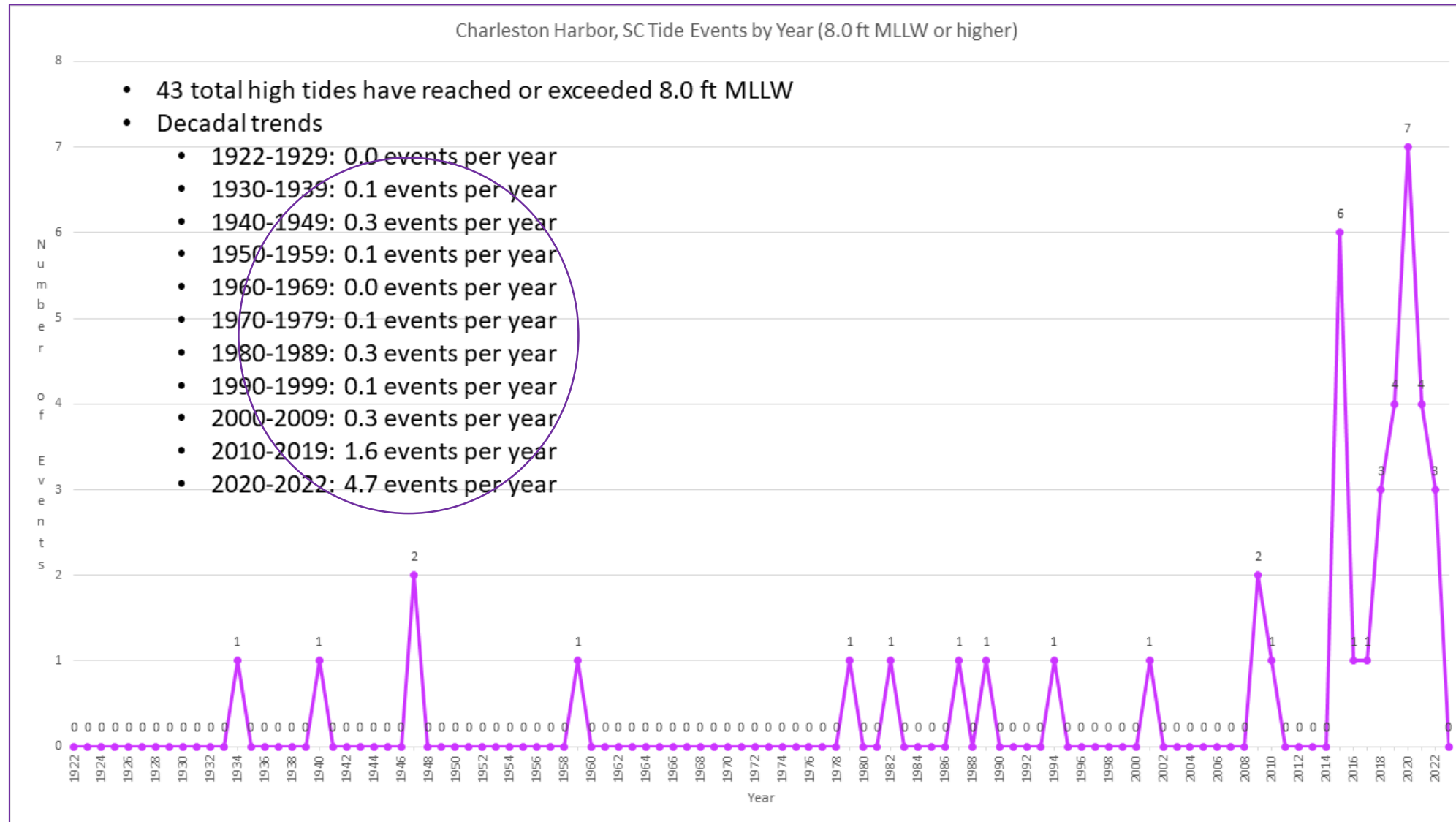


# Moderate tidal flooding





# Major tidal flooding



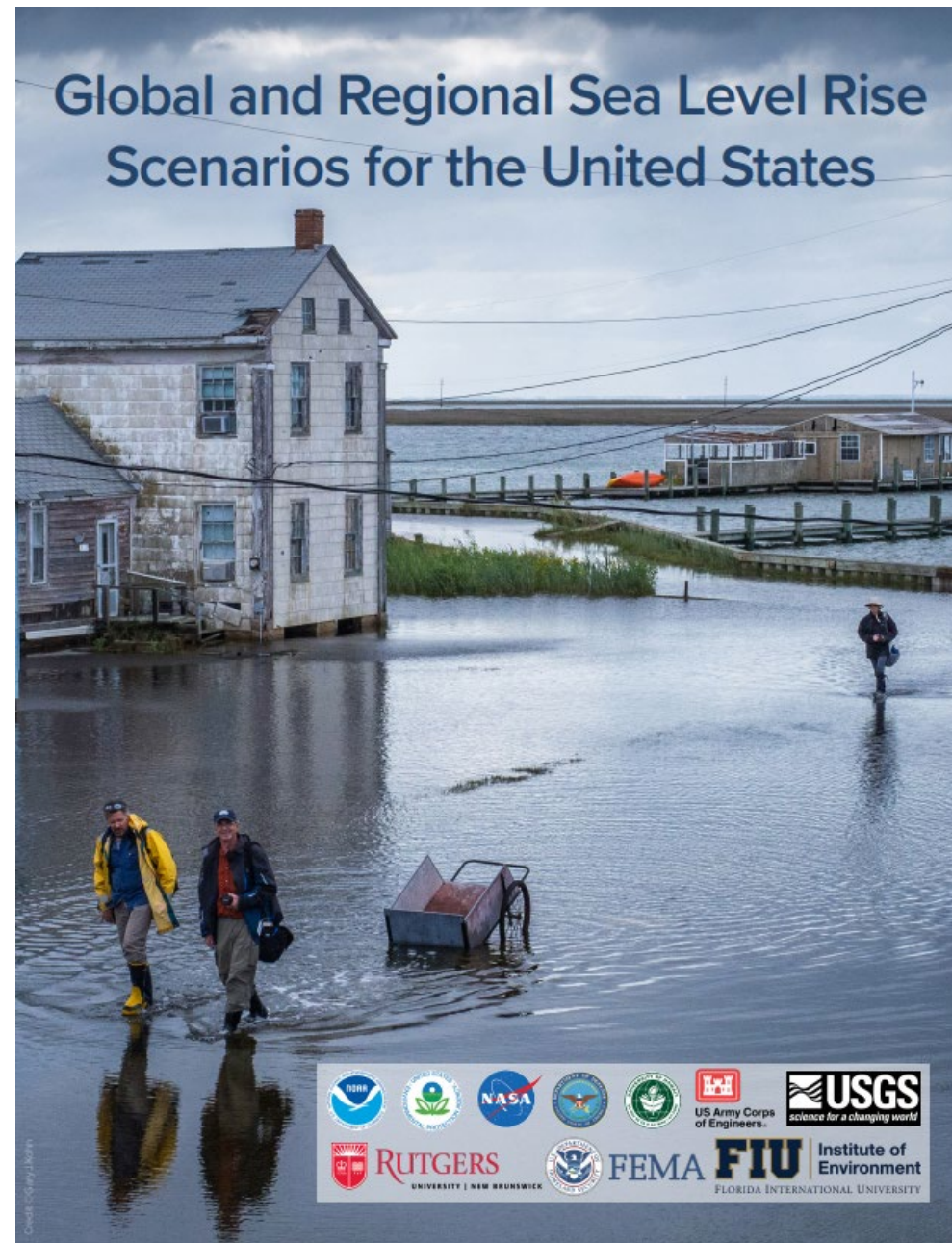
Seas will rise as much over next 30 years as they have over last 100.

High confidence by 2050:

- Gulf Coast: 14"-18"
- Southeast Atlantic: 10"-14"

By 2100: 2' to 7'?

