Smart Sea Level Sensors –
Chatham County

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Georgia Power Chair
Earth & Atmospheric Sciences

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Senior Research Scientist
Computer Science

Georgia Tech
CREATING THE NEXT

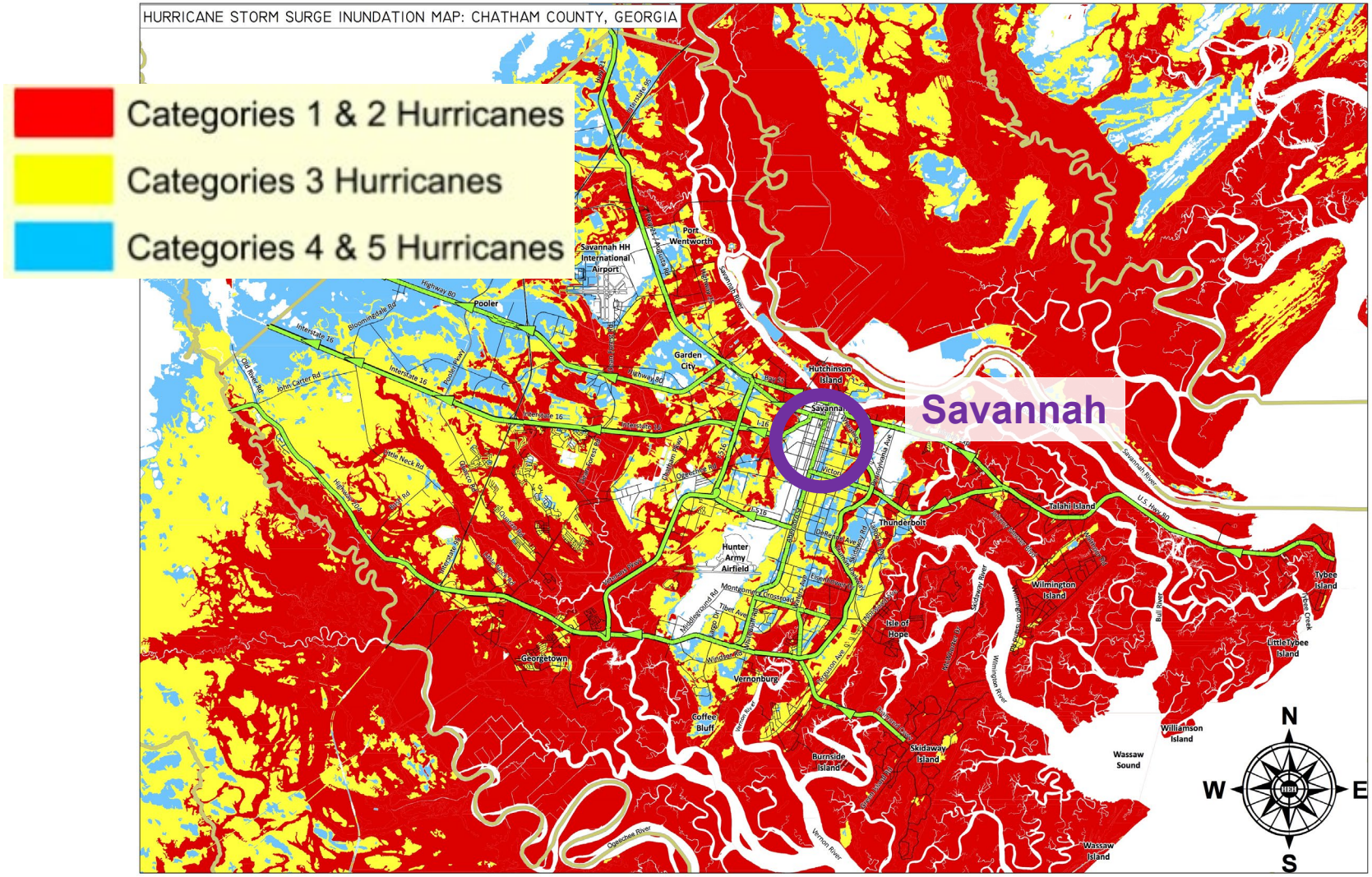
SMART
SEA LEVEL SENSORS

GEORGIA SMART Georgia Tech
COMMUNITIES CHALLENGE

EMERGENCY MANAGEMENT
CHATHAM COUNTY

SAVANNAH
savannahga.gov

Coastal flooding – a current threat



https://www.chathamemergency.org/storm-surge-impact-by-category.php

EMERGENCY MANAGEMENT CHATHAM COUNTY

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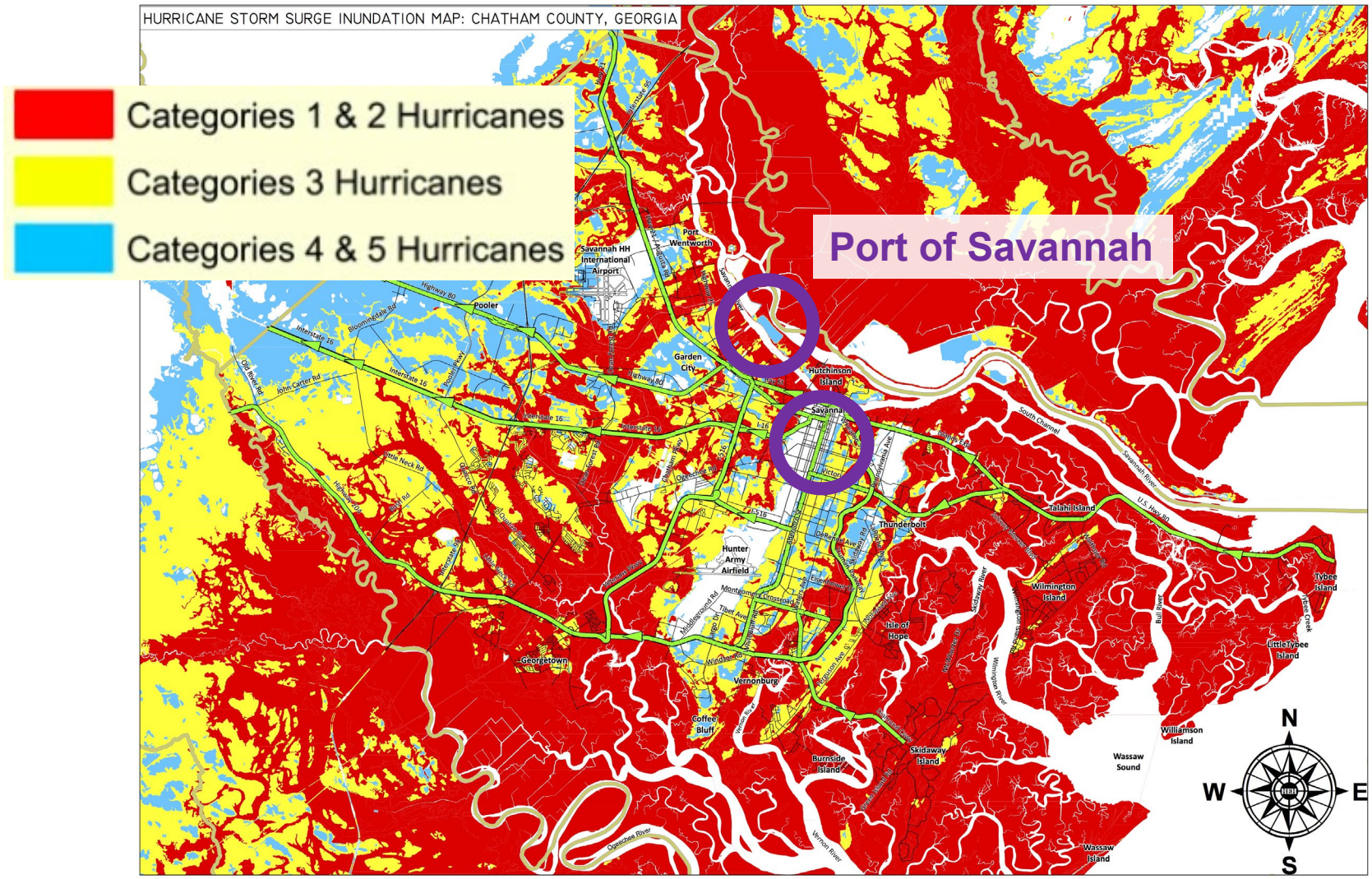

