Smart Sea Level Sensors and coastal flooding in Georgia

Dr. Kim Cobb
Director, Global Change Program
Georgia Power Chair
Earth & Atmospheric Sciences

Dr. Russell Clark
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

The project team

Savannah
savannahga.gov

Nick Deffley
Office of Sustainability
Tom McDonald
David Donnelly

SAGIS
Savannah Area Geographic Information System

Lara Hall

School of Engineering
Herschel V. Jenkins

Tom Matey
Grace Herrington

Georgia Tech

Dr. Kim Cobb
*Dr. Russ Clark**
Dr. David Frost
Dr. Emanuele Di Lorenzo
Dr. Alex Robel
Dr. Sally Ng
Dr. Iris Tuen
Lalith Polepeddi
Jayma Koval
*Tim Cone**
Selena Perrin

**GT-Savannah*

Emergency Management
Chatham County

Randall Mathews
Dennis Jones
David Anderson

<> Open Savannah

Carl Lewis, Open Savannah

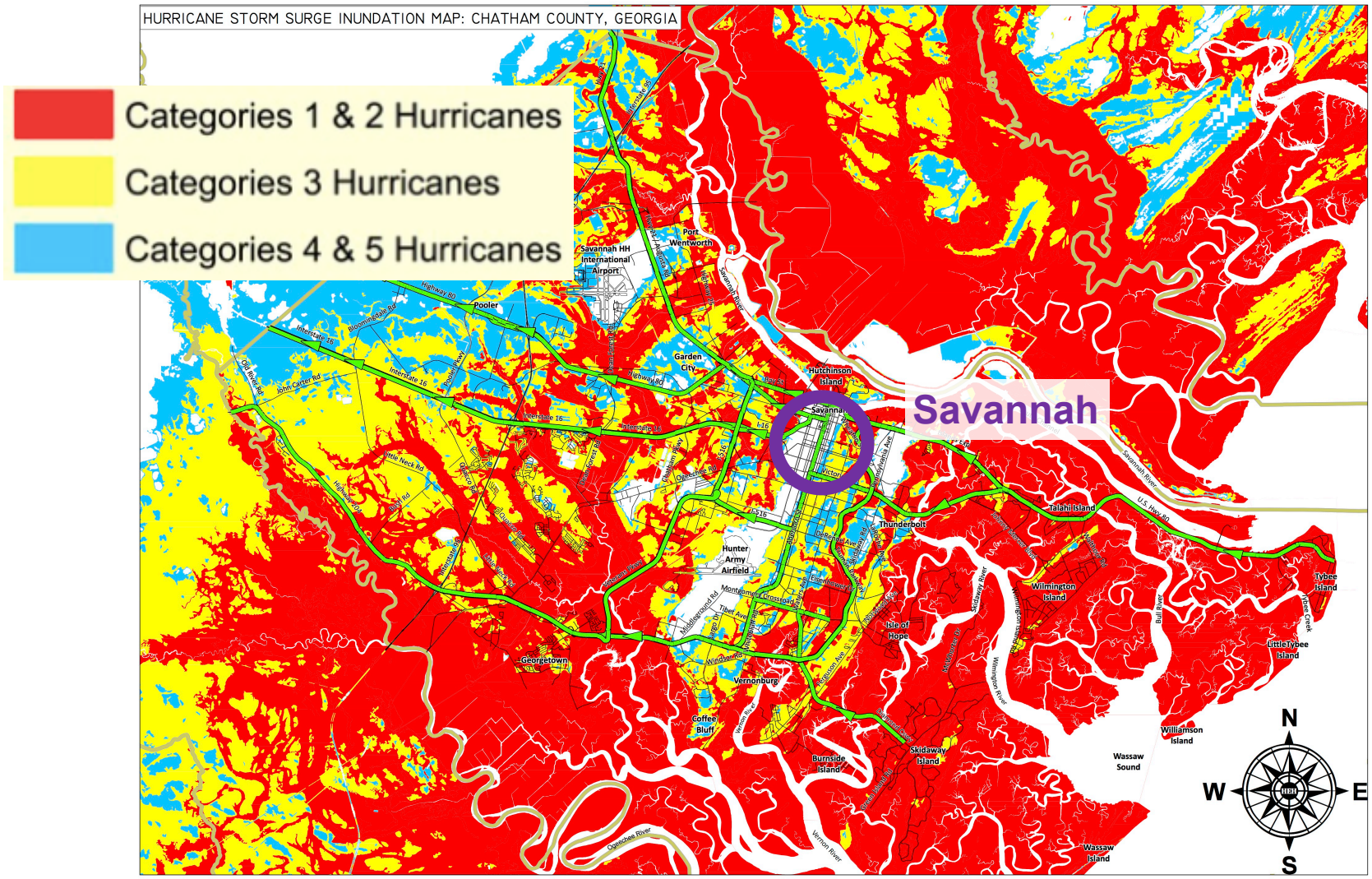
1785
Skidaway Institute of Oceanography
University of Georgia