Tidal event occurrence with SLR?



# Projects, projects, projects...

- Low Battery Rehabilitation
- Spring-Fishburne
  - Ehrhardt drop shaft and tunnel
  - CMD Pump station upgrade
- King-Huger storage, drainage capacity and pump
- Concord Pump Station upgrade
- Brick Arches rehabilitation
- Forest Acres
- Dupont-Wapoo Basin improvements
- Church Creek
- Windermere Drainage Improvements
- Barberry Woods / Johns Island
- Check valves (tidal restriction)
- Drainage maintenance: ditches, outfalls



Collection

# 2023 Flooding and Sea Level Rise Strategy Update (Draft)

City of Charleston

Get started



1 How to Navigate this Site (Draft)



2 Executive Summary (Draft)



3 Strategic Plan



4 Sea Level Rise and Flooding Introduction (Draft)



5 Infrastructure Projects



6 Land Use



7 Governance



8 Resources (Draft)



9 Outreach and Partnerships (Draft)



# Comprehensive, Integrated Water Plan

- Project Underway, Completion +/- Q4 2023.
- **Water Plan, City-wide**
- **All Water Hazards**
- Land use, drainage, adaptation, policy, prioritization, strategies
- 25 yr planning horizon
- 14" - 18" SLR
- Zones of inquiry: hydrologic basin / floodplain / neighborhood, edge

Team Lead & Owner's Agent



Water Plan Lead





# All Hazard Vulnerability Analysis, 2019

**Physical and social vulnerability:** surge, tidal, rainfall, sea-level rise, earthquake, dam failure, heat, hazmat.

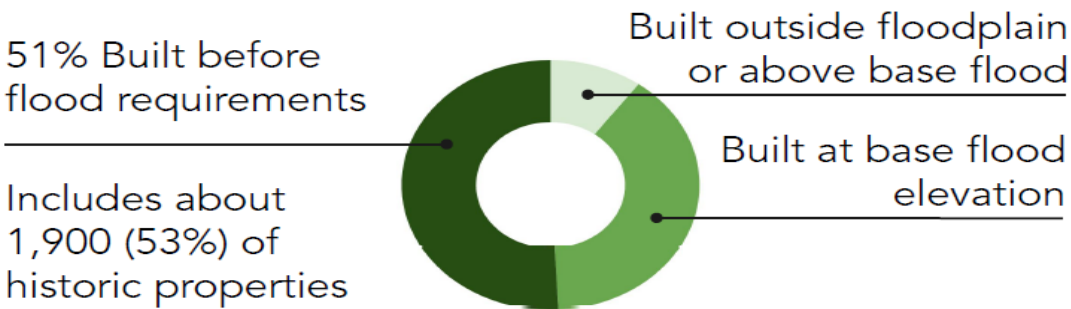
## Key Finding 1

Flooding, storm surge, and earthquakes drive vulnerability citywide

	Floodplain Inundation	Storm Surge	Earthquake
Businesses	71%	84%	46%
Homes	70%	87%	39%
Critical Facilities	59%	72%	88%

## Key Finding 2

The ability to cope with flood inundation is a main driver of vulnerability



# NOAA Category 3 Storm Surge

Virtually all of the Peninsula is within the NOAA max category 3 storm surge, with the exception of Laurel Island.