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EMERGENCY MANAGEMENT CHATHAM COUNTY

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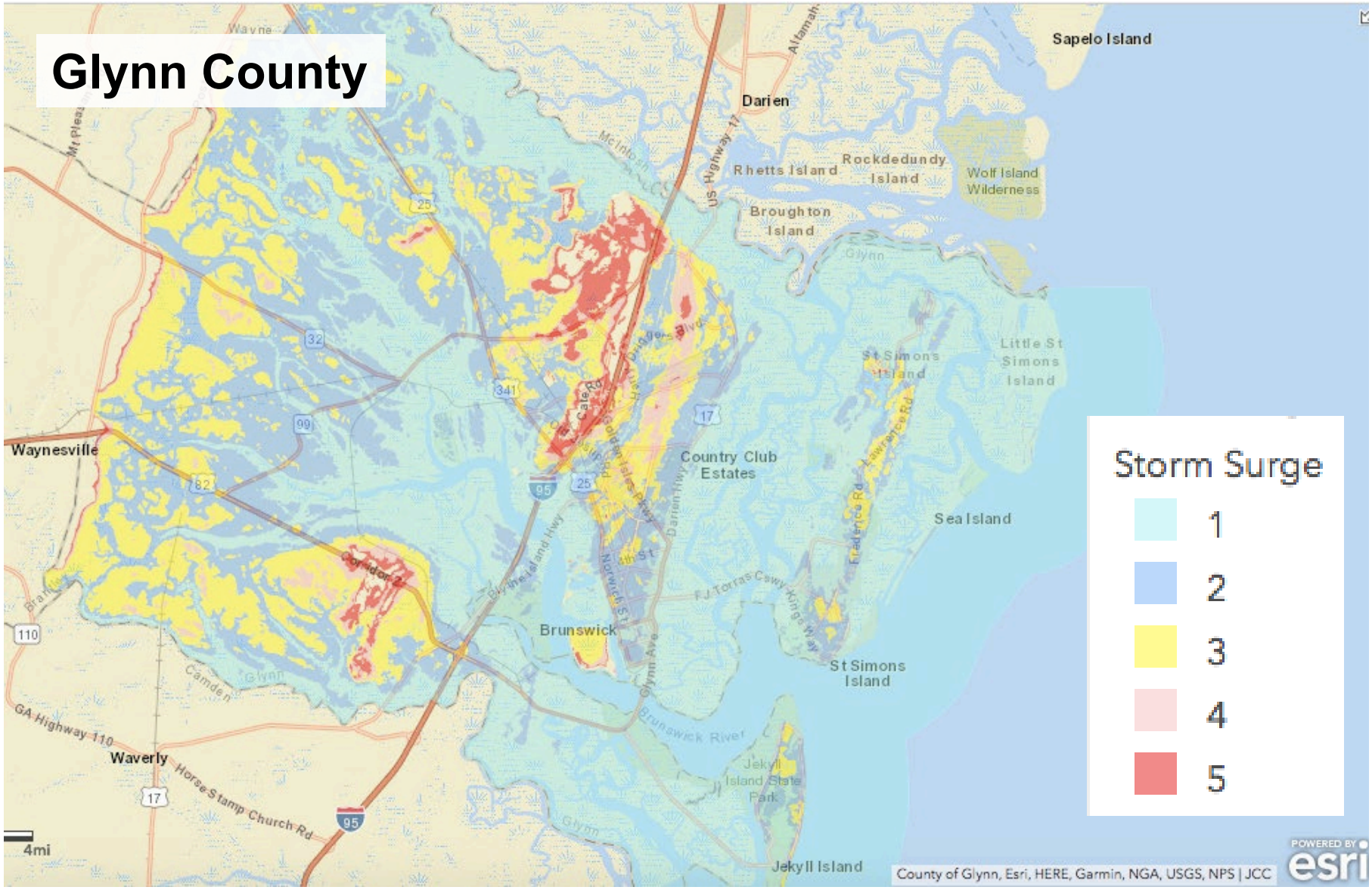
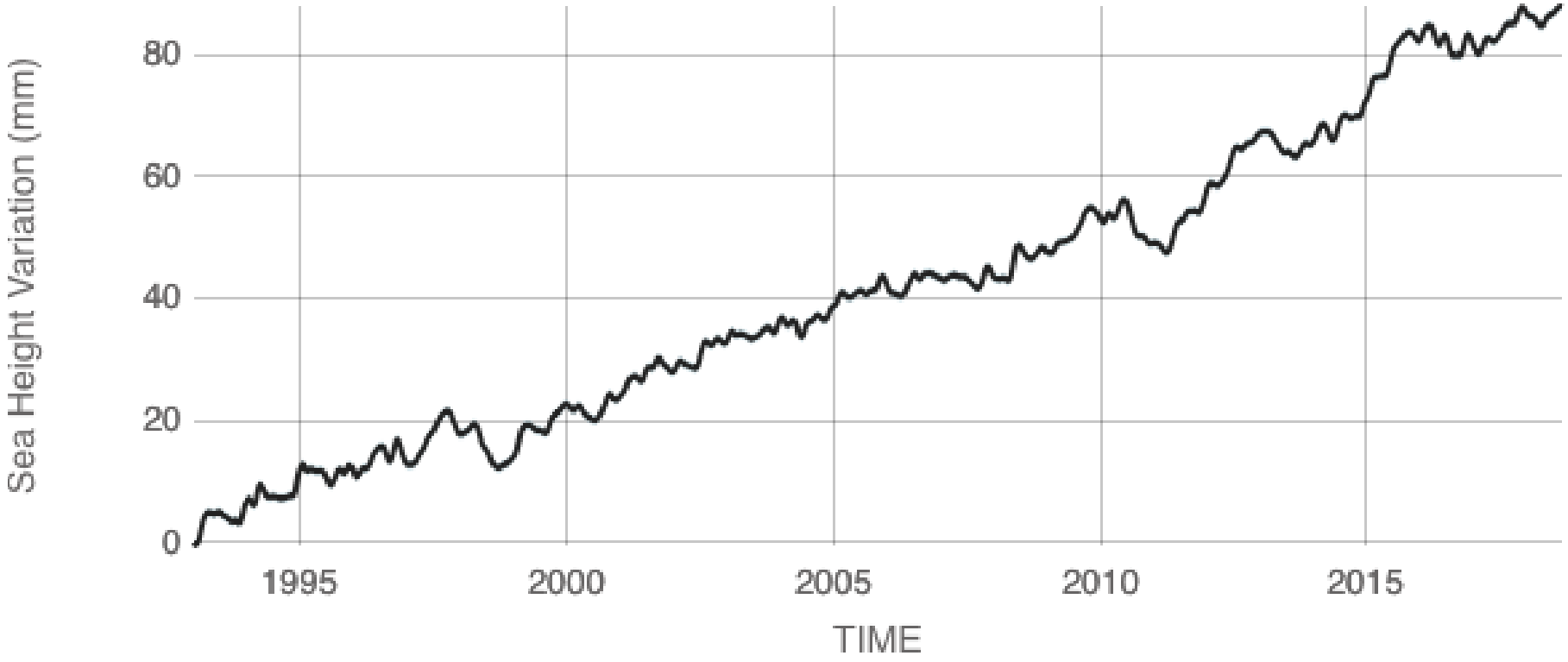