Dr. Clark Alexander
Dr. Marc Frischer

OCS
Oglethorpe Charter School
1999

Rebecca Greenbush

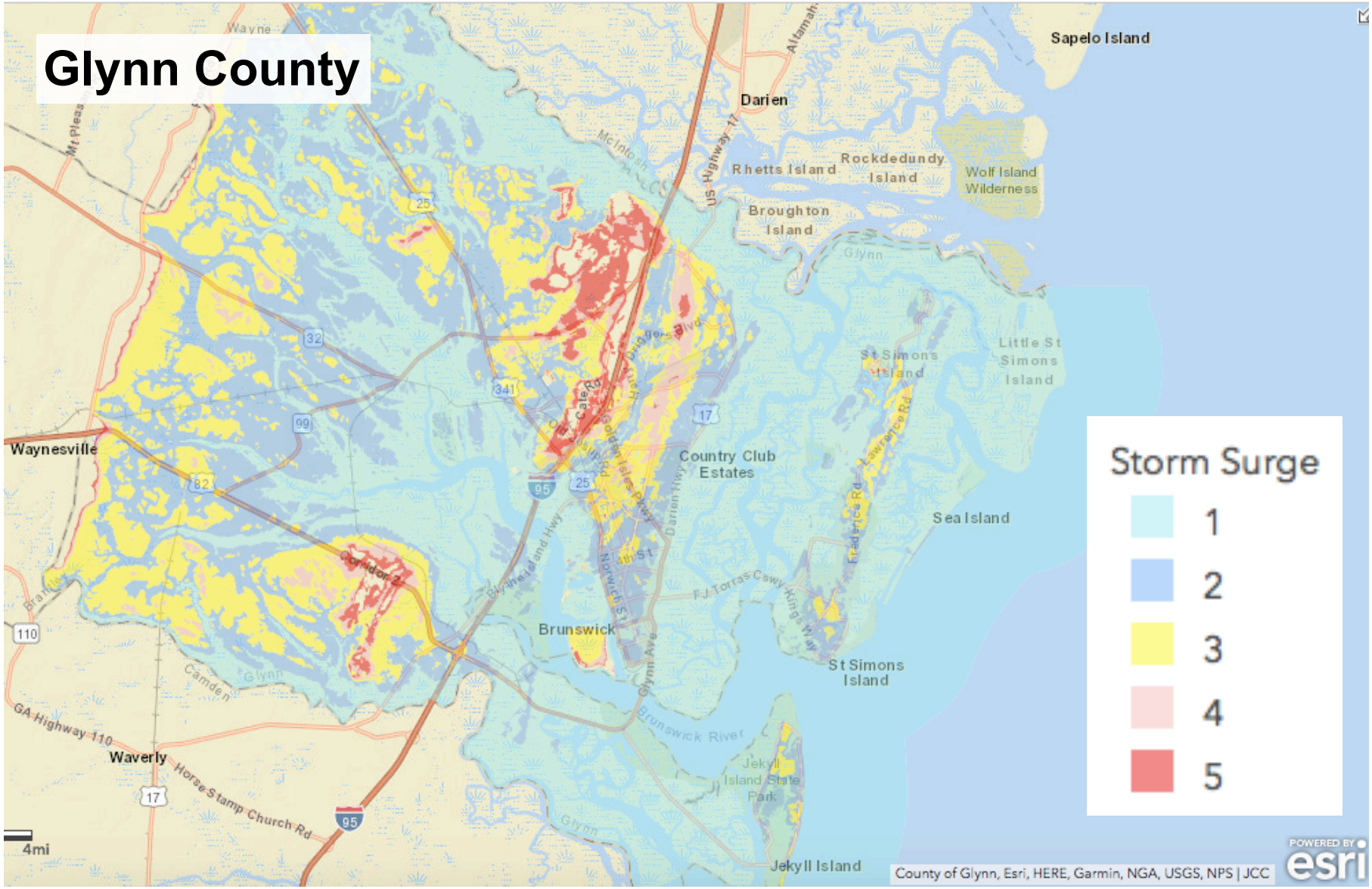
Coastal flooding – a current threat



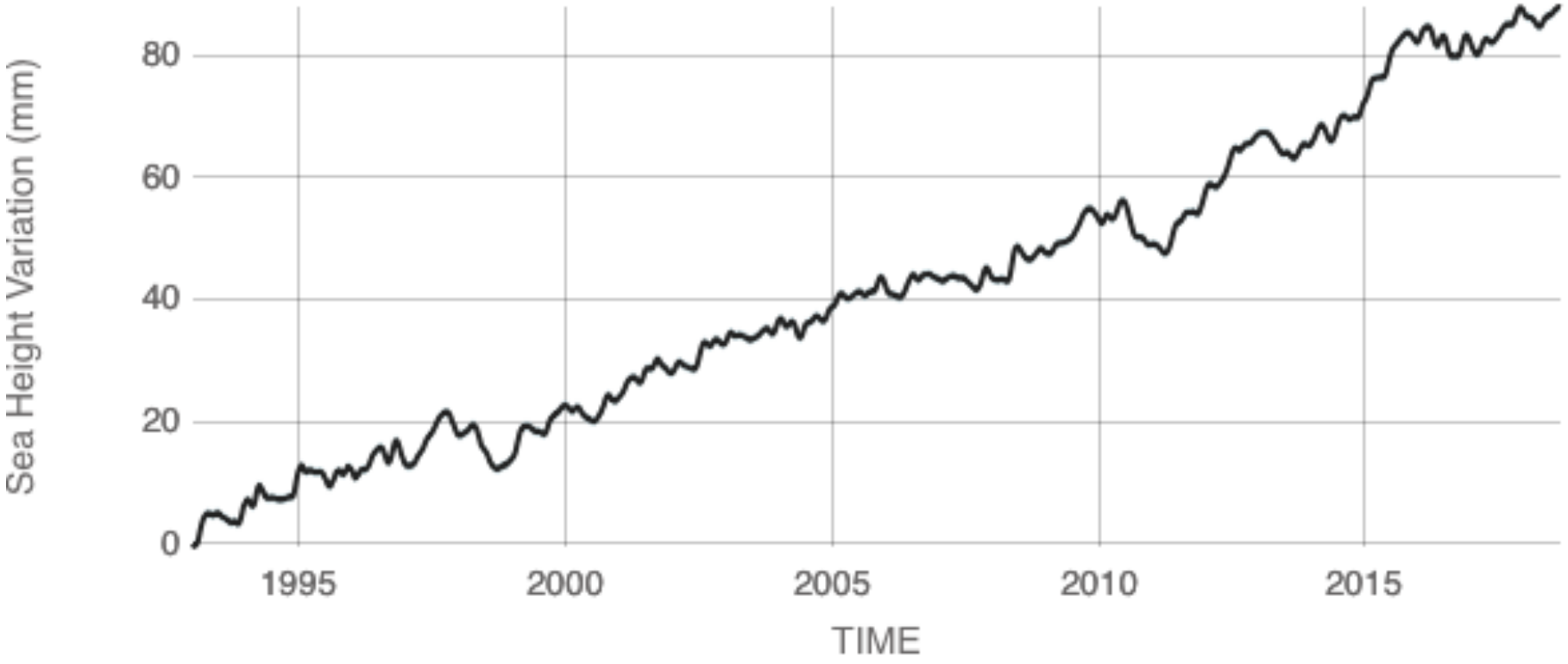
https://www.chathamemergency.org/storm-surge-impact-by-category.php

