Sea Level and Climate Change Research at Savannah State University

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The University by the Sea

Savannah State Campus

- Adjacent to the salt marsh, Country Club Creek, and Williamson Creek
- Former beach ridge on eastern edge of mainland

NOAA Sea Level Rise Viewer

Today at Mean Highest High Water

+ 1.2 m Sea Level Rise

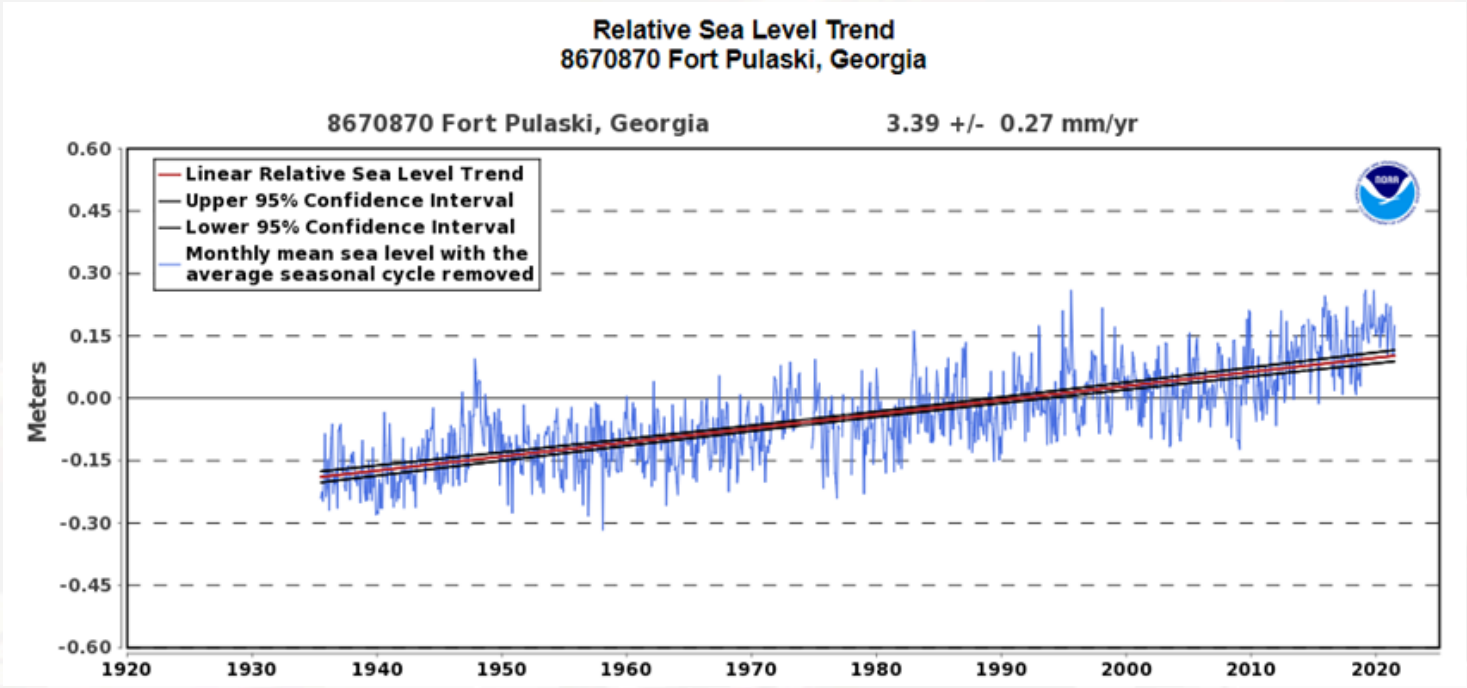
Ongoing creek bank erosion and loss of salt marsh near dock

- Nat Campbell internship project

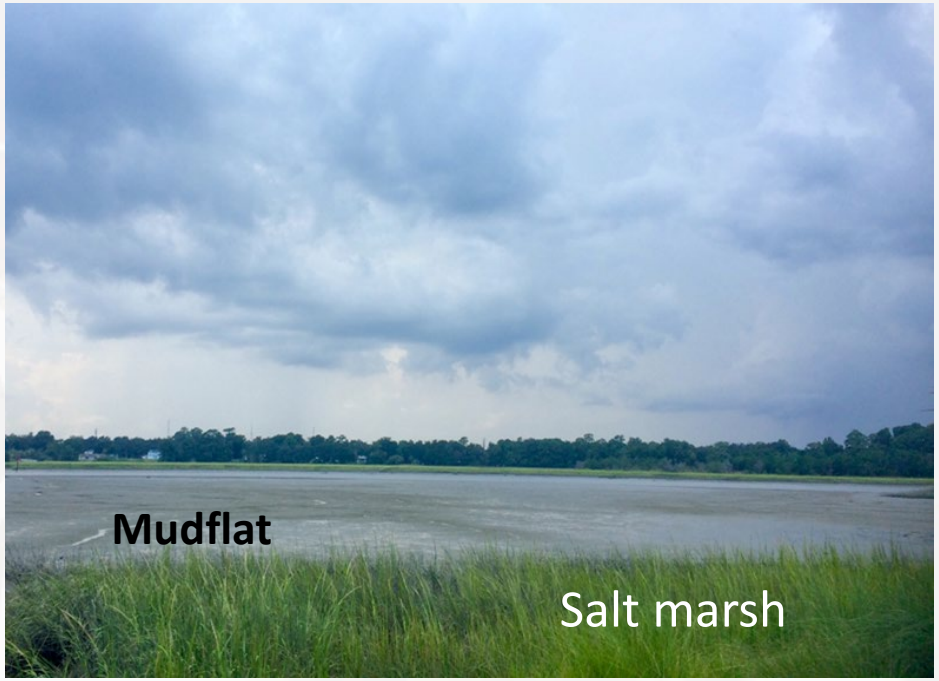
https://coast.noaa.gov/slr/

Sea Level Rising Locally at Rate of 3.39 mm/yr

If sea level rises faster than the marsh surface can accrete, it can transition to mud flat.