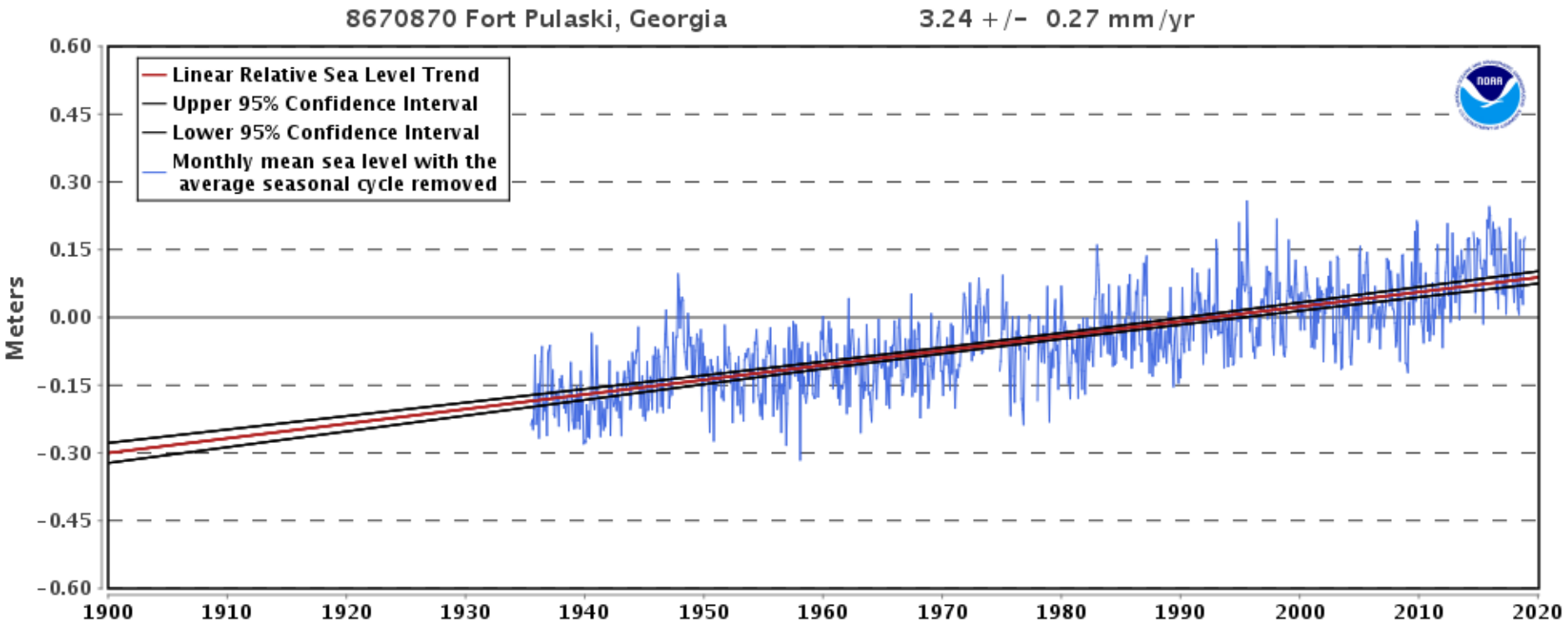
Sea level rise – a growing threat



Source: climate.nasa.gov

current rate of sea level rise = +3.2 mm/yr
→ in 100yrs, +320mm (or 12”) minimum

Ft. Pulaski - Georgia's only NOAA tide gauge



local sea level has risen by +10" in 85yrs

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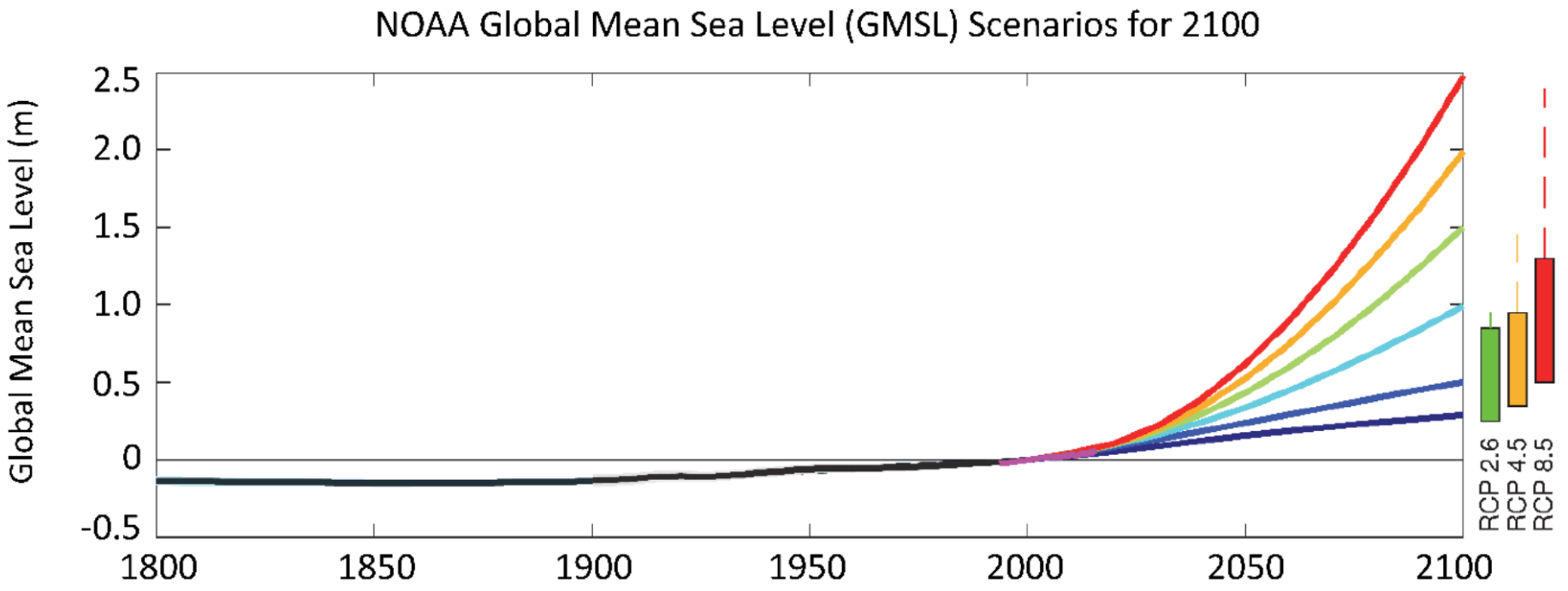