EMERGENCY MANAGEMENT CHATHAM COUNTY

Coastal flooding – a current threat



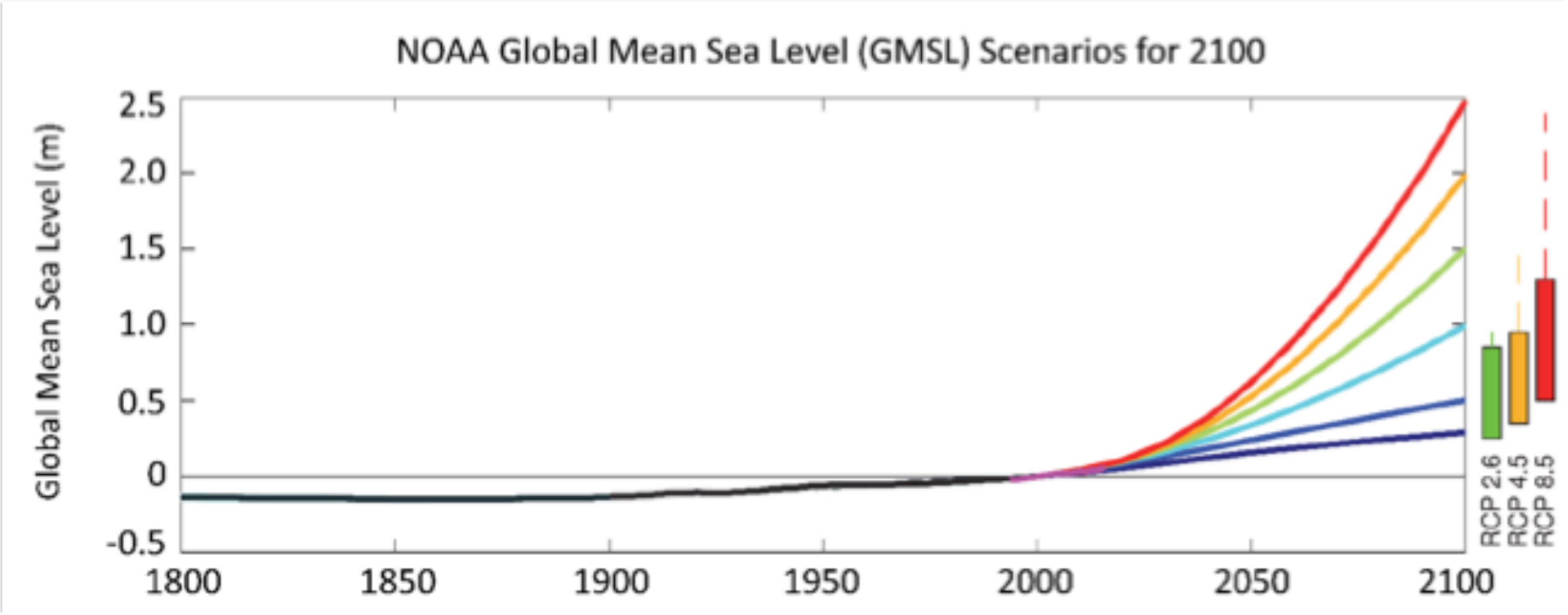
Sea level rise – a growing threat



Source: climate.nasa.gov

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

Global sea level rise scenarios



future sea level rise rates depend on:
1) our emissions pathway
2) response of the ice sheets to warming