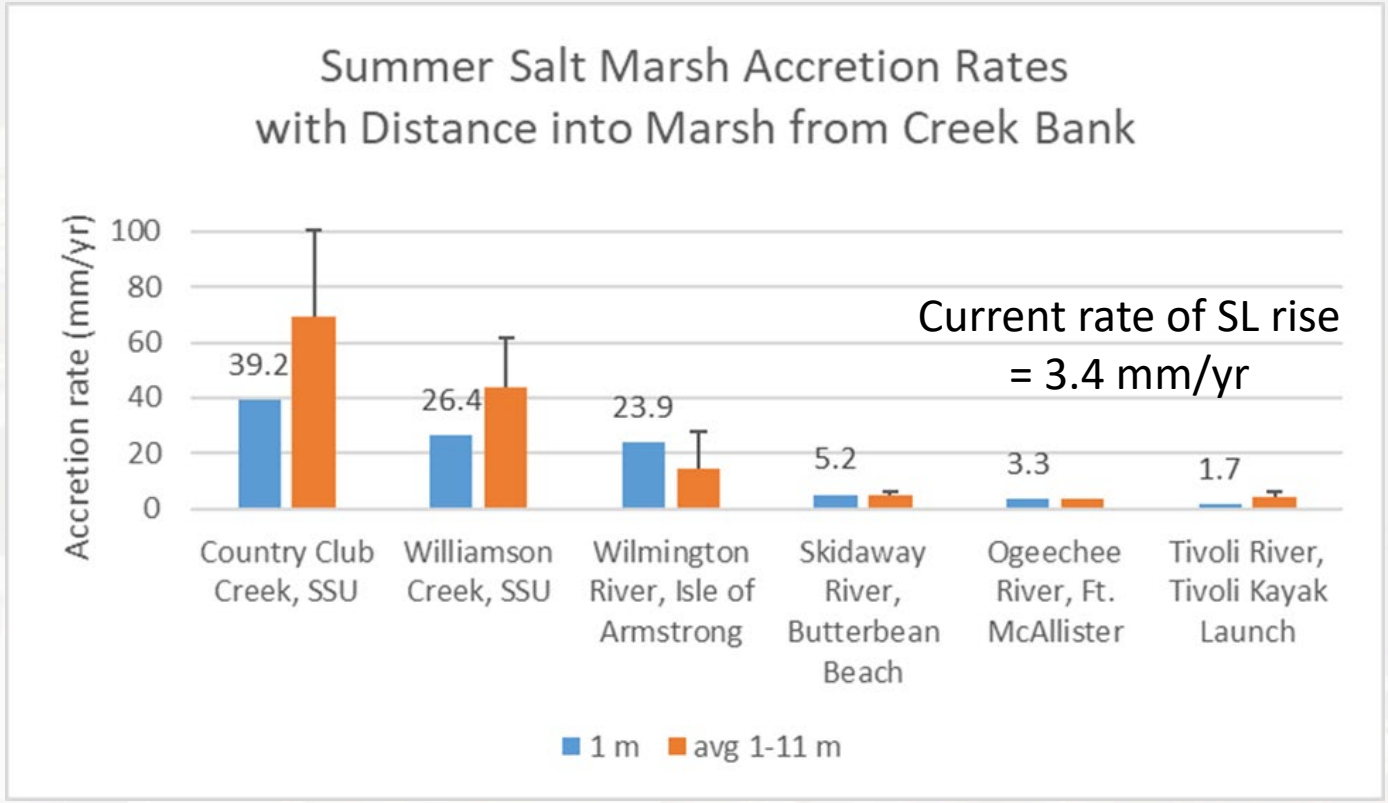


https://tidesandcurrents.noaa.gov/sltrends/



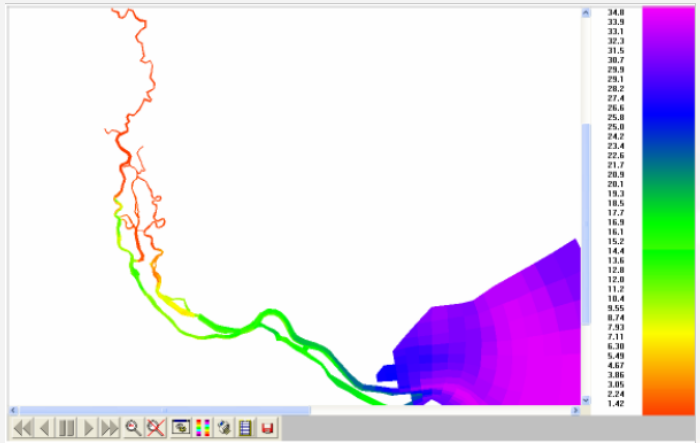
Salt Marsh Accretion Estimates using Sediment Traps

- Measured accretion rates exceed current rate of sea level rise, except at black water river sites
- However, erosion during rain events is not accounted for, nor are biological changes (plant density, biomass, baffling, grazers, organic flux) that may coincide with increased tidal inundation

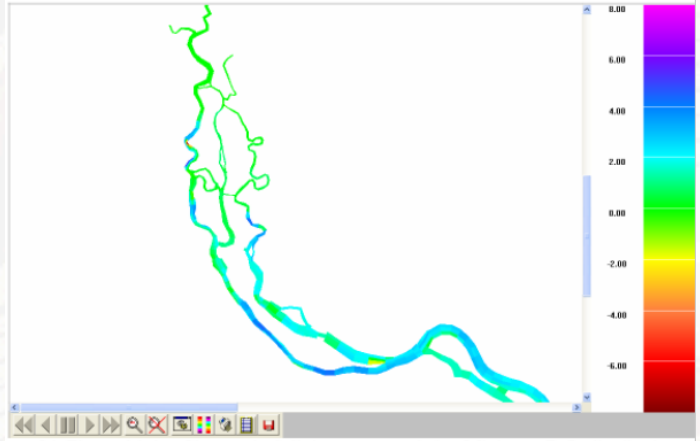


Interns: Kristina Schwarz, 2016 data; Holly McCrory, 2021 data

Savannah River harbor deepening as analog for enhanced seawater inflow and estuarine salinification with sea level rise



11. Figure A.4. Salinity corresponded to Minimum D.O. distribution along bottom layer within the analyzed period of May 1 - October 30, 1999: Existing bathymetry



34. Figure A1.4. Changes in Salinity corresponded to Minimum D.O. distribution along bottom layer within the analyzed period of May 1 - October 30, 1999: 6 ft deepening