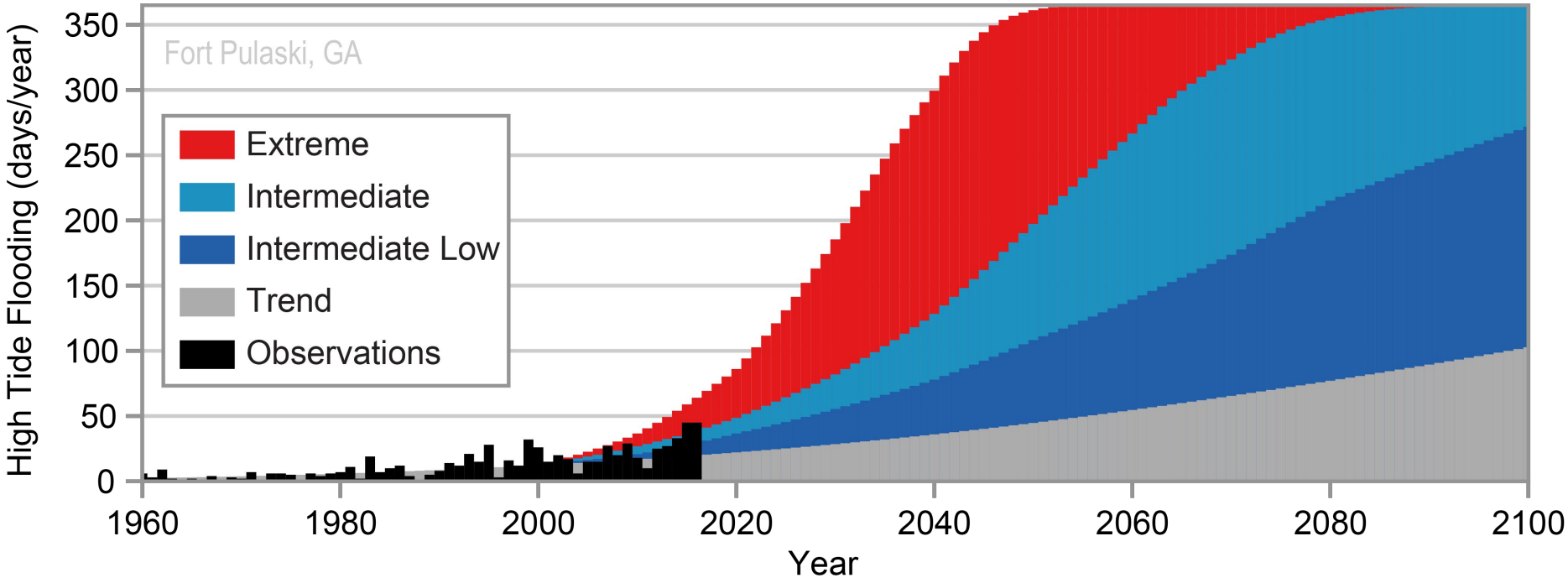


local sea level has risen by +10" in 85yrs

Sweet et al., 2017
https://nca2018.globalchange.gov/chapter/19/

Ft. Pulaski – flooding more frequent

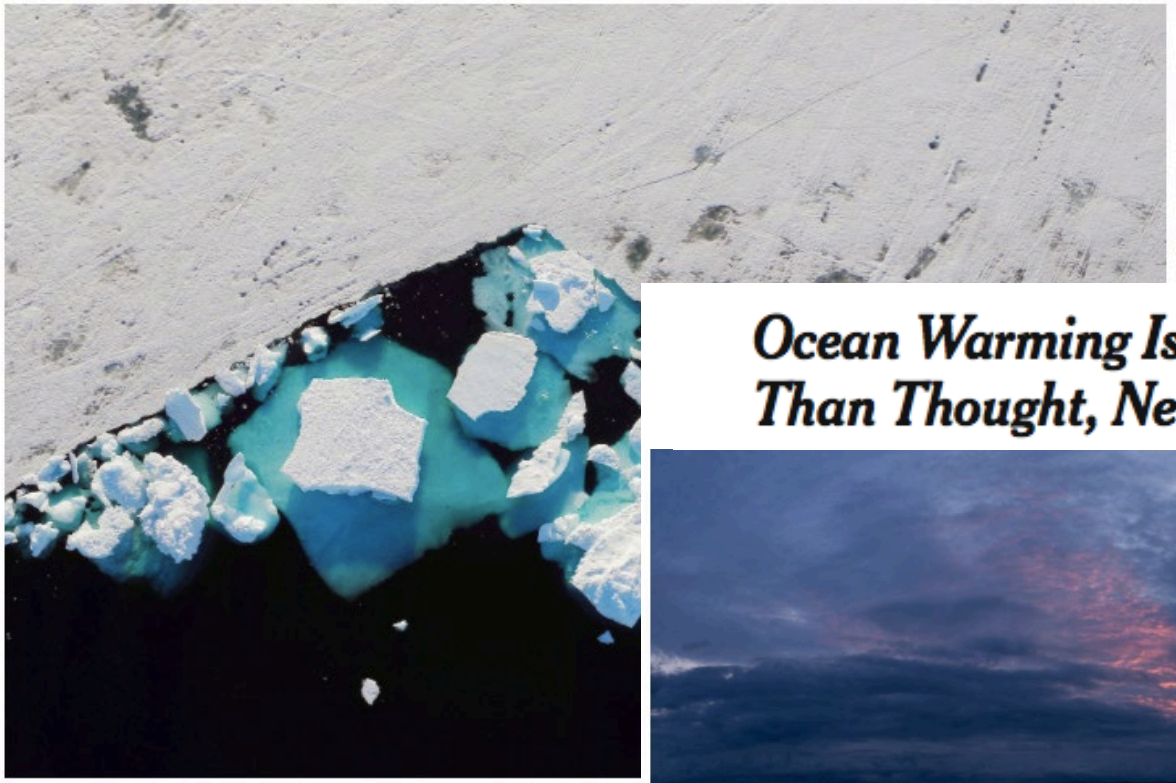


More extreme scenarios project +1300mm (+51”) of global sea level rise by 2100.