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

“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

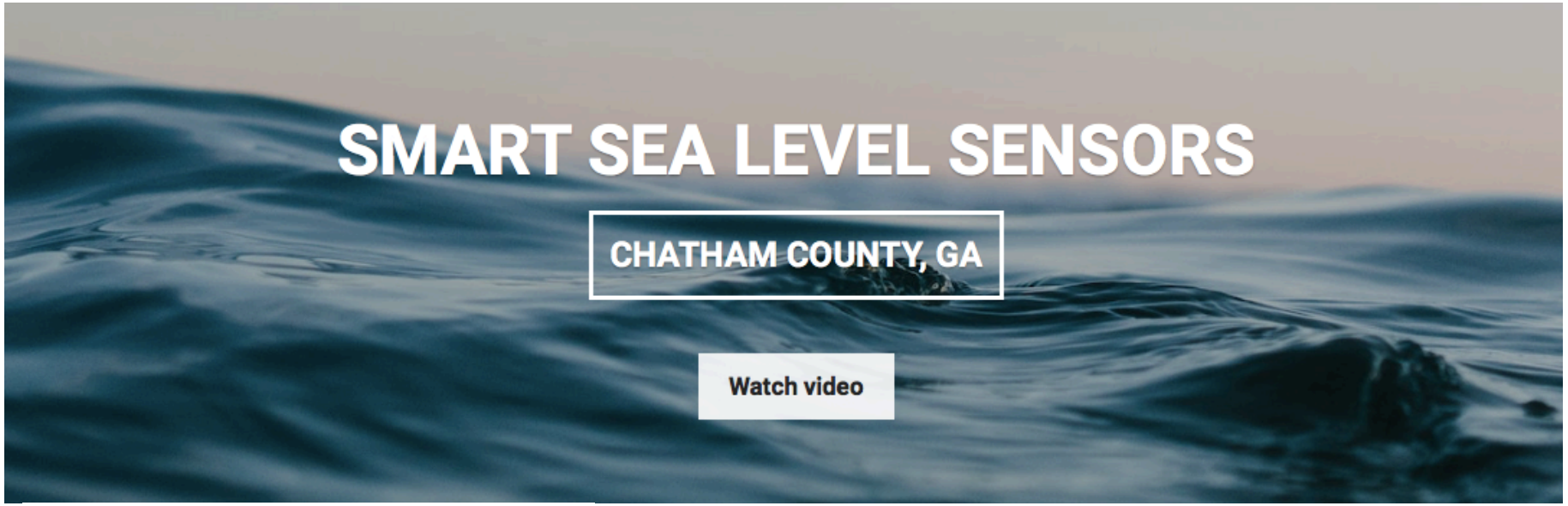
during. . .

lack of real-time information can thwart emergency response

after. . .

slow assessment of potentially compromised critical infrastructure

http://sealevelsensors.org



Georgia Tech

"Georgia Smart Communities"

Georgia Power

ARC
Atlanta Regional Commission

ACCG
Advancing Georgia's Counties.

Georgia USA

GEORGIACHAMBER

Georgia Department of Community Affairs

GEORGIA MUNICIPAL ASSOCIATION

TAG
Technology Association of Georgia

GLOBAL CITY TEAMS CHALLENGE

METRO ATLANTA CHAMBER

APA GA
American Planning Association
Georgia Chapter

Project goals

emergency planning & response

real-time data portal & toolkits

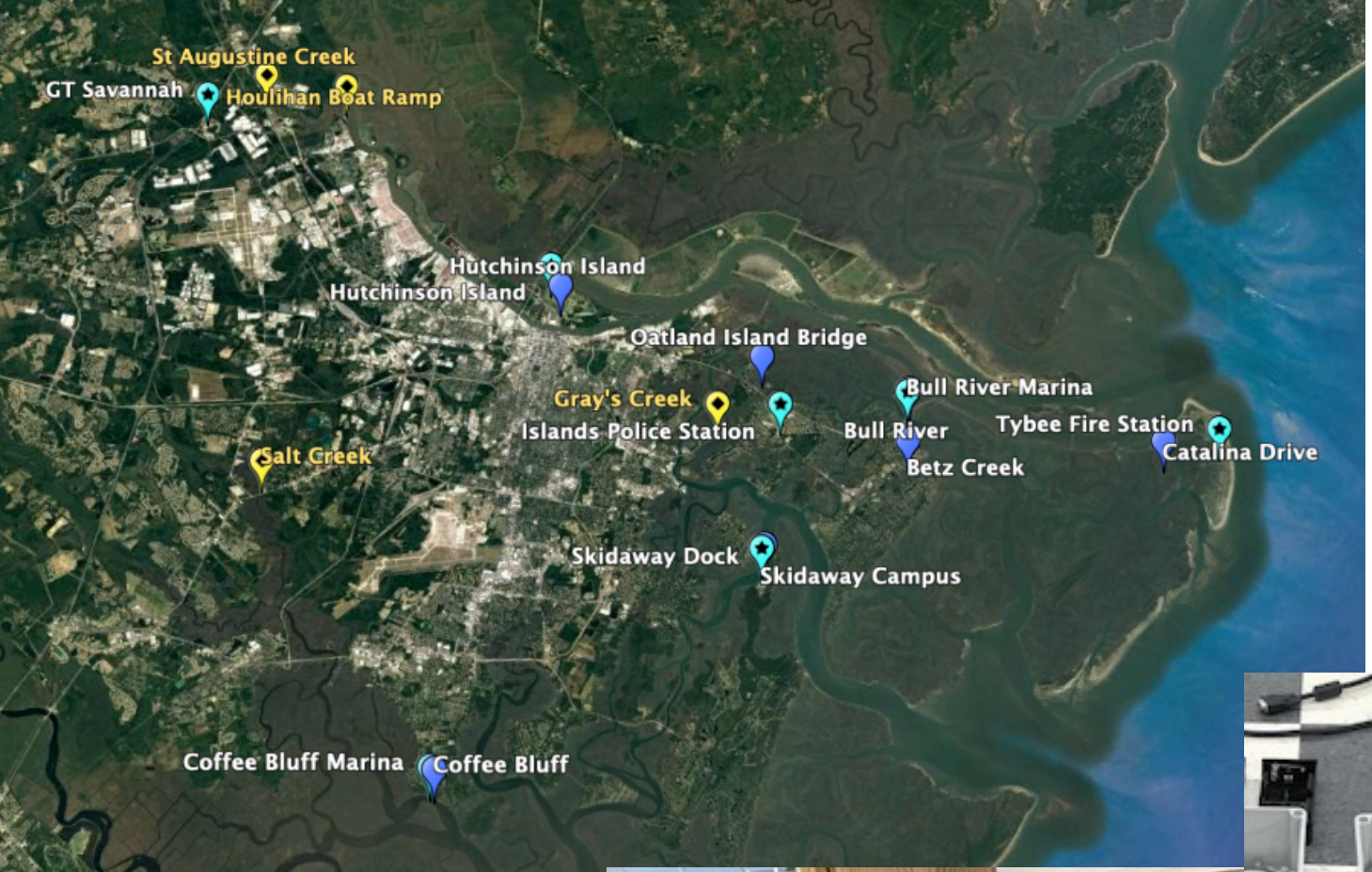
short- and long-term risk assessment and resilience planning