map sources: NOAA

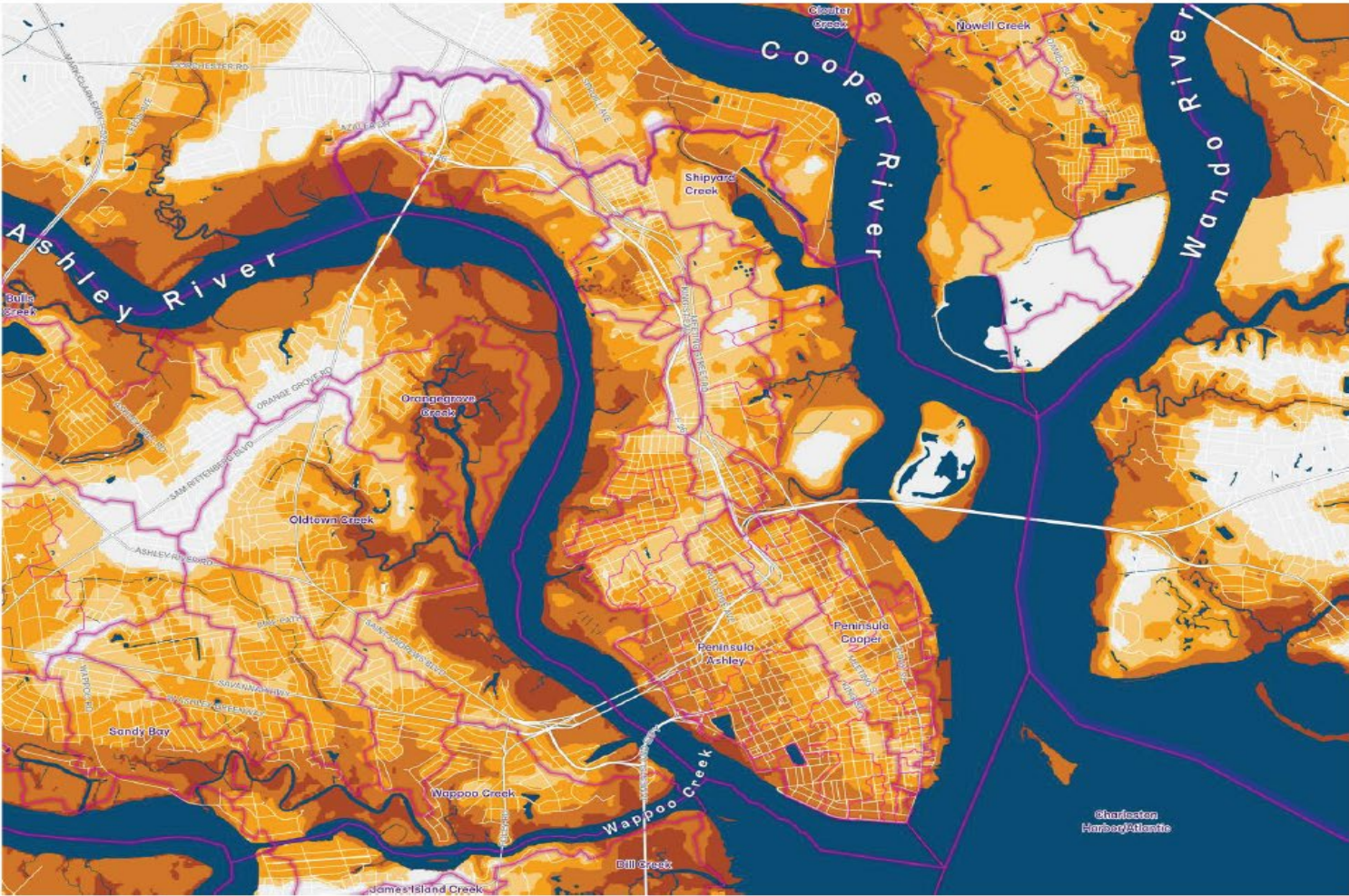
## Legend

### Cat 3 Max Storm Surge (Above Ground)

- <5 ft
- 5-10 ft
- 10-15 ft
- >15 ft

### Watersheds Neighborhood

- Project Watersheds
- Project Subwatersheds
- Urban Growth Boundary
- Water



# USACE 3x3x3 / Coastal Storm Risk Management feasibility study

April 2018, CSRM Study kickoff

April 2020, Tentatively Selected Plan (TSP)  
Public Comments: EIS, NBS, alignment

Fall 2020: EIS approved, stakeholders fund Discovery Analysis

Discovery Analysis Report (recommendations)

