



# ***GLYNN COUNTY SHORELINE PROTECTION AND SEA LEVEL RISE PLAN***

**Coastal Empire Resiliency Network**  
*Partner Organization Meeting*

Courtney Reich, AICP, CFM  
Goodwyn Mills Cawood (GMC)

**February 21, 2022**

This report was prepared by Glynn County under grant award #NA18NOS4190146 to the Georgia Department of Natural Resources from the Office for Coastal Management, National Oceanic and Atmospheric Administration. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of DNR, OCM or NOAA.

# PROJECT PARTNERS & TASK FORCE PARTICIPANTS



- Grantee:



- Other Task Force Members:



- Project Partners:



- Consultant:



Goodwyn Mills Cawood

# TIMELINE OF EVENTS: HISTORY



Hurricane  
Matthew

Hurricane  
Irma



Source: The Florida-Georgia Star



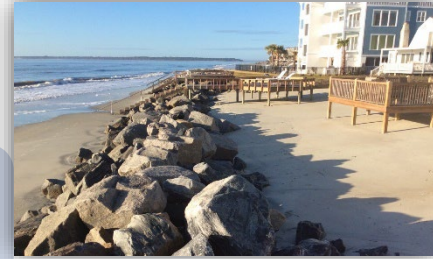




“Shoreline Assessment & Implementation Resiliency Plan”



“Sea Level Rise Response and Implementation Plan”

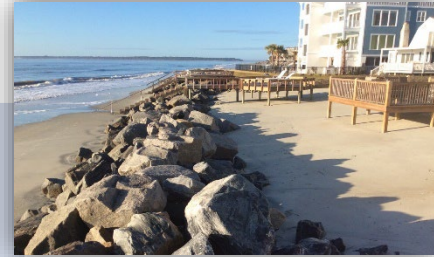


# PHASE 1 - SHORELINE ASSESSMENT & IMPLEMENTATION RESILIENCY PLAN



Gather

Gather shoreline related data (beaches, marshes, and rivers)



Evaluate

Evaluate exposed shoreline to determine vulnerability



Explore

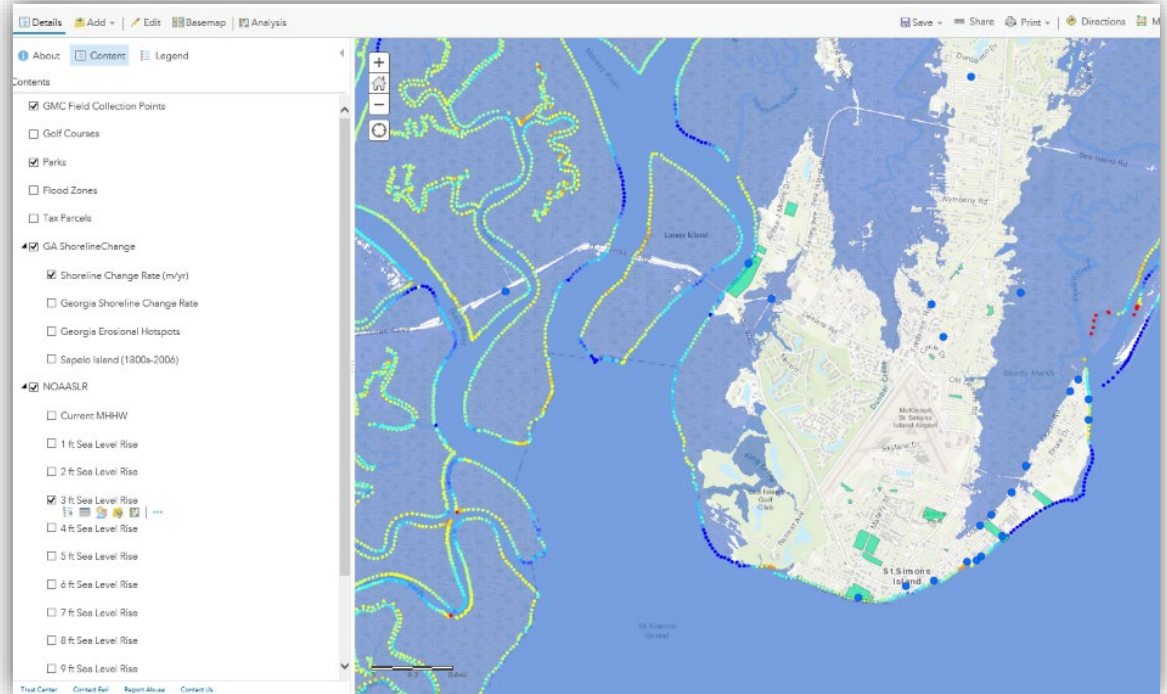
Explore preventative measures and remediation solutions

- Emphasis on minimal armoring, but to include beach sand control alternatives



## Data Sources: County, JIA, City, BGJWSC, CRD, GA Southern

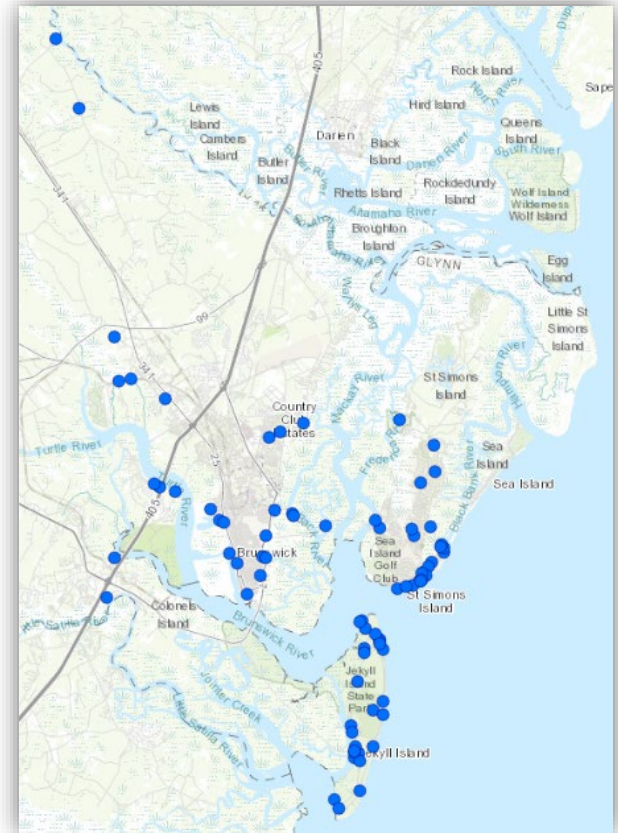
- NOAA Sea Level Rise
- Flood Zones
- Shoreline Change
- SLAMM
- Critical Facilities
- Beach Profiles
- Potential Projects
- Census data - income