Sweet et al., 2017
https://nca2018.globalchange.gov/chapter/19/

Greenland's Melting Ice Nears a 'Tipping Point,' Scientists Say

Jan 21, 2019



Ice in a fjord in southeastern Greenland last June. Lucas Jac

Ocean Warming Is Accelerating Faster Than Thought, New Research Finds

Jan 10, 2019

Rising ocean temperatures can bleach corals, like these off of Papua New Guinea. Jurgen Freund/NPL/Minden Pictures

“Blue sky flooding”

Savannah,
Nov 24, 2018

photo by Russ Clark

The challenge

before a flooding emergency. . .

flood risk depends on wind direction, runoff patterns

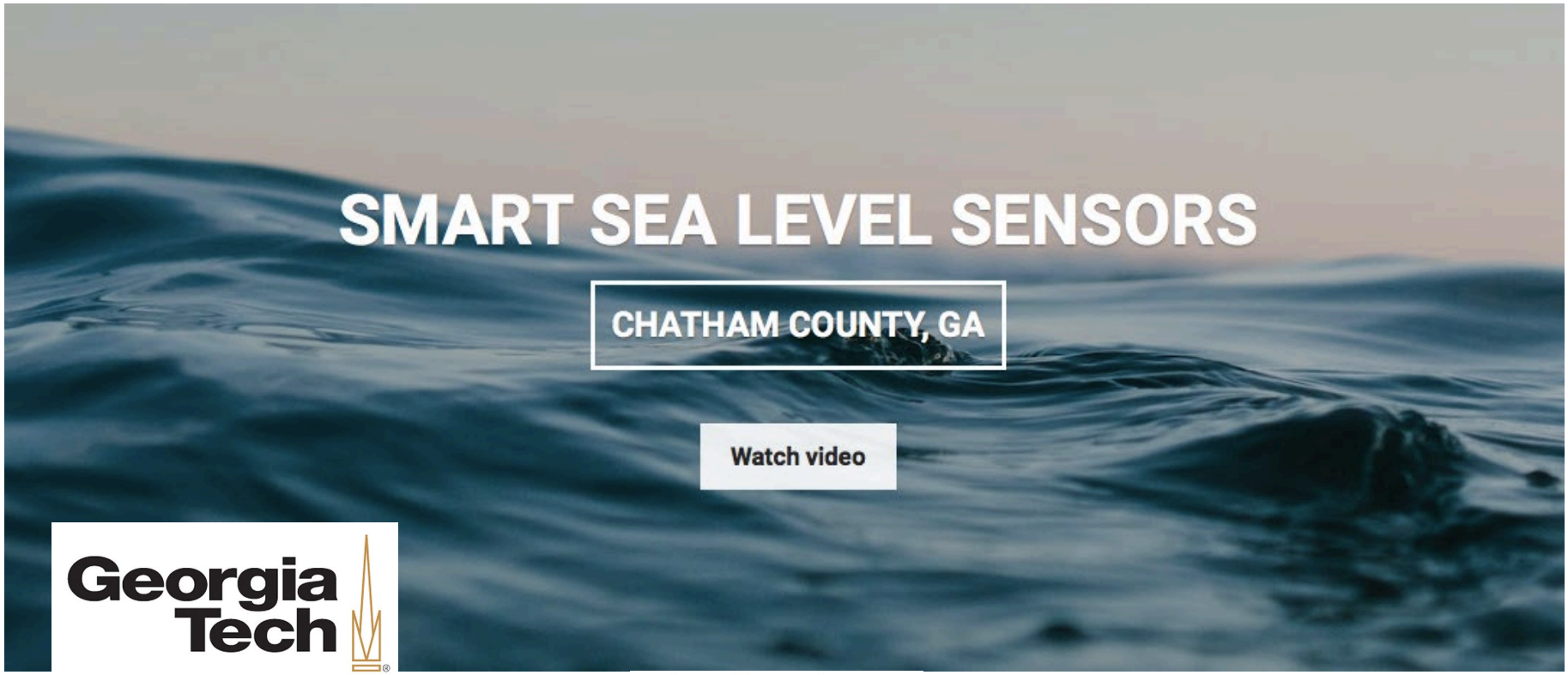
during. . .

lack of real-time information can thwart emergency response

after. . .

slow assessment of potentially compromised critical infrastructure

http://sealevelsensors.org



Georgia Tech

Dr. Kim Cobb
Dr. Russ Clark
Dr. Emanuele Di Lorenzo
Dr. David Frost
Lalith Polepeddi
Tim Cone (GT-Savannah)
Jayma Koval

EMERGENCY MANAGEMENT CHATHAM COUNTY

Randall Mathews
David Anderson
Dennis Jones

SAVANNAH
savannahga.gov

Nick Deffley
Director, Sustainability
Tom McDonald
David Donnelly

Project goals

emergency planning & response

real-time data portal & toolkits

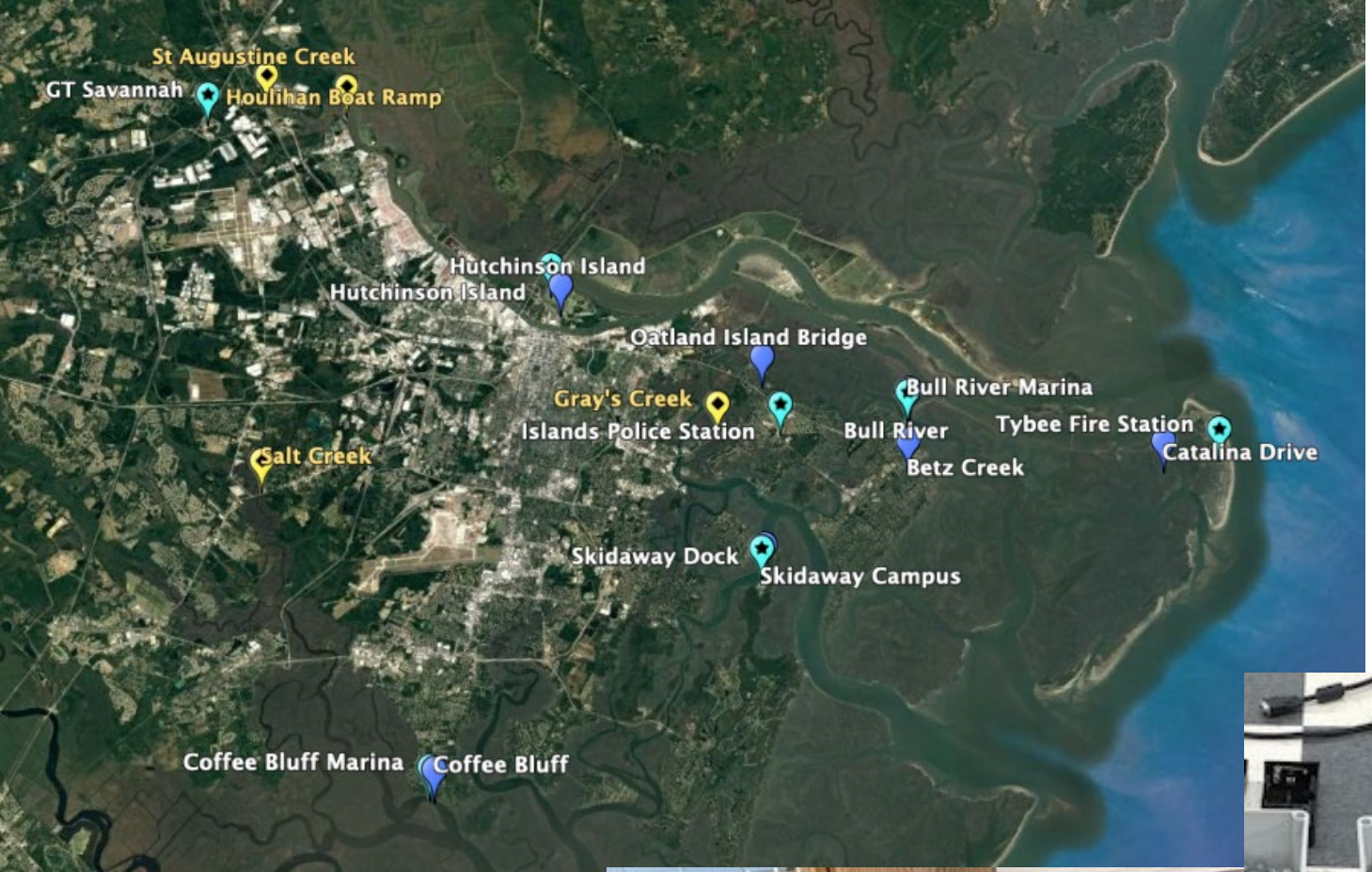
short- and long-term risk assessment and resilience planning