Tetra Tech, 2007

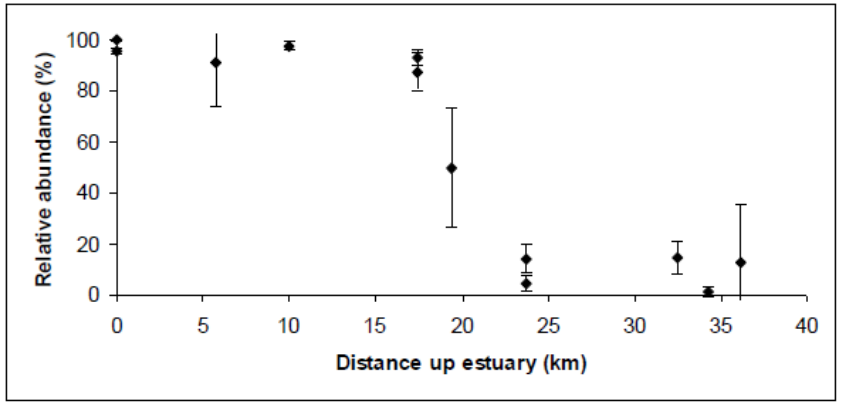


Figure 4. Relative abundance of calcareous foraminifera.

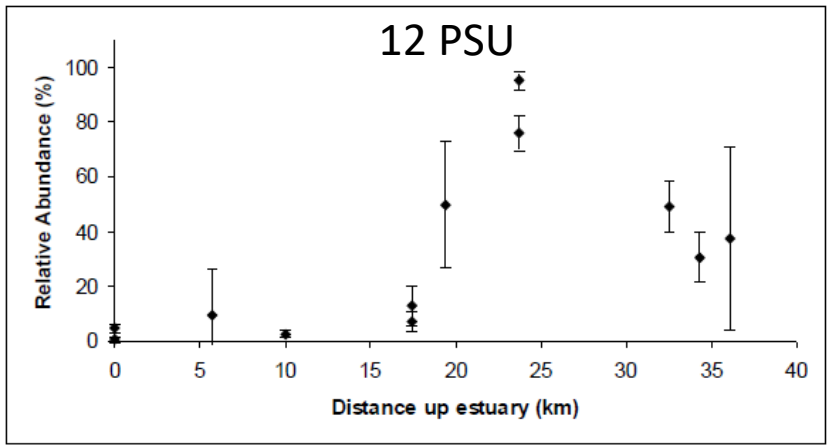
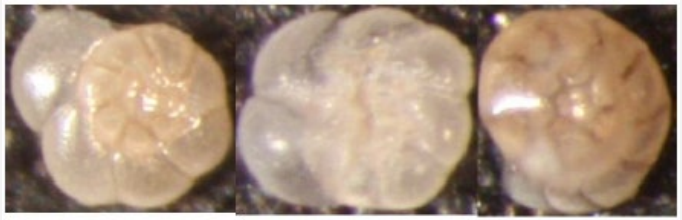
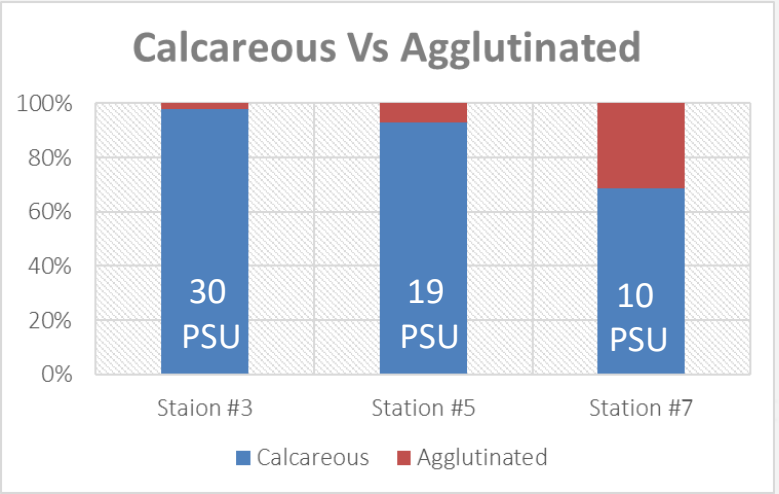


Figure 5. Relative abundance of agglutinated foraminifera.