# FIELD VISITS (ASSESSMENTS) WITH LOCAL STAFF (JIA, CITY, & COUNTY)



- Field visits and meetings to identify:
  - Coastal erosion
  - King Tide / flood prone areas
  - Vulnerable areas
- Information Collected
  - Issue (flooding, erosion, both)
  - Primary/Secondary Threat
  - General description and detailed comments





# FIELD VISITS WITH LOCAL STAFF

(Example Erosion Photos)





# COMMUNITY ENGAGEMENT: COASTFEST BOOTH (10/5/2019)



- Public Input for areas with
  - Coastal Erosion
  - King Tide Flooding
- 27 locations identified
  - Many were confirmed with local staff



# SHORELINE TASK FORCE



- Review vulnerable areas
- Management practice preference survey (14)
  - Nature-based
  - Traditional
- Factors and weighting to prioritize projects





Projects ID'ed & vetted by staff



Type of Infrastructure



Proximity to Infrastructure



Sea Level Rise Impacts



Presence and Rate of Erosion





# FACTORS



Vulnerable Populations



Flood Zone



Ownership of Parcel

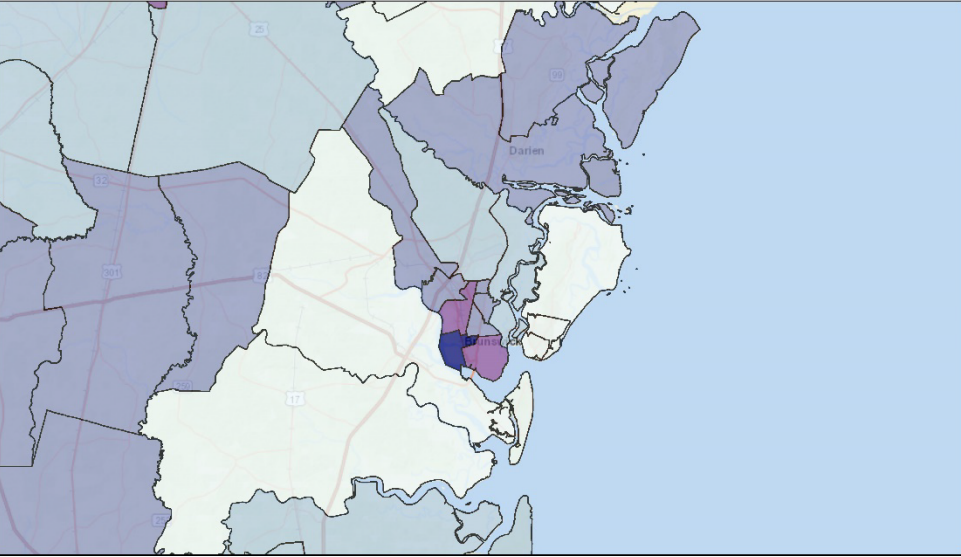


Special Habitat



Previous Flooding

CPD Maps - Consolidated Plan and Continuum of Care Planning Tool



February 21, 2022

PovertyRate	9.21-17.64% Poverty	28.17-43.06% Poverty
0-9.21% Poverty	17.64-28.17% Poverty	>43.06% Poverty

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (The Netherlands), NNGCC, (c) OpenStreetMap contributors, and the GIS User Community

# PROJECT PRIORITIZATION – MATRIX ANALYSIS



New ID	Shoreline Change	Infra-structure	Infrast Prox	Vulner Pop	Ownership	Habitat/Veg	SLR	Flood Zone	Frequent flooding	Erosion	Total Score	Rank
Glynn -	Multipier	Score	Score	Score	Score	Score	Score	Score	Score	Score		
GM1	7	7	0	0	0	3	5	3	3	0	147	29

- 10 Factors for prioritization
- Additional Output:
  - Cost (relative; \$ to \$\$\$\$)
  - Proposed Solutions & Alternates
  - Potential Partners / Project Leads
    - Tied to funding opportunities and ownership

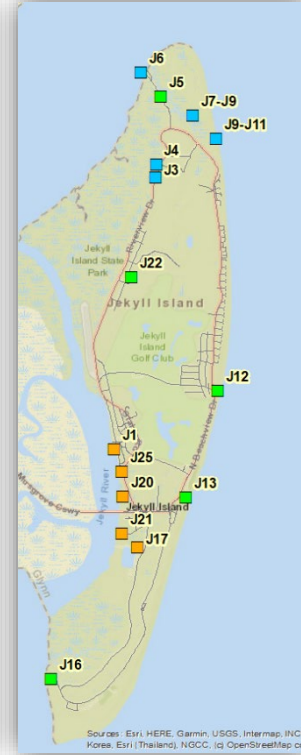
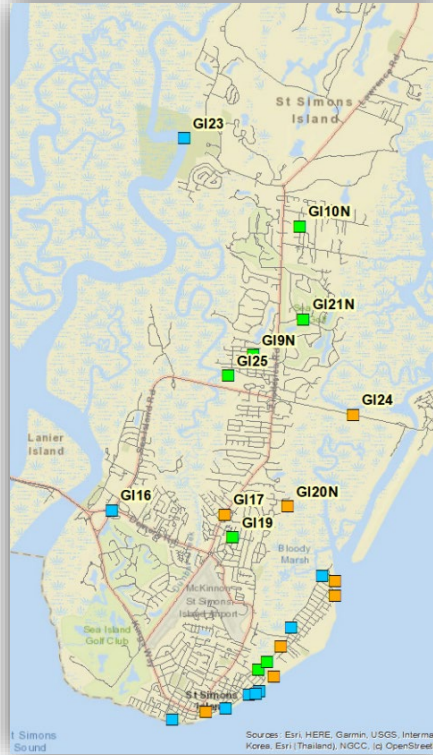
# PRIORITIZATION: SCORED BY JURISDICTION