develop & test educational resources

middle school & high school curricula

communication and building awareness

public events, installations, website



8 sensors
8 gateways

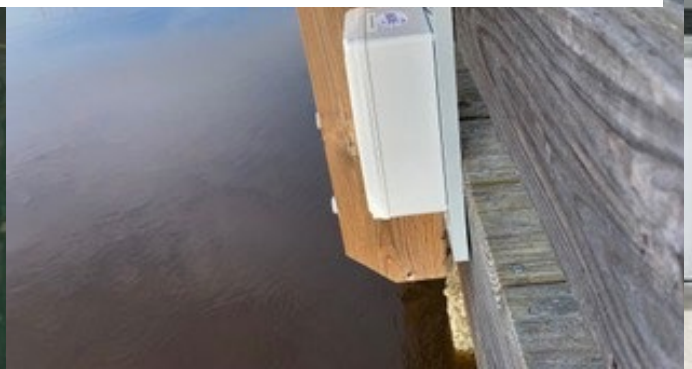
<u>goal</u>: 100 sensors by August

currently:
sea level, air temperature

planned:
seawater properties
air quality
inland flooding

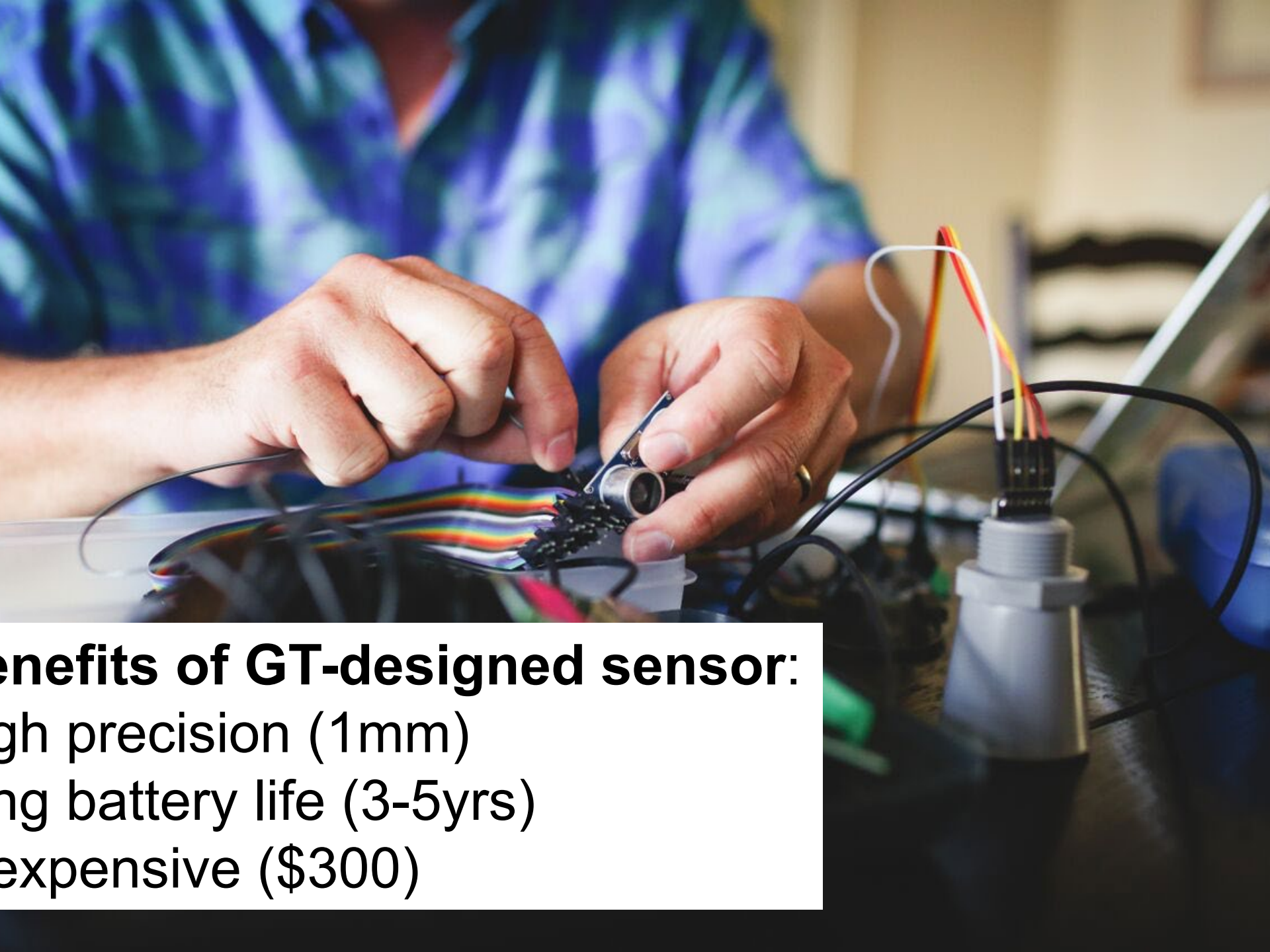
8 sensors
8 gateways

goal: 100 sensors by August



gateway device:
- roughly $1,500
- 1 to 4 mile range
- can serve hundreds of sensors
- needs internet, power

goal:
provide backbone for diverse IoT applications



enefits of GT-designed sensor:

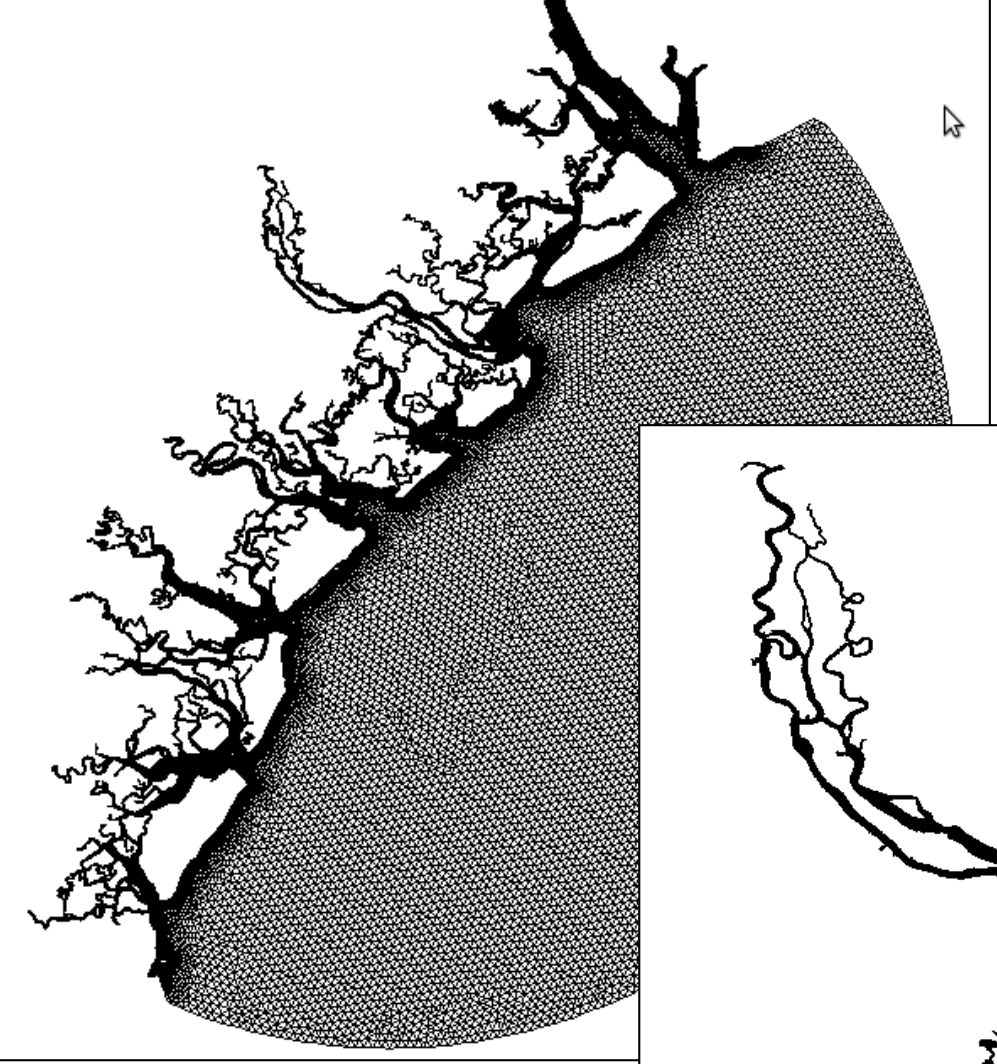
gh precision (1mm)

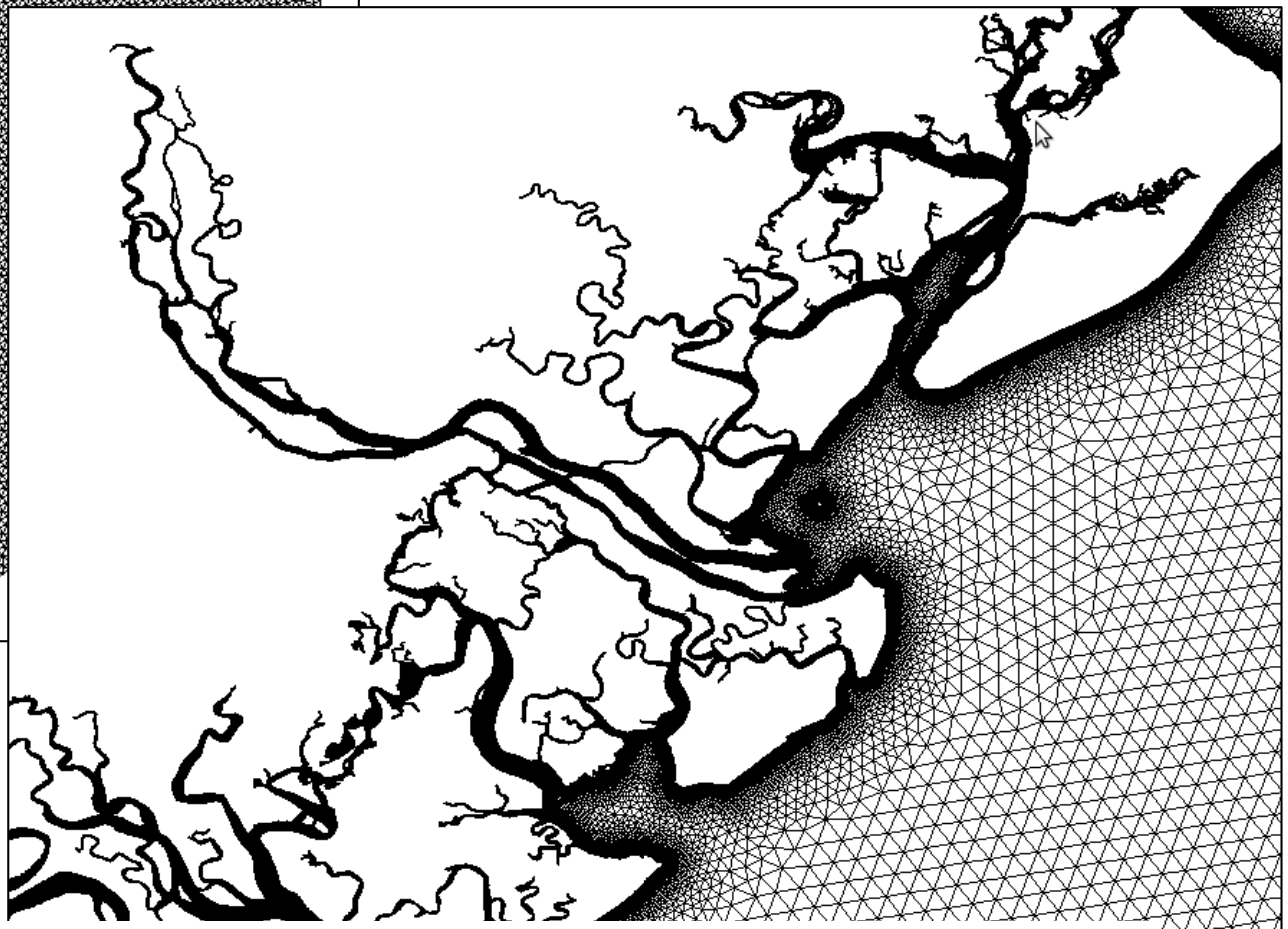
ng battery life (3-5yrs)

expensive ($300)