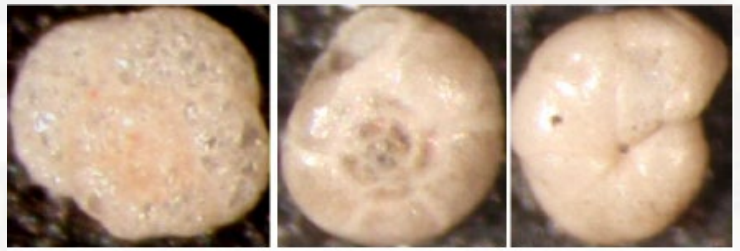
Mark Wagner thesis, 2010



Ammonia falsobecarii *Ammonia becarii*



Mone't Murphy Sr Research Project, 2021



Trochammina inflata *Arenoparella mexicana* *Haplophragmoides*

Head of Tide Study

C. Hintz, S. Rosenquist, S. Wright

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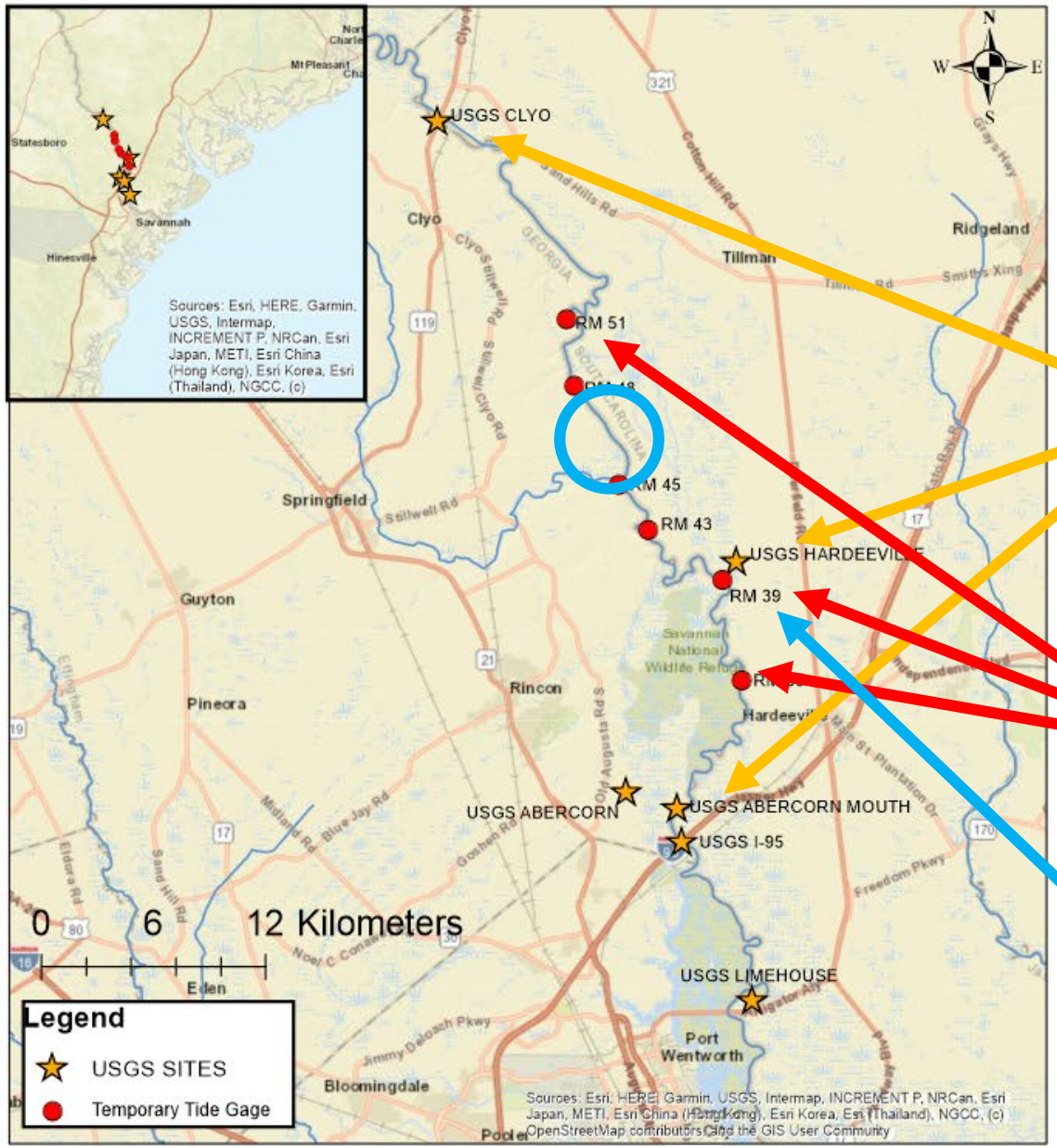
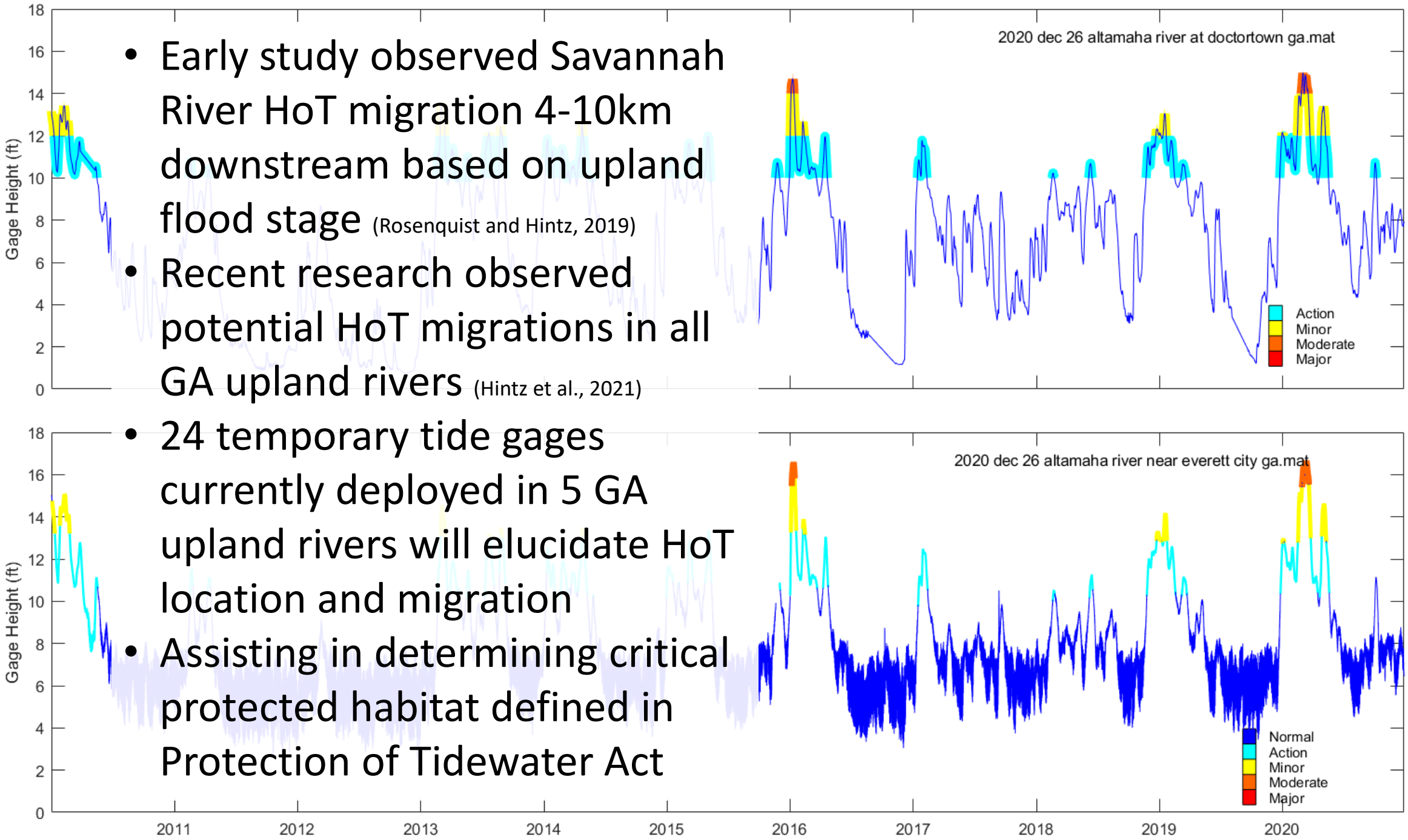
Savannah Sensor Locations