	Glynn County	City of Brunswick	Jekyll Island
Near-Term	231-287	259-322	287-336
Intermediate	168-224	196-224	210-259
Long-Term	98-161	119-175	119-161
<b>Total Projects</b>	<b>37</b>	<b>16</b>	<b>15</b>



# PROJECT LOCATION MAPS



## Community Identified Hotspots

### Priority

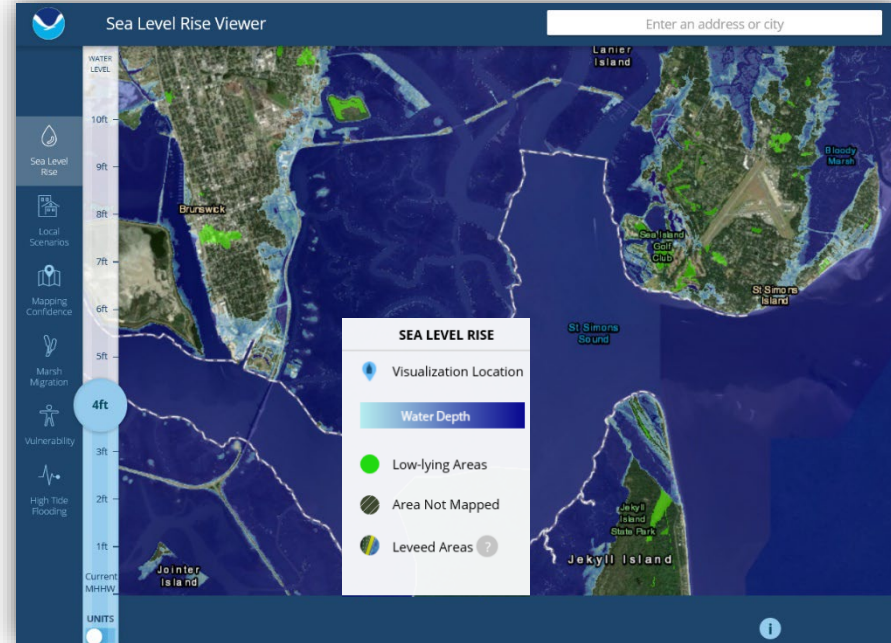
- Near-Term
- Intermediate
- Long-Term

Mainland (& City)    St. Simons Island    Jekyll Island

# PHASE 2 - SEA LEVEL RISE RESPONSE AND IMPLEMENTATION PLAN



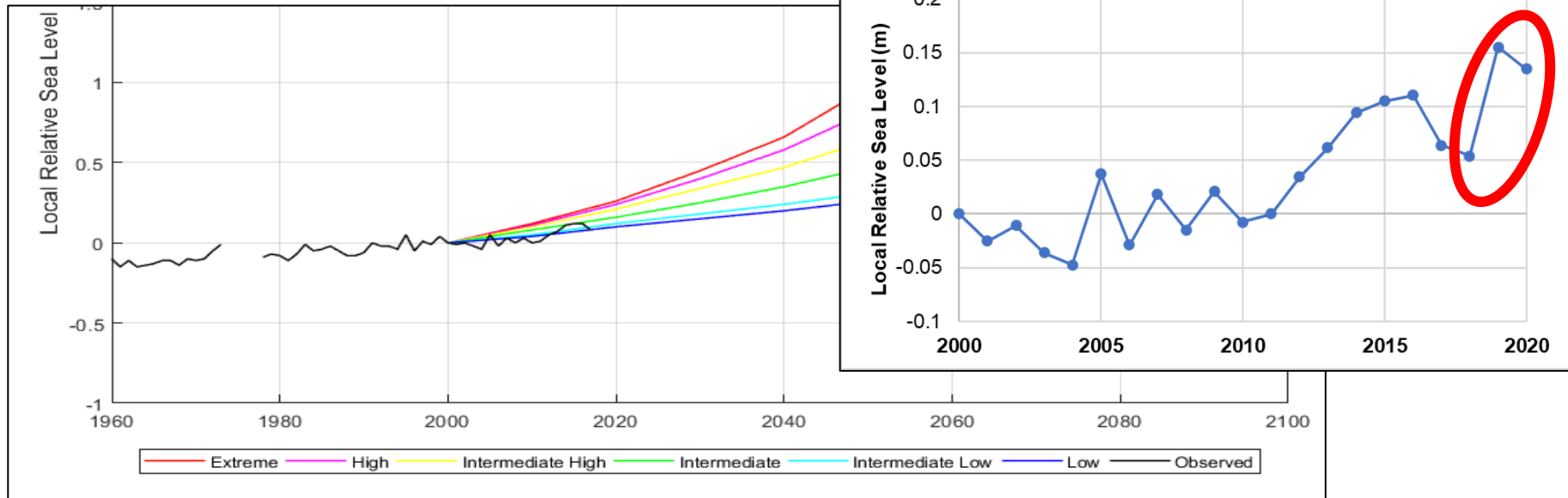
- Analyze recent sea level rise changes
- Examine data on SLR and its related intermediate and long-term hazards
- Critical facility inventory and relocation plan
- Outreach & Public Education