Sept 2021: Draft EIS, Optimized TSP

Sept – Dec 2021: SCSPA (Port) realignment

Dec 2021: Agency Decision Milestone (peer review)

Feb 2022: financial self certification, MOA on Historic and Cultural Mitigation, Programmatic Agreement on environmental mitigation

Feb – June 2022: USACE Division and HQ review, signed “Chief’s Report”

Dec 2022: US Congress authorized and funded next phases of project:

- Pre-construction Engineering and Design (PED)
- Construction (only if PED is successful)



# USACE Recommended (Feasibility) Plan, with EIS

8 mile storm surge structure @ 12' NAVD 88

Tentative alignment – all on public property -- at edge of peninsula. SCPA facilities now inside protection.

Added nature-based features (more needed)

10 pumps (impoundment and overtopping)

\$1.3b, cost shared 65%-35%. City net cost: +/- \$250m

10.8 – 1 benefit-cost ratio

Design goal: to replicate and extend Low Battery around peninsula.

Overall goal: design and eventually construct a structure acceptable to Charleston with Feds paying 65%.

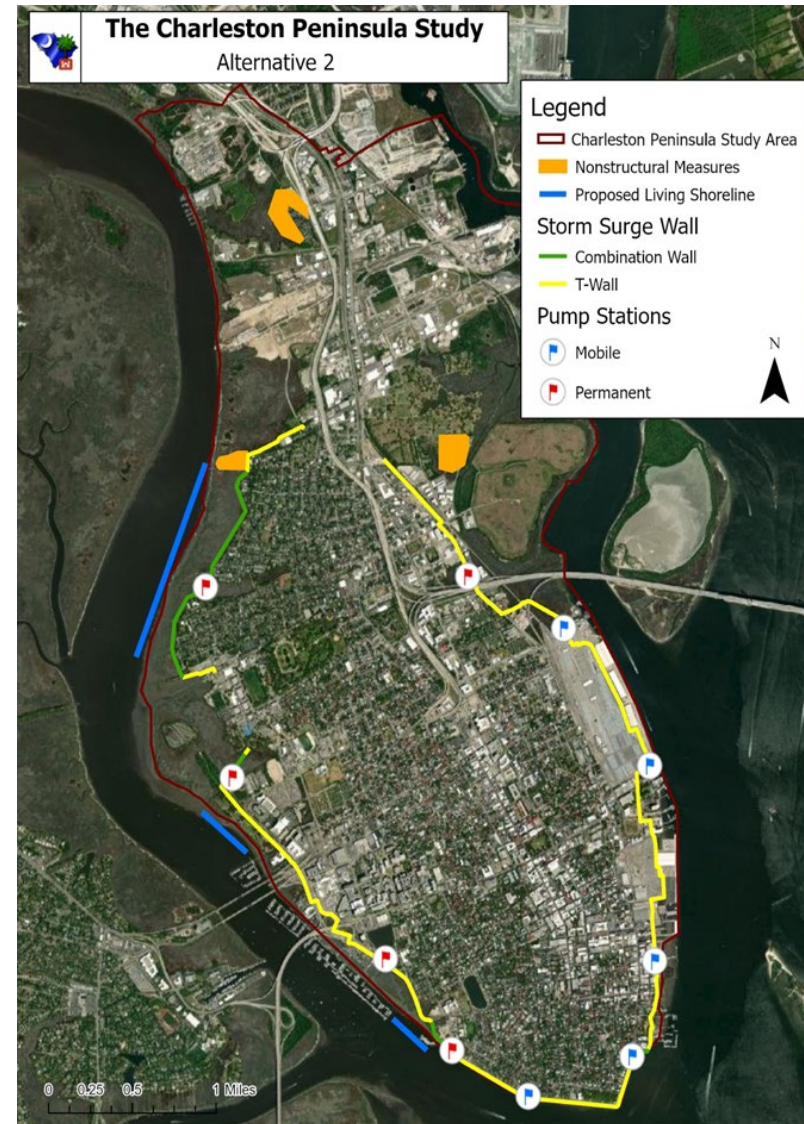




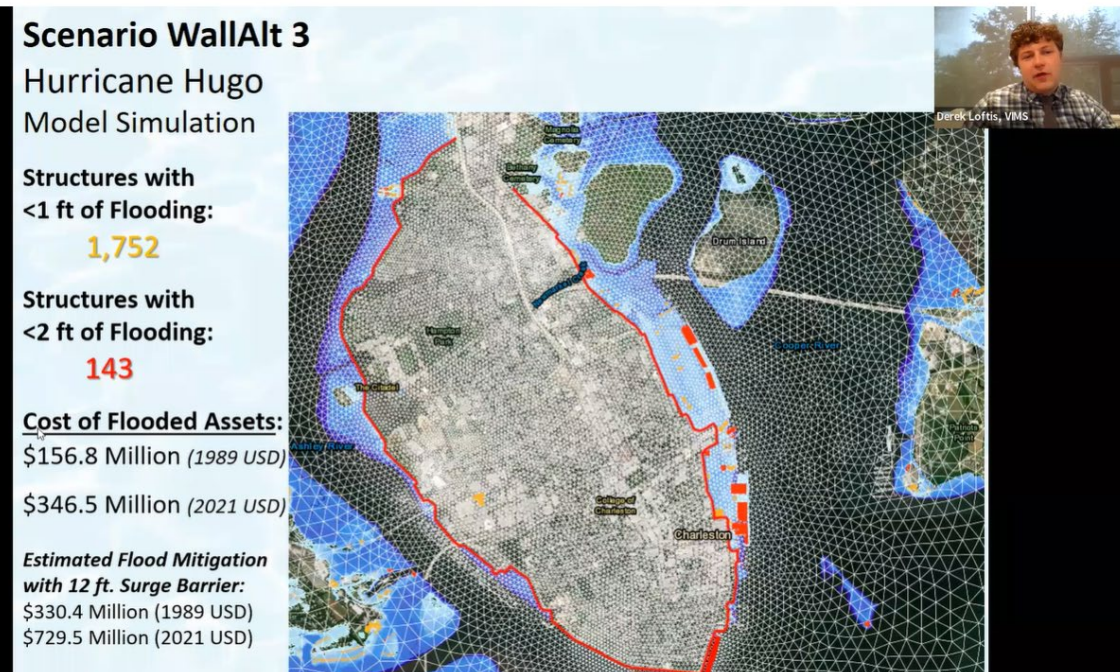
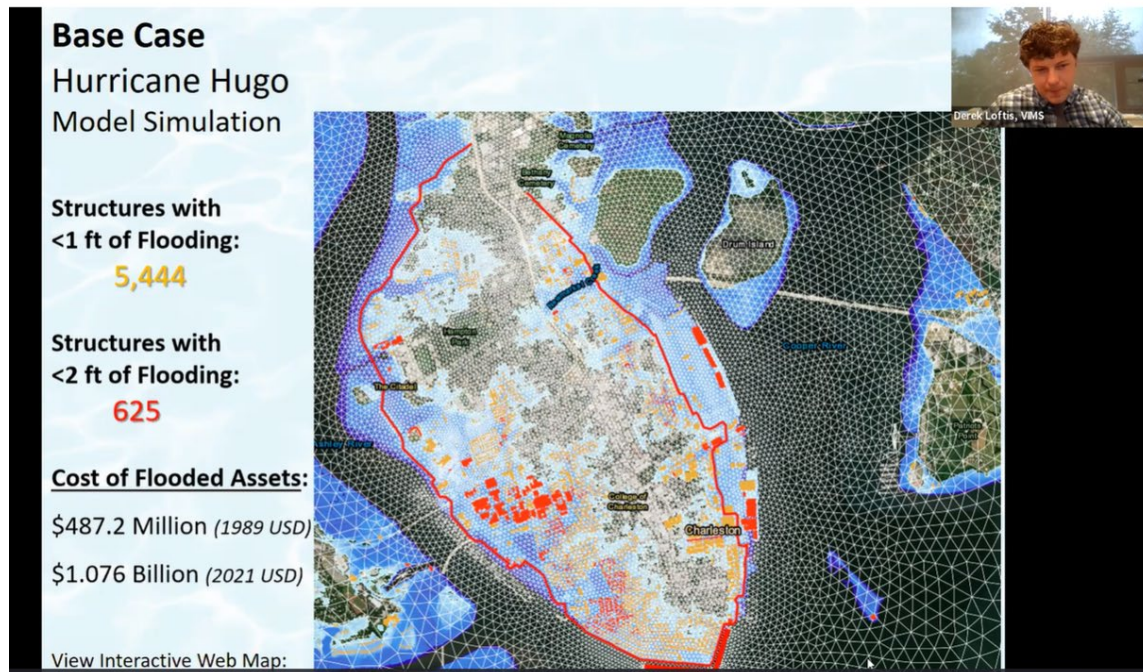