23 river miles of coverage, 4 USGS Sites

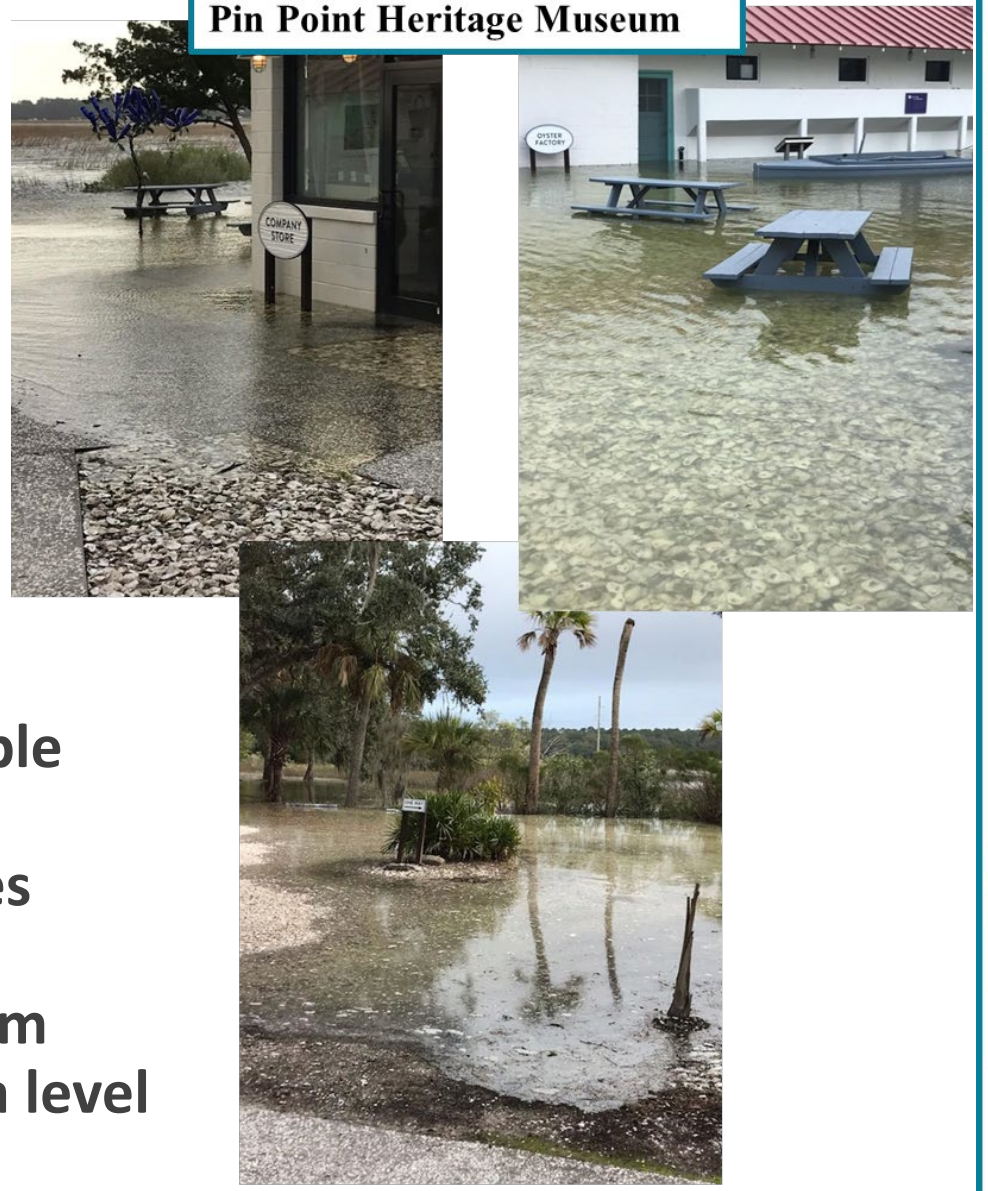
- Savannah River, highly controlled, managed water flow, well instrumented
  - 4 long-term USGS gages
    - 1985 to 2009 installs
  - 6 temporary SSU tide gages
  - Historical and recent measured HOT **(US ACE, 1965, 1994; Rosenquist and Hintz, 2019)**

- Early study observed Savannah River HoT migration 4-10km downstream based on upland flood stage (Rosenquist and Hintz, 2019)
- Recent research observed potential HoT migrations in all GA upland rivers (Hintz et al., 2021)
- 24 temporary tide gages currently deployed in 5 GA upland rivers will elucidate HoT location and migration
- Assisting in determining critical protected habitat defined in Protection of Tidewater Act