develop & test educational resources

middle school & high school curricula

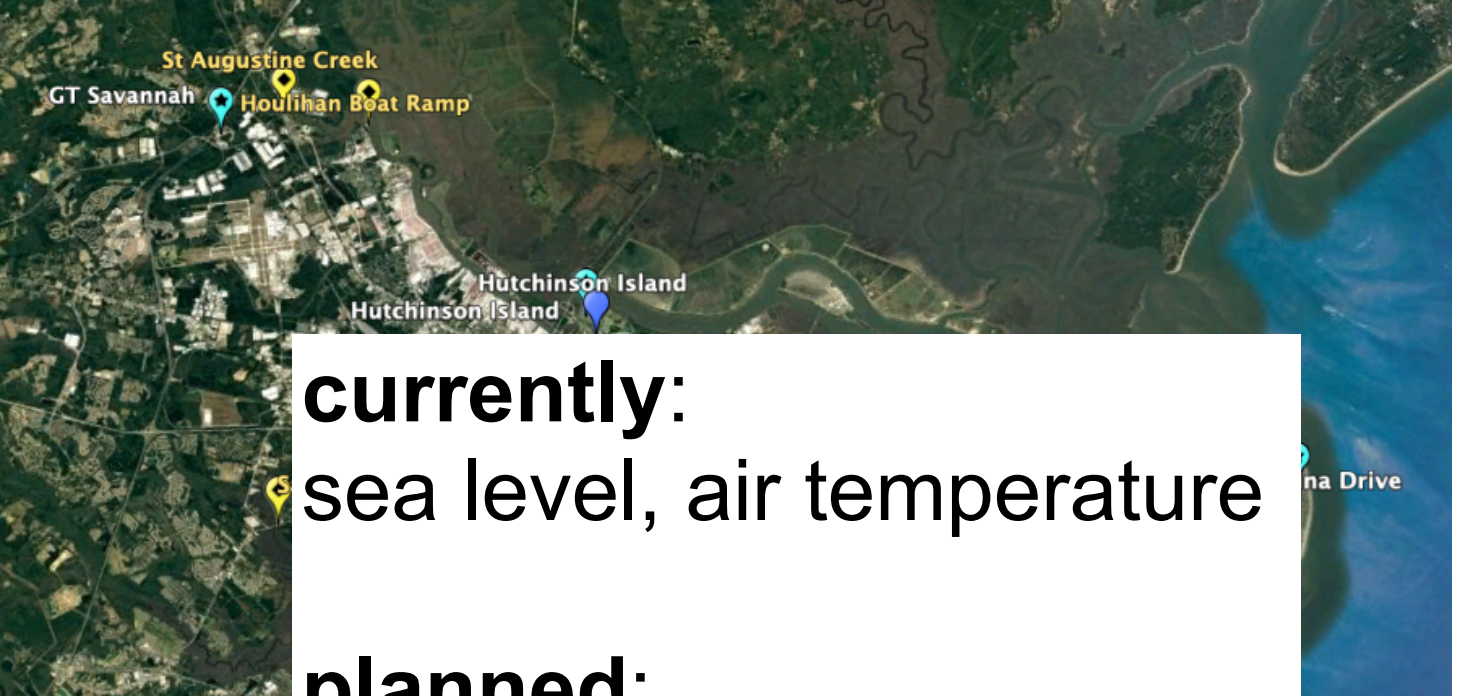
communication and building awareness

public events, installations, website



10 sensors
8 gateways

<u>goal</u>: 50 sensors by August



currently:
sea level, air temperature