Figure ES 5. Comparison of a 20% AEP coastal storm event in 2082, assuming a high rate of SLR. With implementation of Alternative 2, damages to critical facilities and interruptions in emergency services would be limited and life safety risk would be reduced.



# Virginia Institute of Marine Sciences: SCHISM Model.

## Hugo conditions; calibration with Joaquin and Matthew

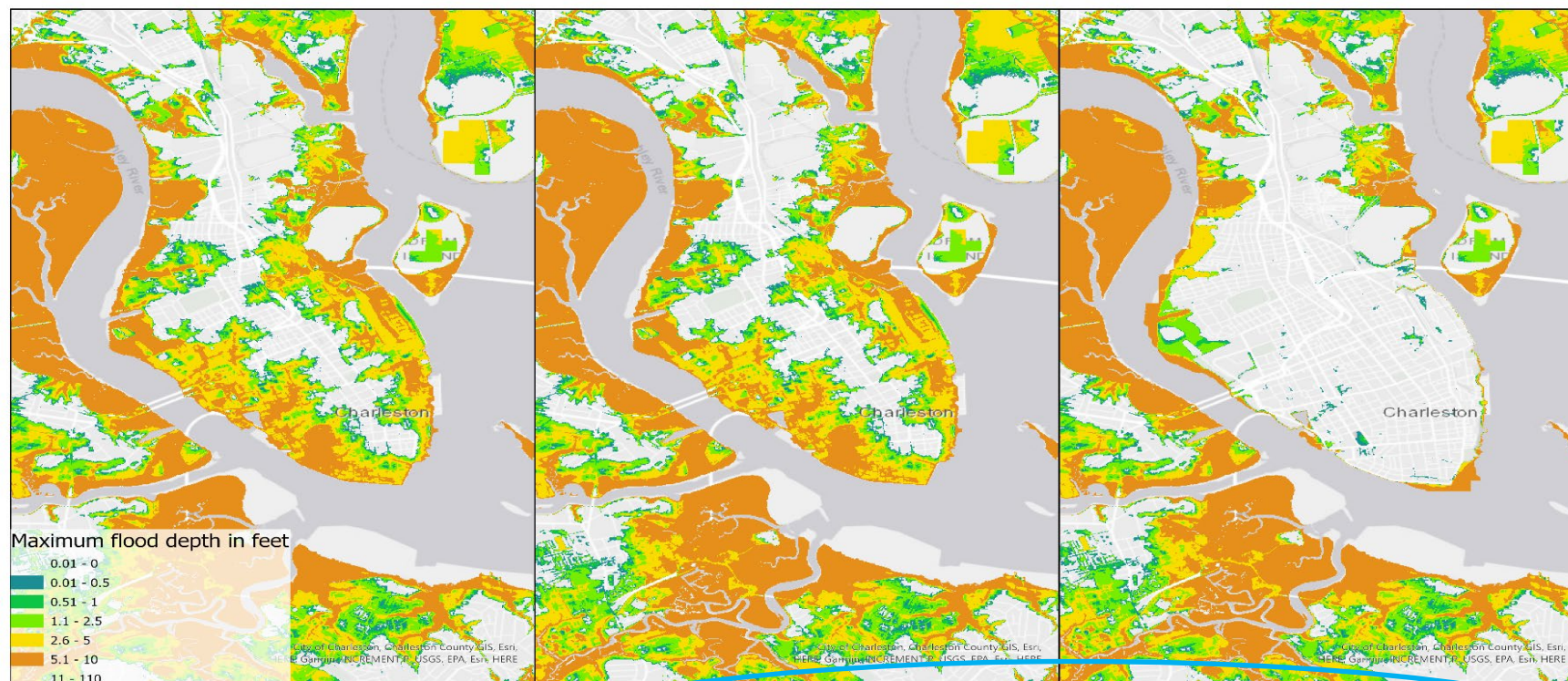




# Deltares FloodAdapt tool (Dept of Homeland Security)

## Alternatives for 2.5' SLR

Irma



2.5 ft sea level rise  
No adaptation

2.5 ft sea level rise  
Pumps

2.5 ft sea level rise  
Seawall and pumps



# Next Steps: PED (pre construction engineering and design)

2023: USACE receives HQ green-light and \$

City / USACE negotiates Design Agreement (DA)