Gullah Geechee Cultural Heritage Corridor

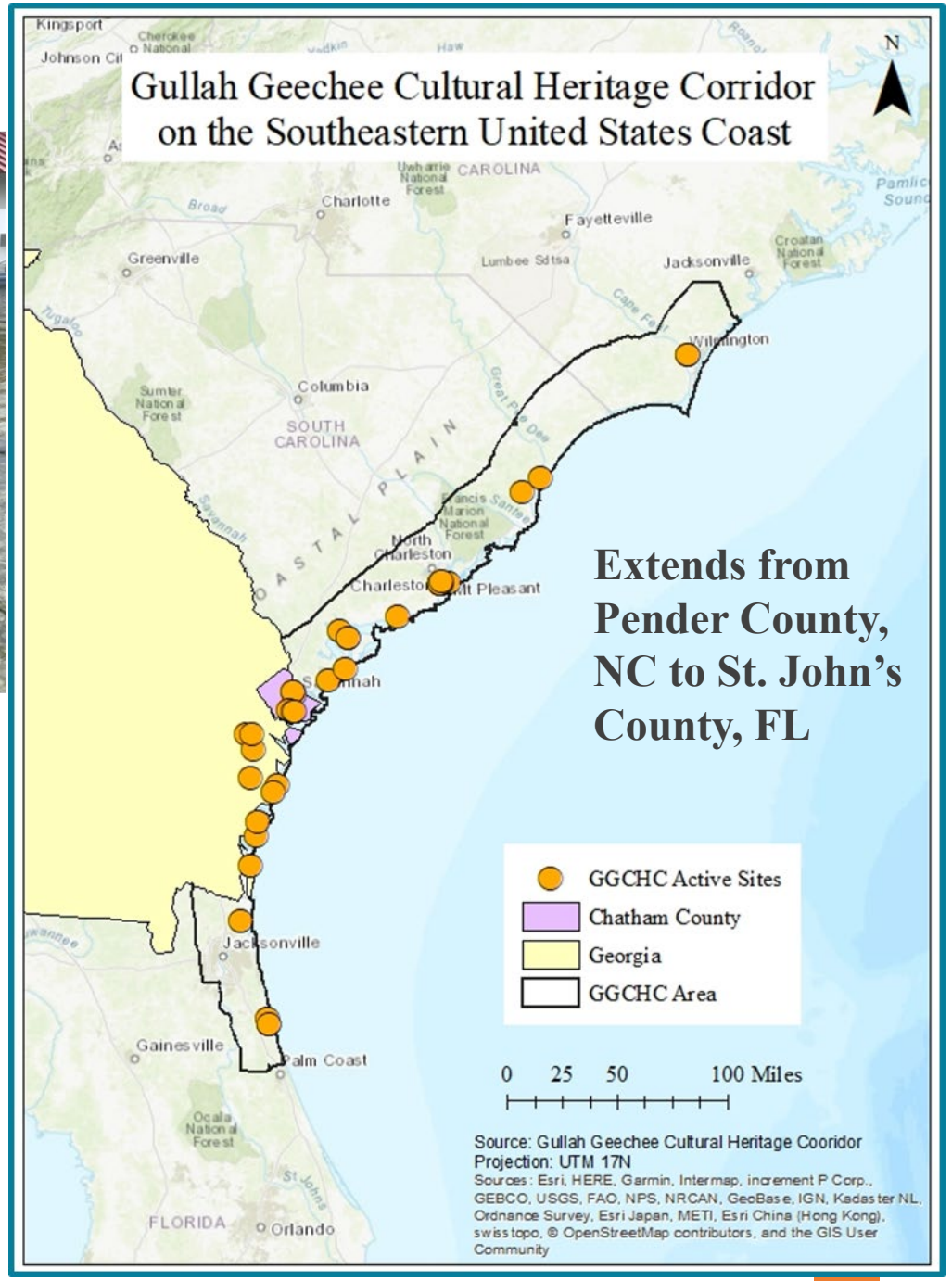
Pin Point Heritage Museum



Source: Provided by Julia Keating from Pin Point Heritage Museum

Purpose:

Identify vulnerable Gullah Geechee cultural resources under different scenarios of storm intensity and sea level rise



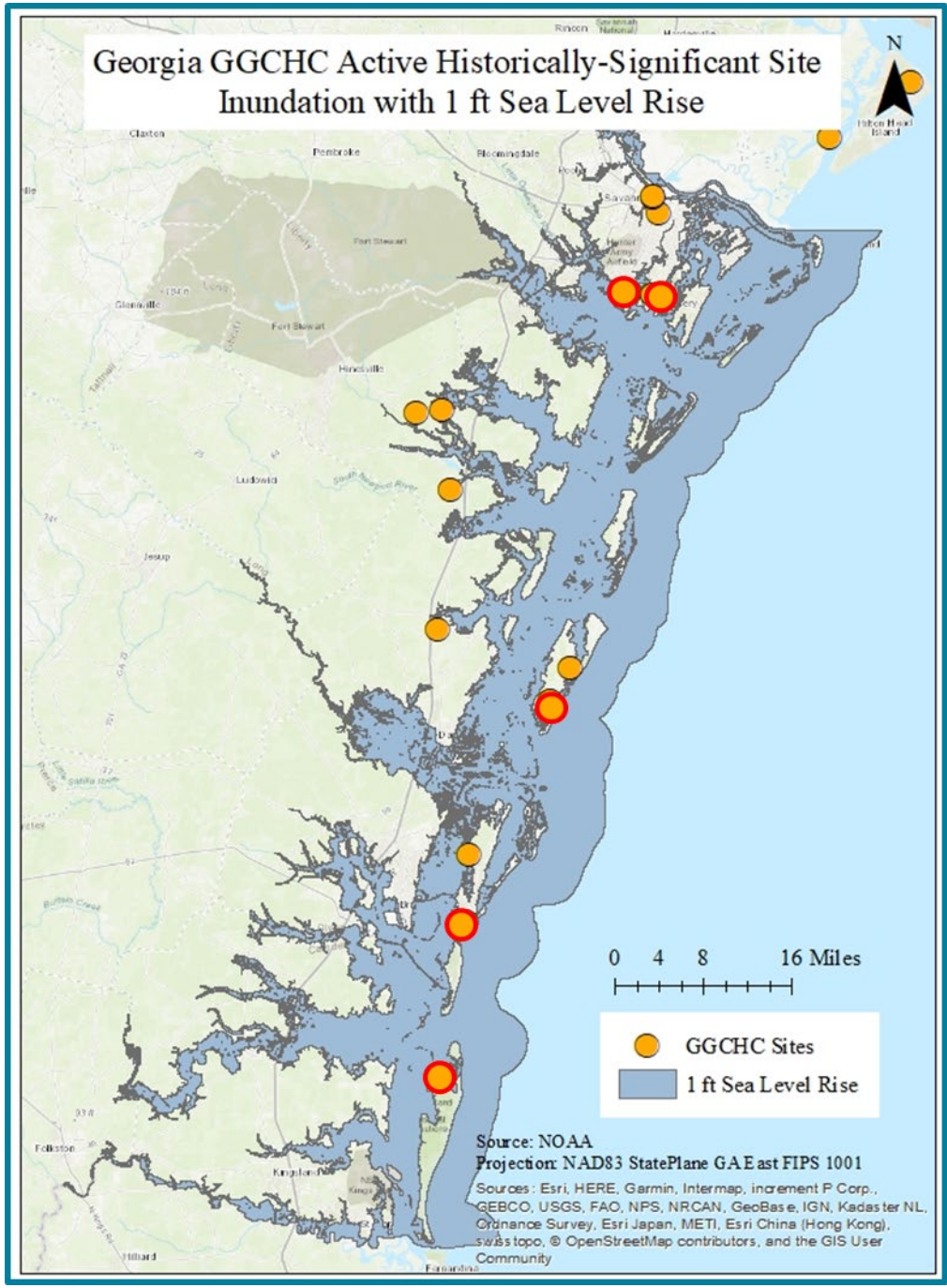
Environmental Vulnerabilities of the Gullah Geechee Communities in Georgia

Jennifer Colley, Tara Cox, Dionne Hoskins-Brown

- Mapped community asset data in ArcGIS 10.4
- Used Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model
- Identified sites susceptible to inundation for different storm intensities in Chatham County, Georgia.