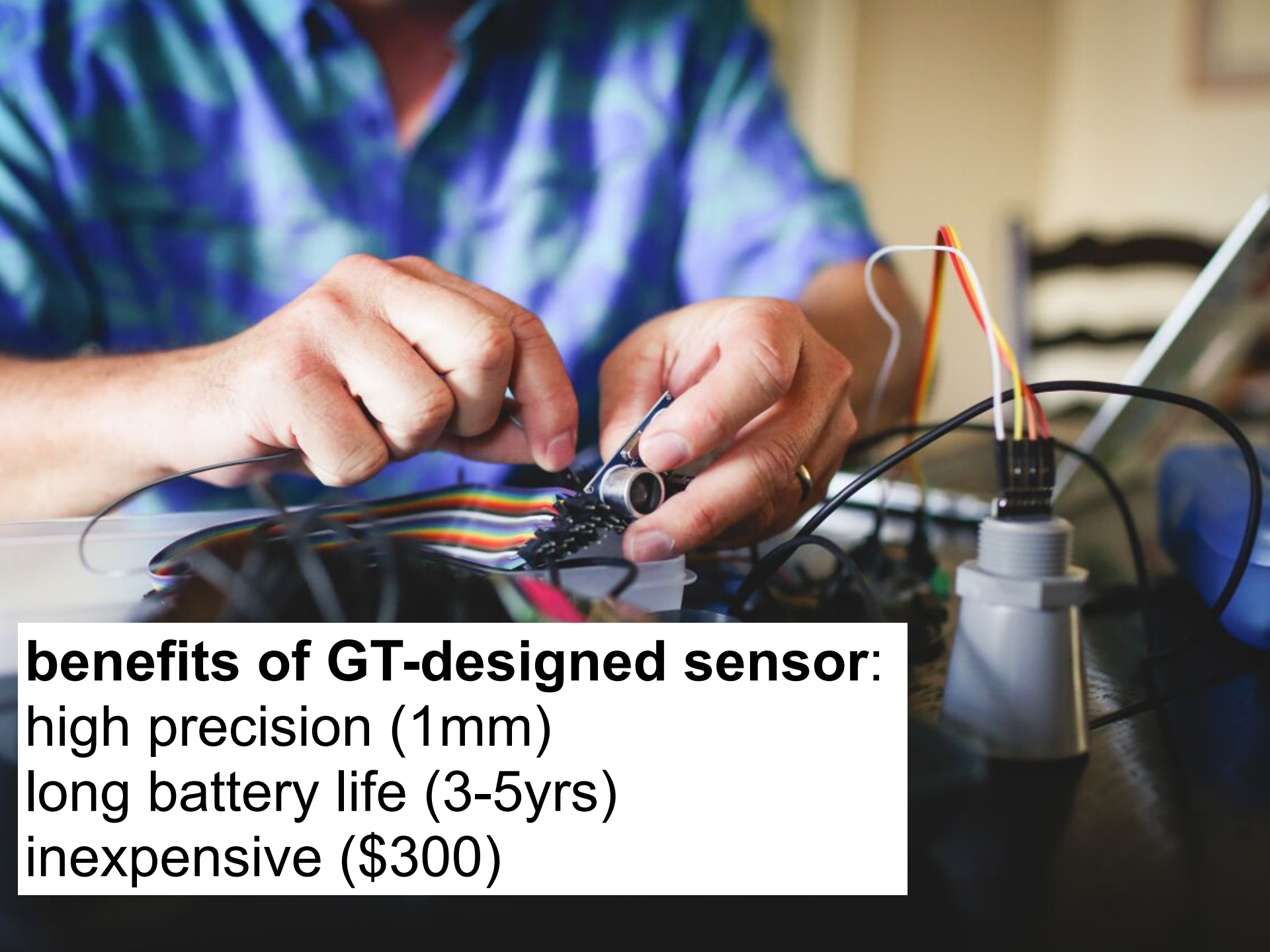
planned:
seawater properties
air quality
inland flooding

10 sensors
8 gateways

goal: 50 sensors by August

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

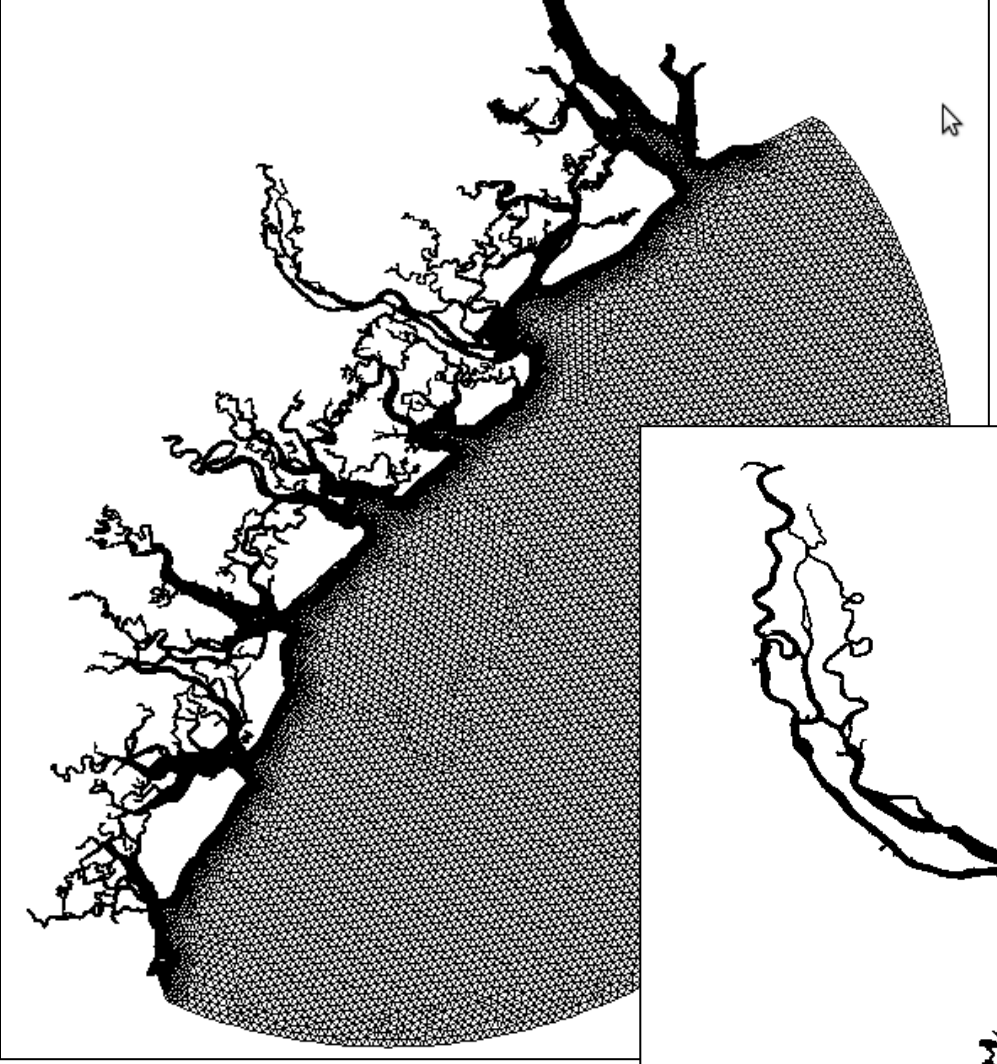
goal:
provide backbone for diverse ‘internet of things’ applications