Lead:
Dr. Emanuele Di Lorenzo
Director, Ocean Science & Engineering
Earth & Atmospheric Sciences

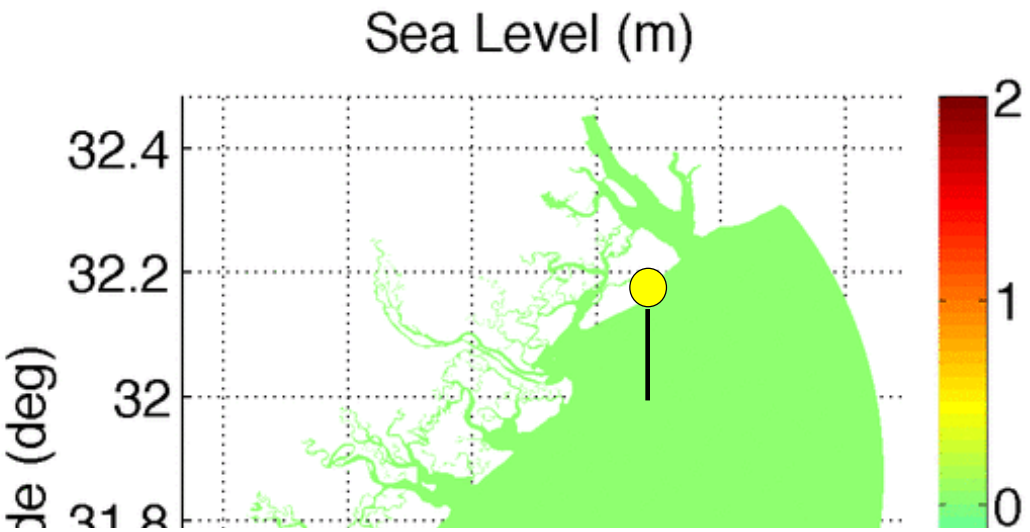
FROM THE OPEN OCEAN TO THE URBAN SCALE:
A MODELING SYSTEM FOR SAVANNAH CITY AND THE GEORGIA





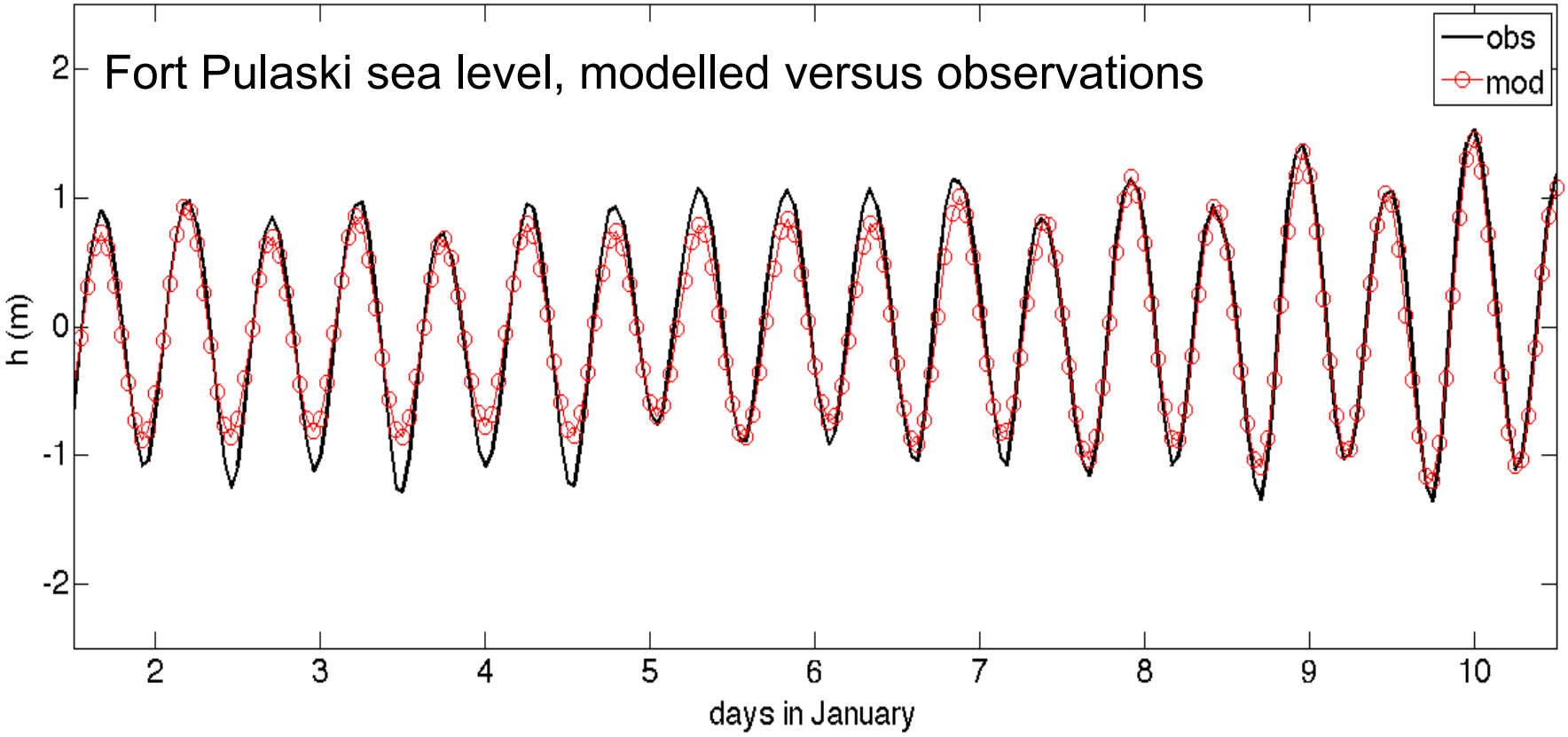
<u>adaptive, 10m grid</u>
simulate tides, hurricanes, extreme weather

<u>in process</u>
+ hydrology
+ land model
+ infrastructure [with David Frost & Iris Tuen (CEE)]



Trial simulation:
sea level
every six hours

Targets:



Educational partnerships

Jenkins High School – assembling sensors
Oglethorpe Middle School – sea level curriculum development
by Jayma Koval (CEISMC) & Alex Robel (EAS)

Community engagement

- Brunswick workshop on sea level rise Jan 22, 300 attendees
- 15+ stakeholder meetings thus far:

National Weather Service
Skidaway Inst. of Oceanography
Savannah College of Art and Design
Tybee Island Marine Science Center

Looking ahead

- join workshop livestream **Jan 29, 9-10:30am**
- sign up for Smart Sea Level Sensor newsletter on website
- get involved → modeling? risk & resilience? equity?
  data science? education? health applications?

How can we best serve coastal communities?