# REVIEW OF RECENT SEA LEVEL CHANGES

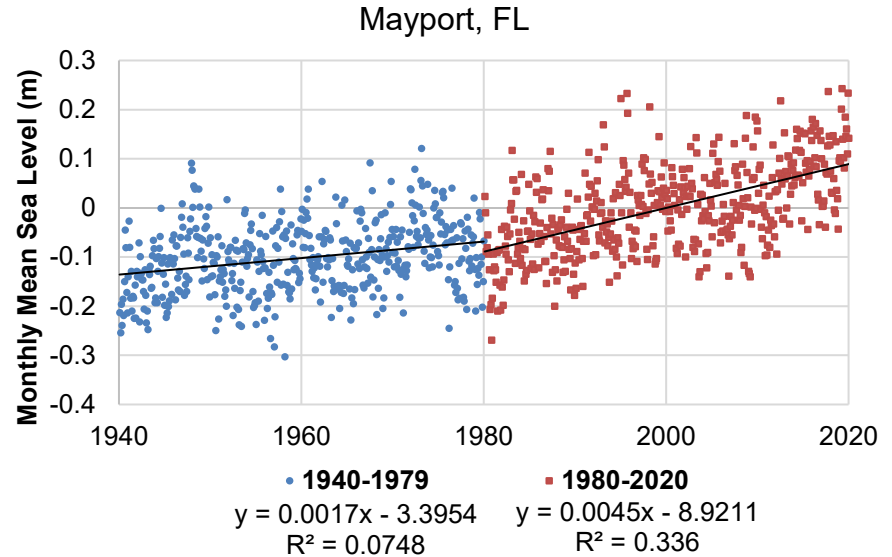
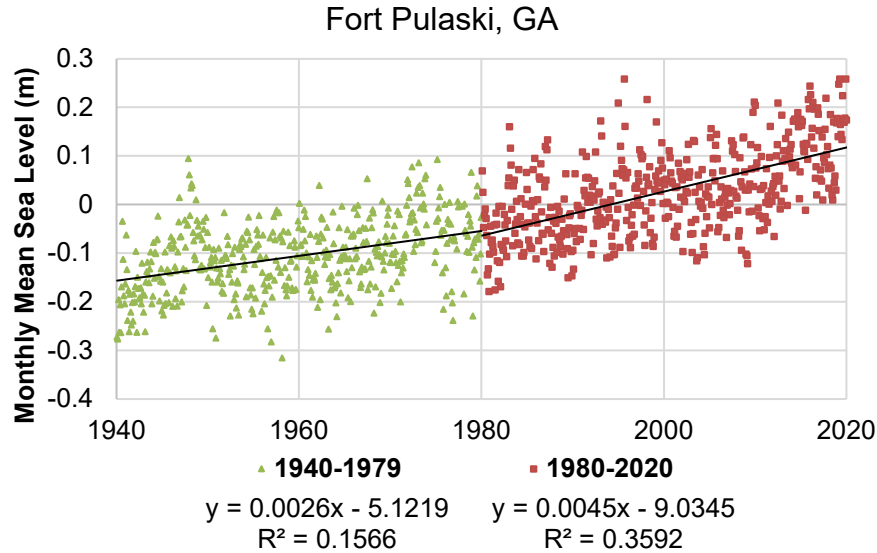


- With addition of new data, sea level trend is currently tracking around “Intermediate” scenario
- Very small separation at this point





# HISTORICALLY, RATE OF CHANGE IS ACCELERATING



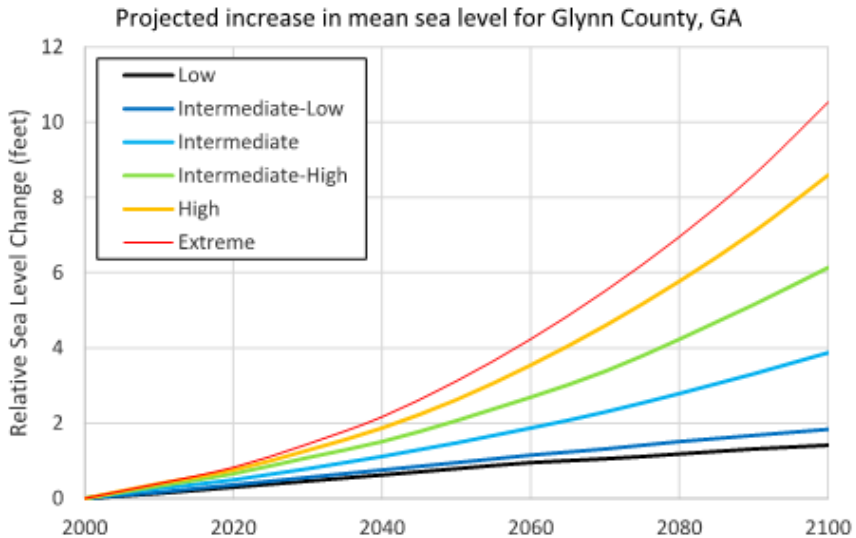
Note: 95% confidence interval is +/- 0.9 mm/yr for 40 years of data (0.3 ft / century)

Year Range	Fort Pulaski, GA	Mayport, FL
1940-1979	0.85 ft / century	0.56 ft / century
1980-2020	1.48 ft / century	1.48 ft / century