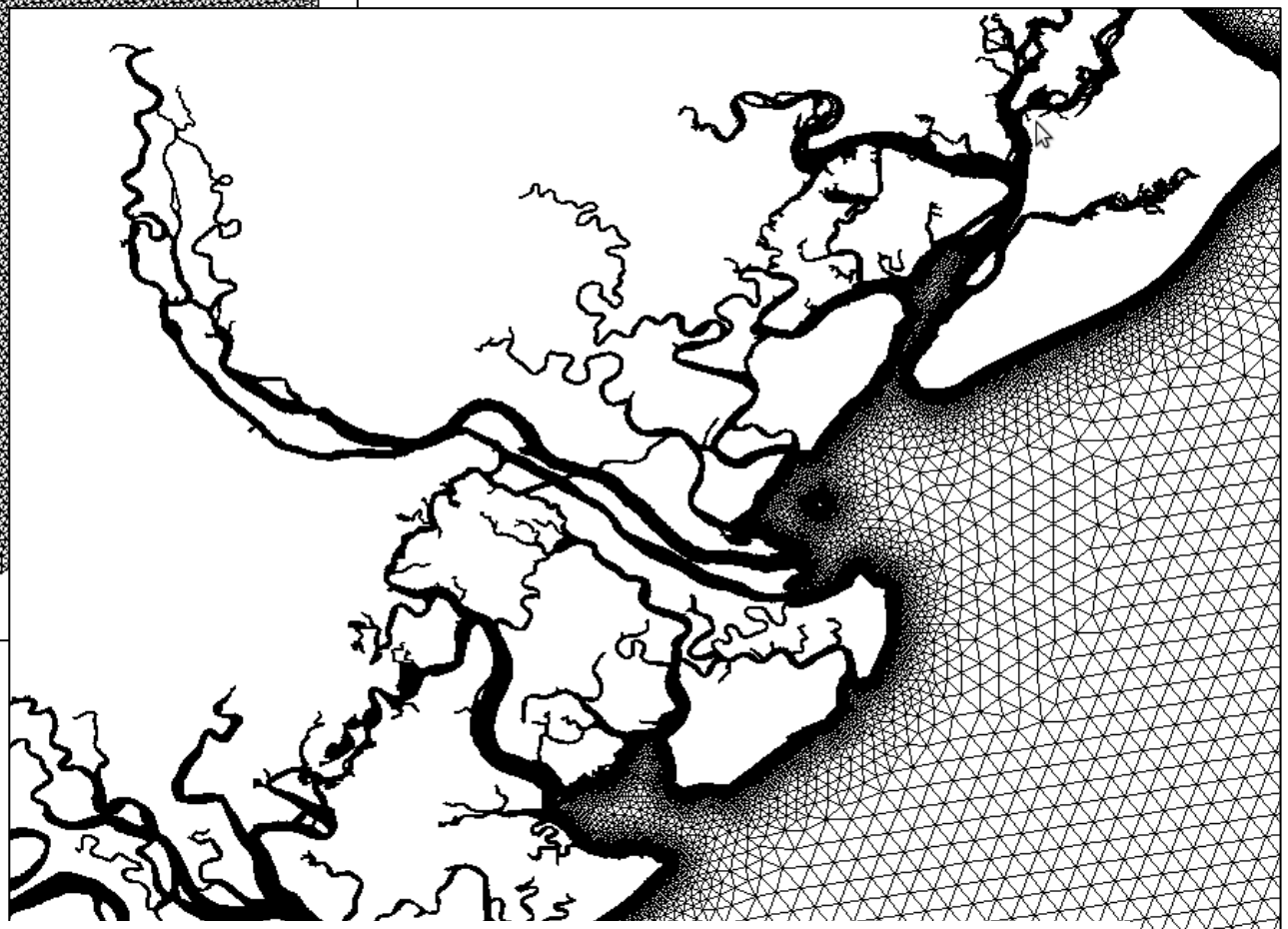
benefits of GT-designed sensor:
high precision (1mm)
long battery life (3-5yrs)
inexpensive ($300)