Results to date:

- A total of 5 active sites predicted to be inundated with just 1 foot of sea level rise in Georgia.
- At 3.7 mm yr^{-1} rate of sea level rise, sites will be inundated by 2070 (IPCC, 2014).



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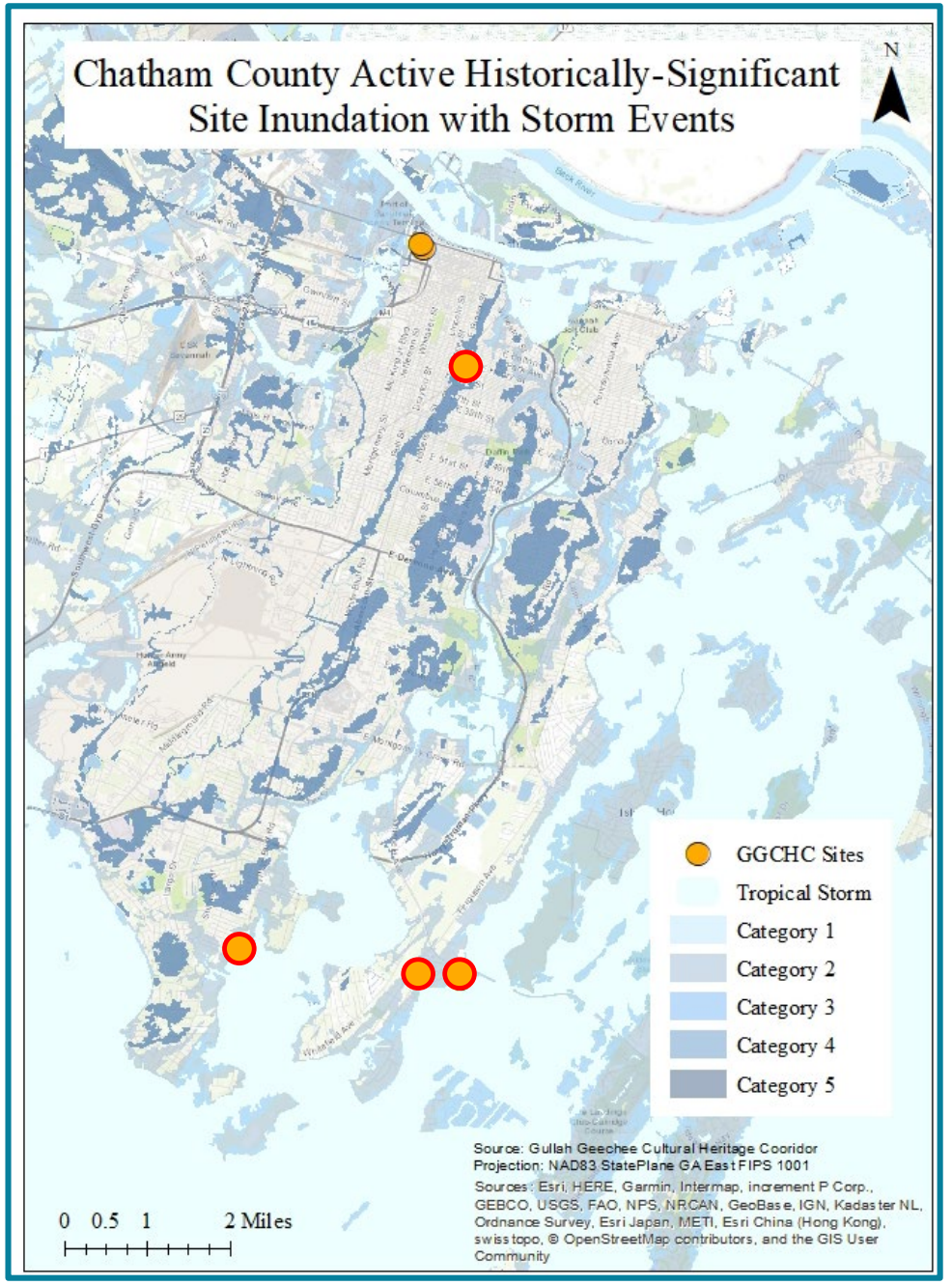
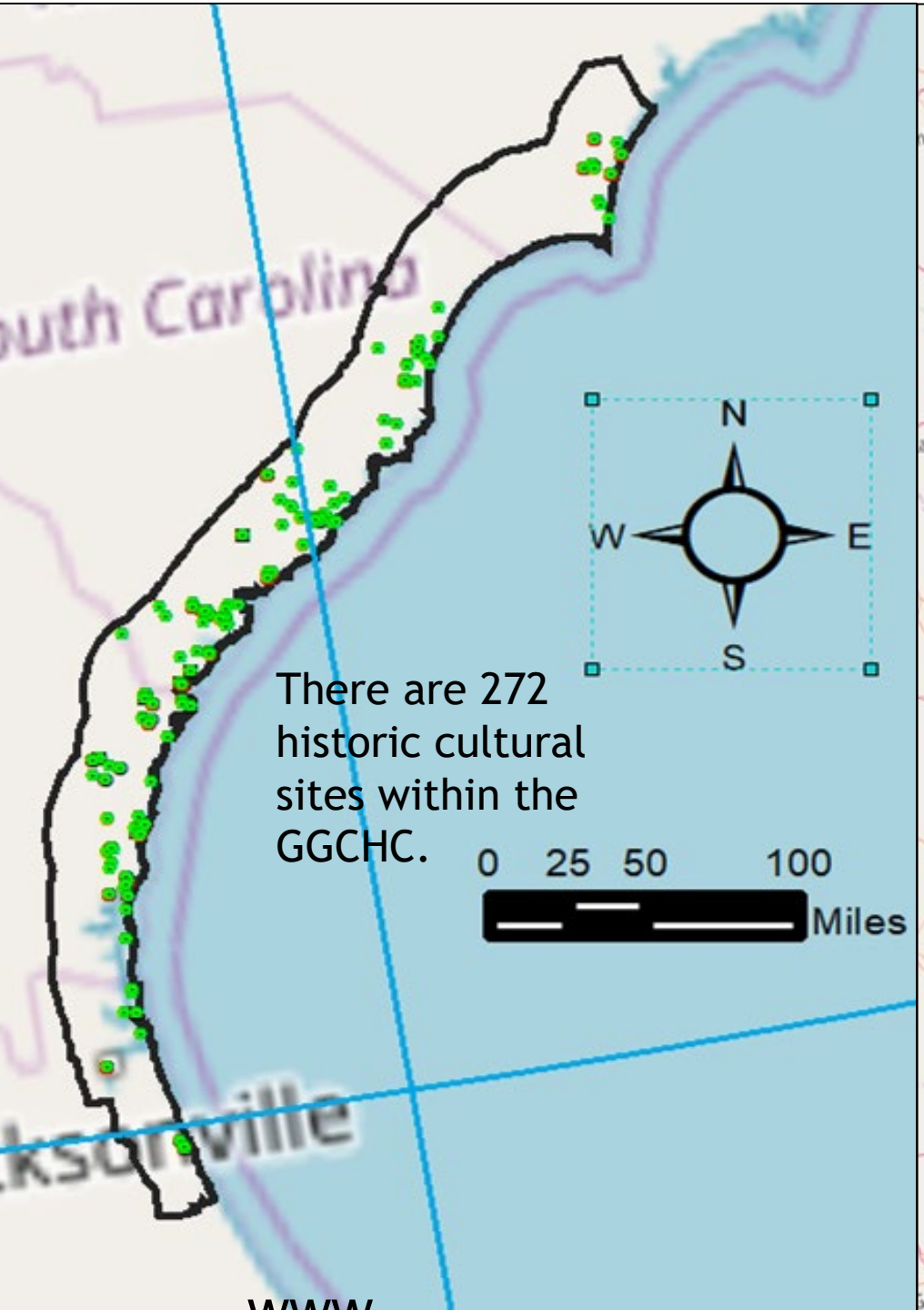
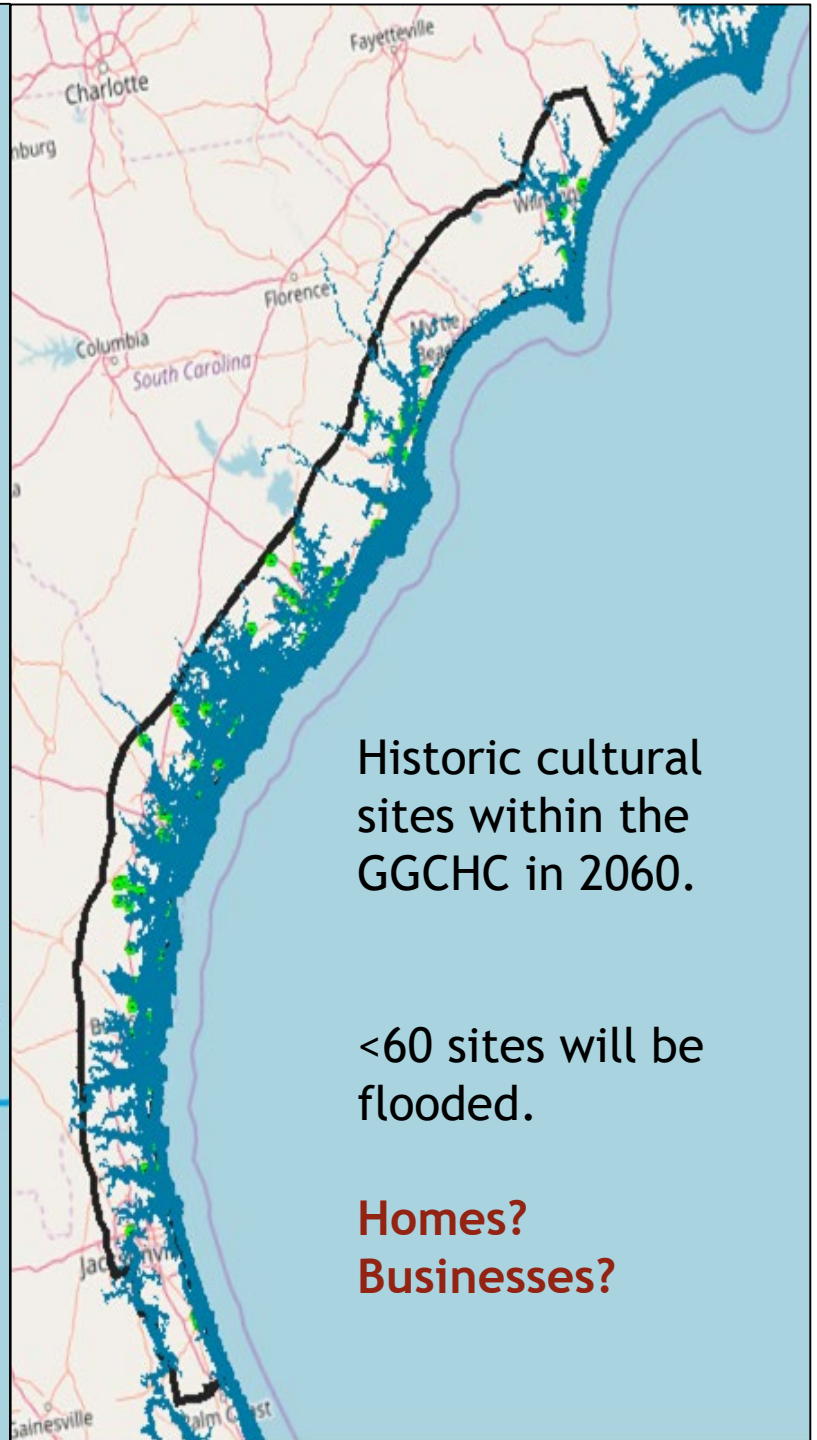
Different Storm Intensities & Chatham County GGCHC Sites

- 2 GGCHC sites predicted to be inundated with a category 2 hurricane
- 3 sites predicted to be inundated with a category 3 hurricane
- 4 sites predicted to be inundated with a category 4 hurricane in Chatham County, Georgia





There are 272 historic cultural sites within the GGCHC.



Historic cultural sites within the GGCHC in 2060.

<60 sites will be flooded.

Homes?
Businesses?

Vulnerability of archaeological and place-based cultural assets along entire GGCHC are needed for preservation plans

For More Information

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