# PROJECTED SLR & PROBABILITY OF EACH SCENARIO FOR 2100



*SLR in Glynn County is projected to be ~30% greater than the global average.*



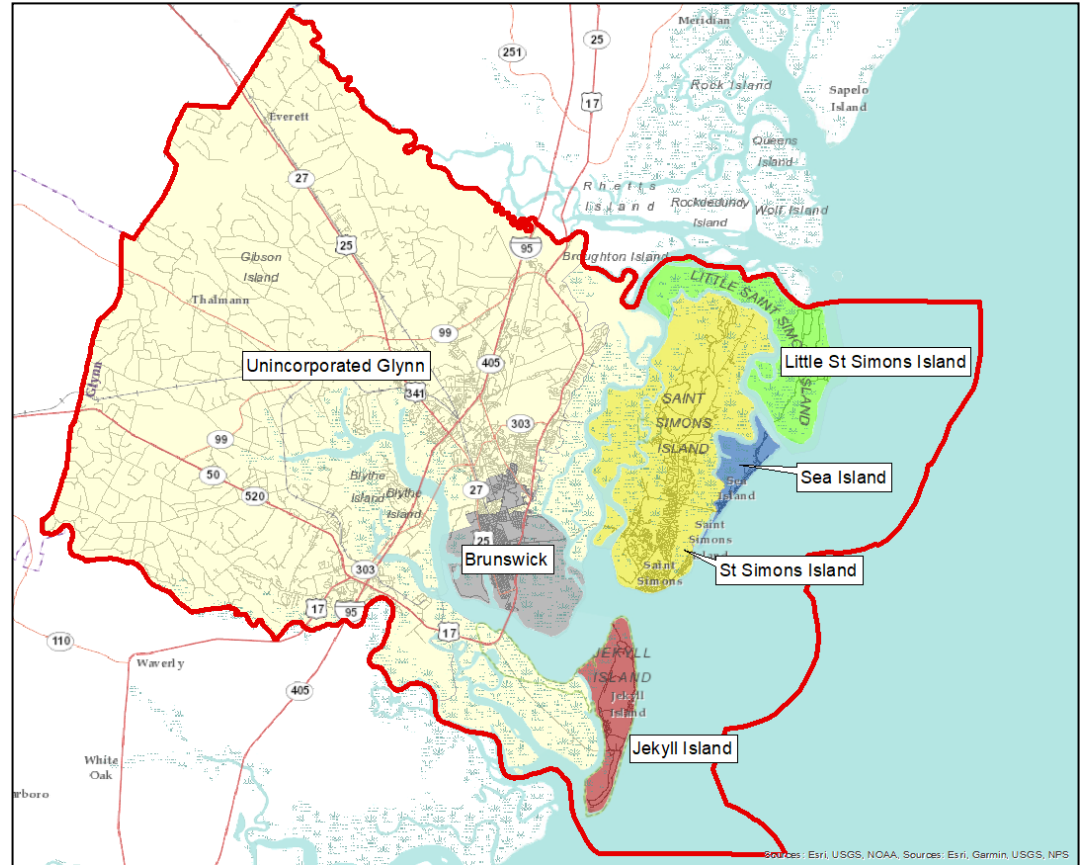
Global SLR Scenario for 2100	RCP 2.6 Dramatic Reduction	RCP 4.5 Modest Reduction	RCP 8.5 No Change
<b>Low</b>	94%	98%	100%
<b>Int-Low</b>	49%	73%	96%
<b>Intermediate</b>	2%	3%	17%
<b>Int-High</b>	0.4%	0.5%	1.3%
<b>High</b>	0.1%	0.1%	0.3%
<b>Extreme</b>	0.05%	0.05%	0.1%

**Figure 1:** Graph shows relative sea level change scenarios for Glynn County, GA associated with the six different global sea level rise scenarios. The low and extreme scenarios represent the minimum and maximum of plausible future sea level rise. Data source: NOAA Technical Report NOS CO-OPS 083; Site: 1005852785.

*Global and Regional Sea Level Rise Scenarios for the US – NOAA 2017, Silver Spring, MD  
Table in the report listed above is based on Kopp et al. (2014)*

# GIS ANALYSIS FOR SLR VULNERABILITIES

- Conducted analysis on six unique geographic areas
- Separated by primary river channel and City limits
- GIS Layers Analyzed
  - Flood Zone & SLOSH (Surge)
  - NOAA SLR Scenarios
    - 1-ft, 3-ft & 5-ft
  - SLAMM Scenarios (from CRD)
    - 1-m & 2-m
  - Marsh Migration
  - High Tide Flooding