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 COAST

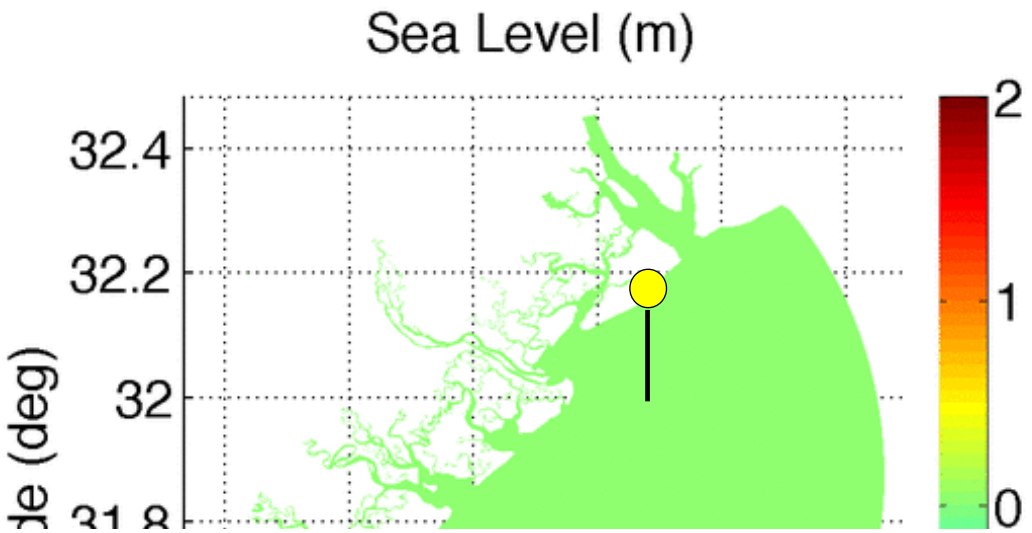


<u>adaptive, 10m grid</u>
simulate tides, hurricanes, extreme weather



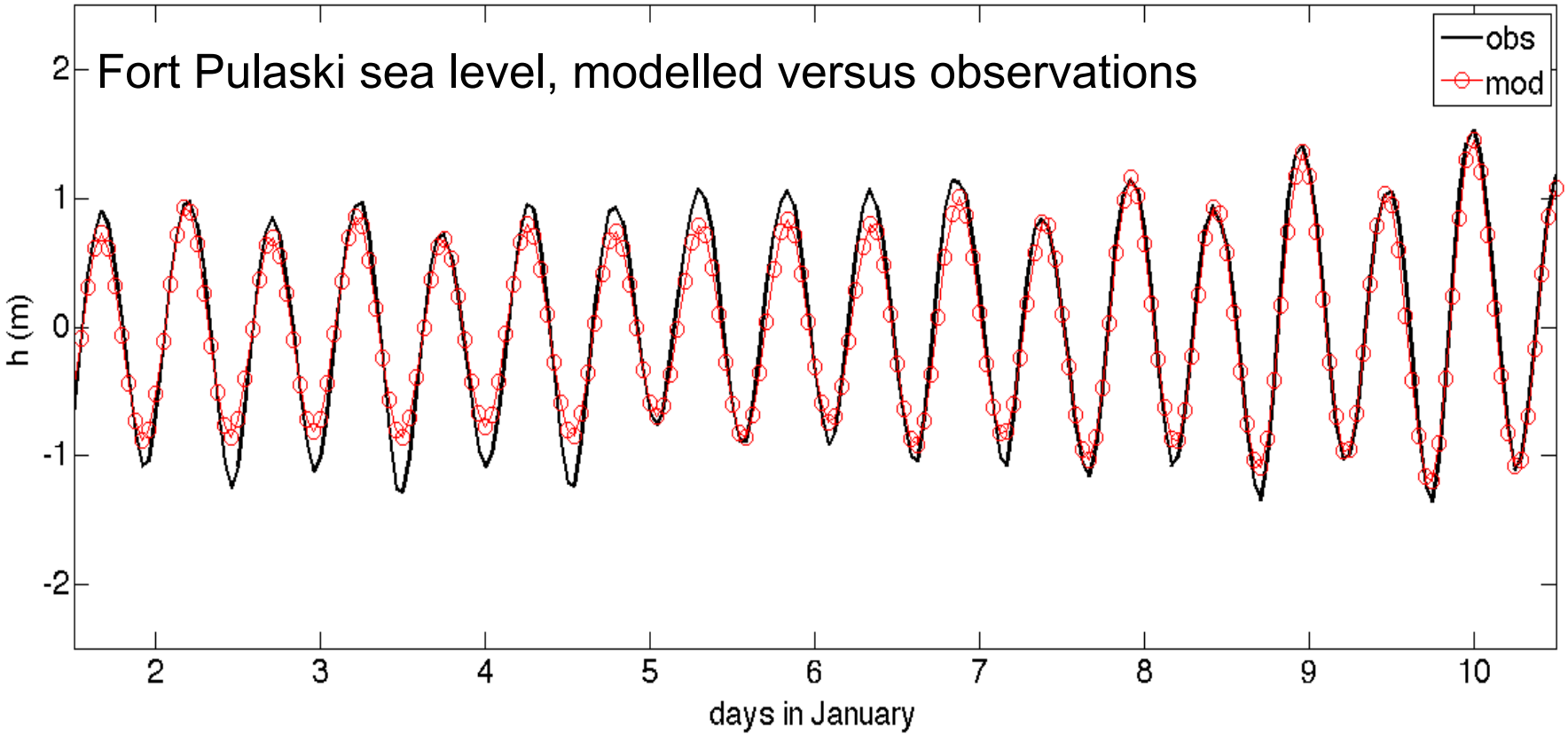
<u>in process</u>
+ hydrology
+ land model
+ infrastructure

[with David Frost & Iris Tuen (CEE)]



Trial simulation:
sea level
every six hours

Targets:
1) sea level fore



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

Featuring Randall Mathews (Mon pm) & Kim Cobb (Mon am)

Featuring Nick Deffley

SMART
SEA LEVEL SENSORS

Save the Date:

MAY 16, 3-6pm

Smart Sea Level Sensor Expo

STATE OF GEORGIA
CONSTITUTION
WISDOM
JUSTICE
MODERATION
1776