- City wants design input / management in PED
- USACE leadership knows and understands

Once negotiated:

- City Council to review DA
- consider annual (year 1) PED funding (+/- \$1-3m).

PED: 4 phases

Mayor's Design Agreement Letter to USACE, Feb 2022

- Alignment: Johnson, Concord, Lockwood, etc.
- Gates and Crossings
- Non Structural / (Rosemont / Bridgeview) Resilience Plan (Justice 40)
- Natural and Nature-Based Features (NNBFs)
- Historic and Cultural (PA)
- Impoundment, Overtopping analyses
- Interior Hydrology (stormwater) and pumps
- System-wide risk assessment (components)
- Community Engagement
- Design Mgmt. and Expertise



No thanks. ...and not proposed...

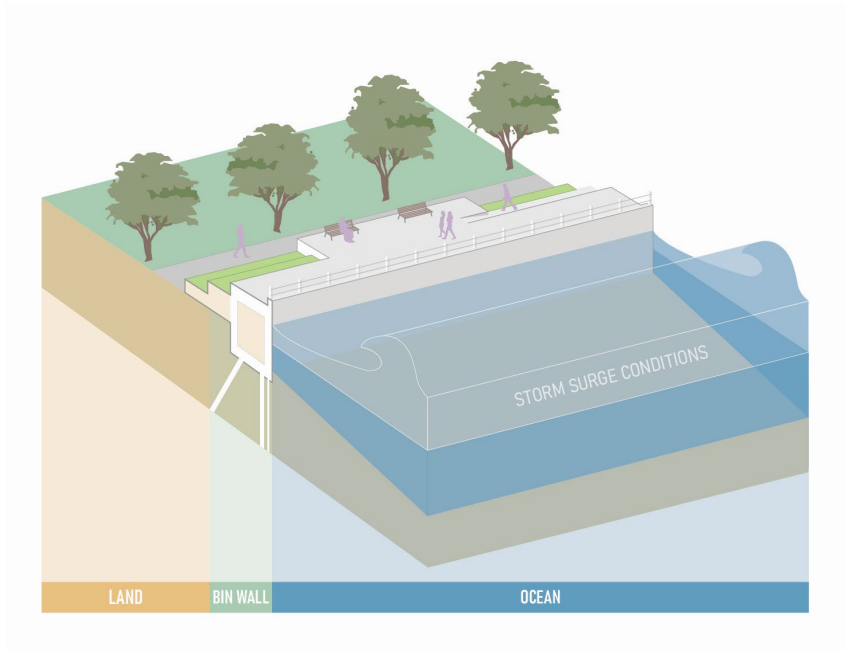














# TS Nicole (Nov 2022). Add 14" of sea level rise?



Ian, ADCIRC, 9/29/2022 AM