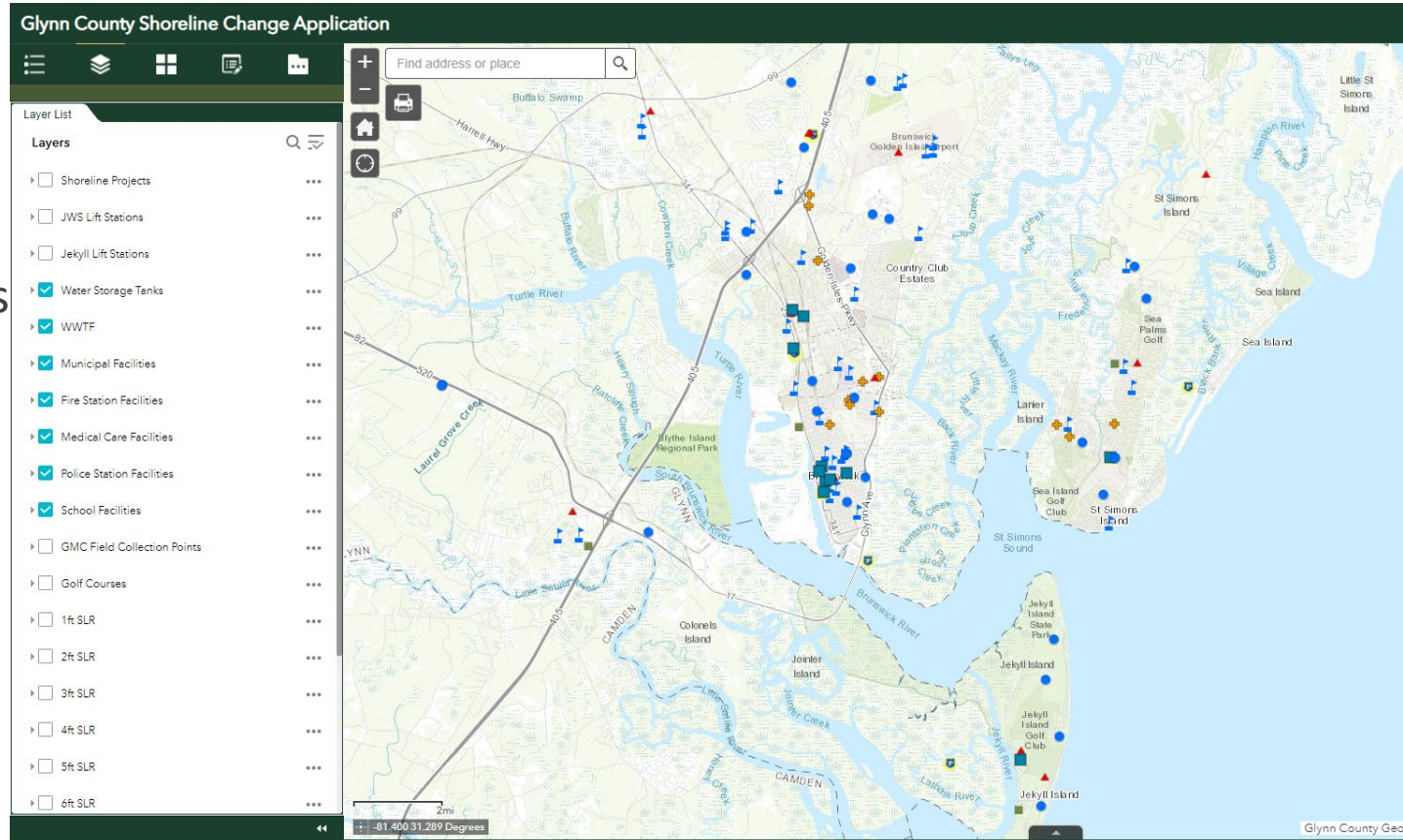




# CRITICAL FACILITY INVENTORY & ASSESSMENT



- Assessed
  - Flood Zone
  - Surge
  - SLR Scenario
- Prioritized results by jurisdiction
  - Glynn County
  - Brunswick
  - JIA
  - BGJWSC
  - Board of Ed.
  - SGHS

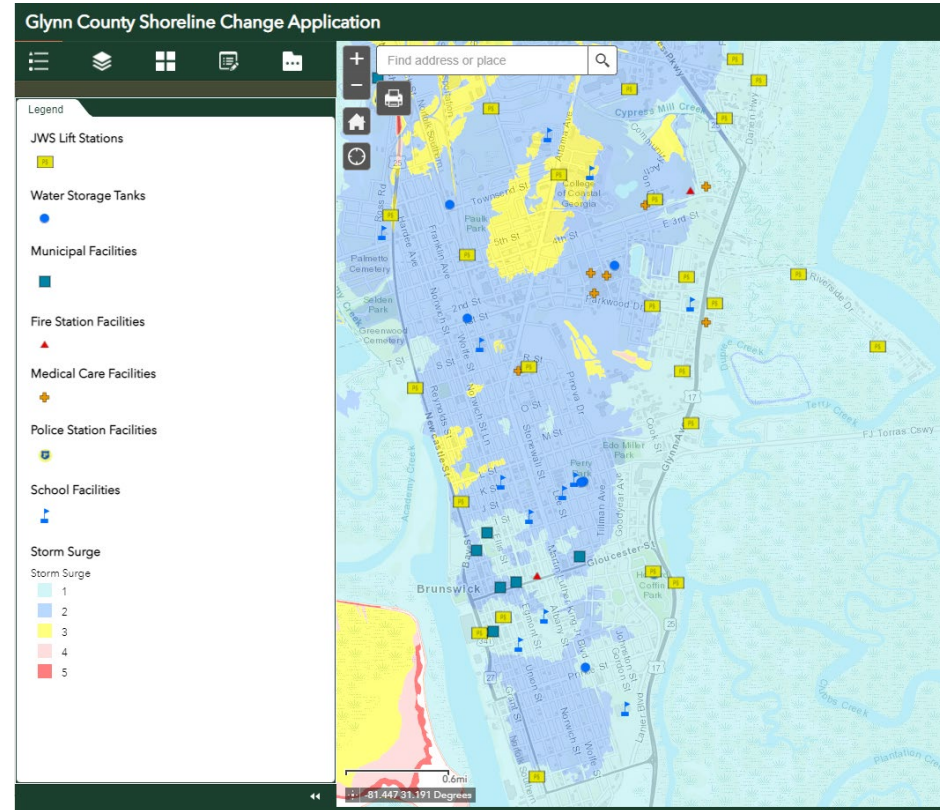


# CRITICAL FACILITY ASSESSMENT SUMMARY



## – BRUNSWICK

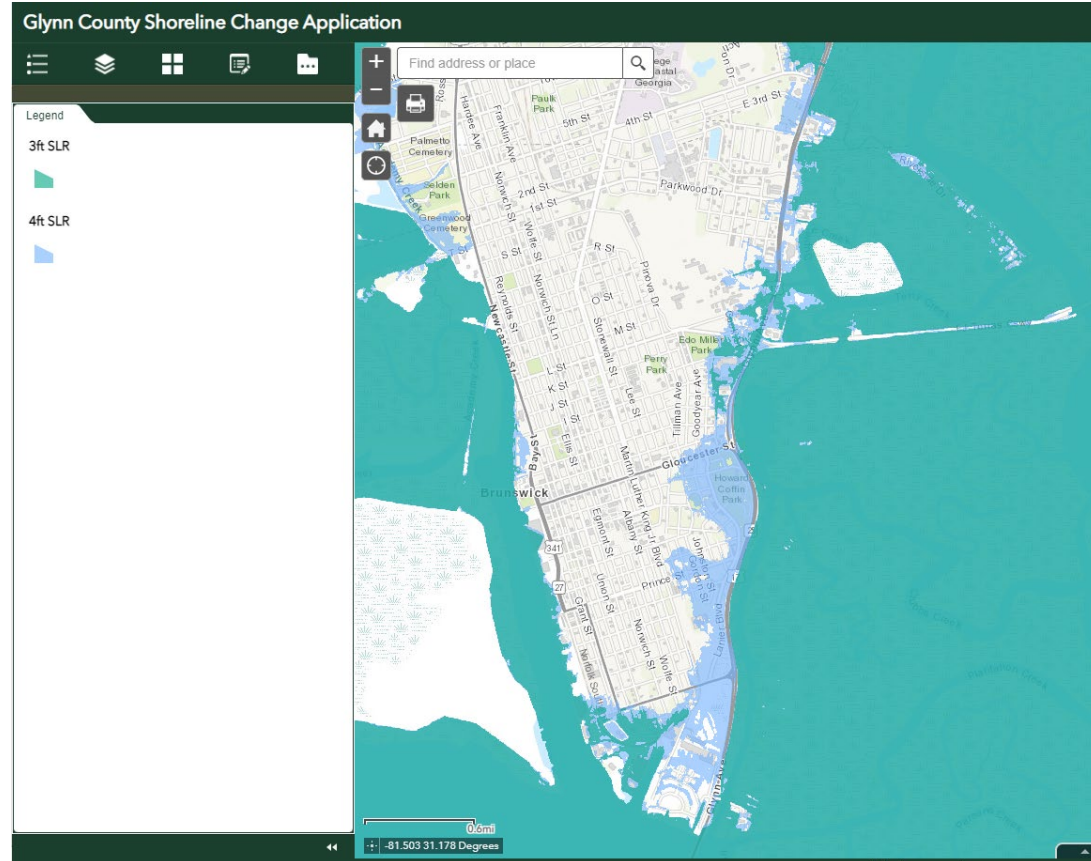
- Central hub along Gloucester and Mansfield Streets is in a vulnerable area in terms of storm surge and SLR
  - Recommendation: floodproof historical structures or future relocation with planned upgrades
- Several major roadways vulnerable to SLR
  - Recommendation: focus on segments vulnerable to 3-ft SLR scenario and consider adjacent segments vulnerable to 4-ft SLR
  - Coordination with GDOT (state hwy.)



# MAJOR ROADWAY VULNERABILITY ASSESSMENT – BRUNSWICK



- State highways; “arterial” & “connector” streets via Glynn County GIS, roads layer
- 3-foot SLR impacts
  - Hwy 17
    - Torras Causeway intersection
    - Adjacent to the Overlook Park
  - K Street near Hwy 17
  - 4<sup>th</sup> Avenue (Hwy 341) near Newcastle Street
  - Riverside Drive (causeway)
    - Only major roadway also impacted by 2-ft SLR scenario





# FURTHER EVALUATION FOR BGJWSC LIFT STATIONS



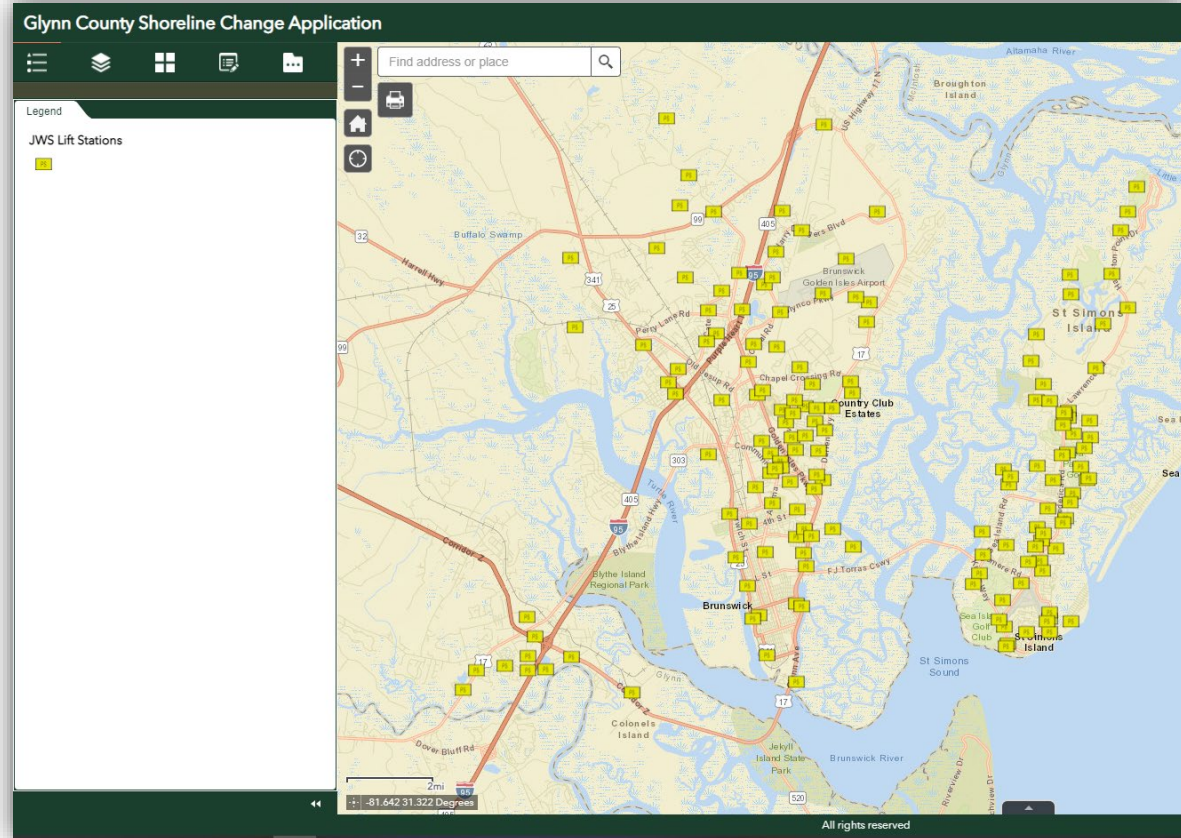
- DRRP Climate Adaptation Strategies Report:

- Rates as 1 to 5 based on surge scenario

- 61 as Cat. 1
- 55 as Cat. 2
- 20 as Cat. 3
- 16 as Cat. 4+

- Updated Approach

- Score for Surge, Flood Zone, SLR Scenario, and multiplier for “regional lift stations and expected/design flow”

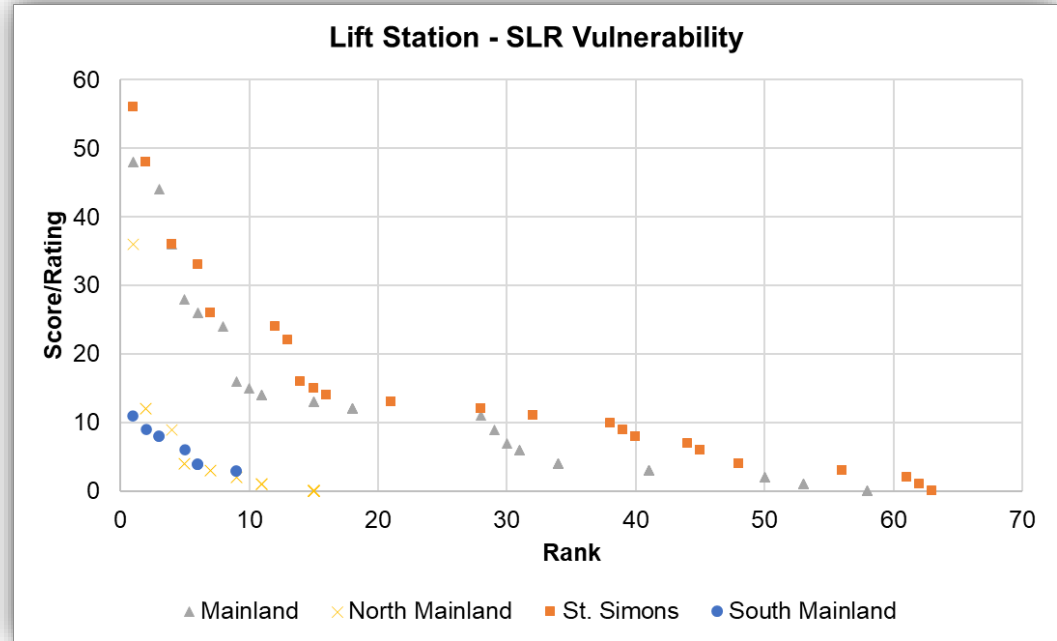




# SUMMARY OF UPDATED LIFT STATION PRIORITIZATION



- Highest priority (22+) – 22 LS
- High priority (13-16) – 23 LS
- Medium priority (11-12) – 24 LS
- Each is about 13-14% of all LSs
  
- South Mainland – good
- North Mainland – only 1 highest priority LS
- St. Simons has the most highest priority LS



# ArcGIS StoryMap (Education)

<https://glynn.maps.arcgis.com/apps/MapSeries/index.html?appid=62cec13255f44791b4f7bd05d14e354f>



## Glynn County Shoreline Protection Plan

Introduction | Shoreline and Resiliency Maps | Sea Level Rise | Management Measures | UAS Video | High Water Model | Other Resources | Acknowledgement & Copy of Plans

**Relative Sea Level Trend at Fort Pulaski, Georgia**

Carbon emissions (RCP 8.5). This scenario will see approximately 1.9 feet of sea level rise from 2000 to 2100.

Area in Glynn County currently experiencing high tide flooding.

### Sea Level Rise Scenario Maps

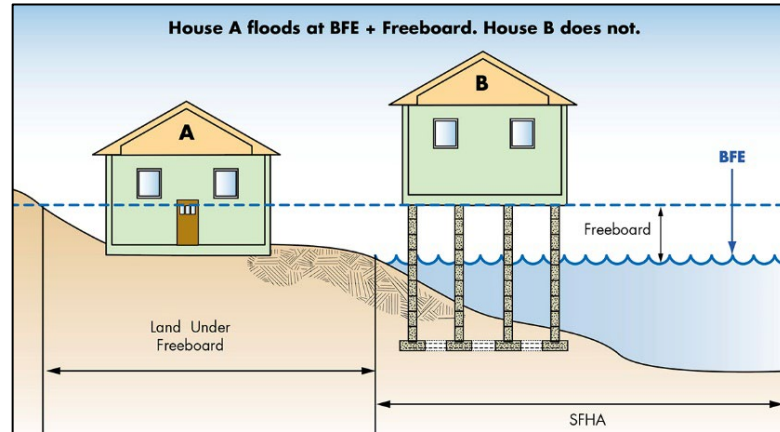
The maps here show sea level rise conditions for the current conditions of Mean Higher High Water (MHHW) which is the average of the higher high-water height of each tidal day, as well as the 3-ft sea level rise scenario.

County of Glynn, Esri, HERE, Garmin, INCREMENT P, NOAA Office for Coastal Management, USGS | Powered by Esri

- Freeboard

- # feet above Base Flood Elevation

- Margin of safety to protect against more severe storms and increased future flood risks from rising sea levels



*\*Graphic from floodsciencecenter.org*

- 2021 Addendum to 2017 CRS Coordinator’s Manual has set 1-foot freeboard, as minimum pre-requisite for CRS Class 8.  
 –All three meet this criteria

Community	CRS Rating	Effective Date
Glynn County	5	10/1/2021
City of Brunswick	6	10/1/2020
Jekyll Island	5	5/1/2017

\*Data as of 10/1/2020 (FEMA)

Freeboard	No Filling Restrictions	Compensatory Storage Required	Fill Prohibited
1 foot	100	110	120
2 feet	225	250	280
3 feet	375	440	500

} **CRS Points**



# KEY OUTCOMES FROM PHASE 2:

## SEA LEVEL RISE RESPONSE & IMPLEMENTATION PLAN



1. SLR Scenario Recommendation
2. Recommend to adopt as Appendix to DRRP
3. StoryMap website for public education
4. Presentation of codes/ordinances to increase resiliency (*Freeboard*)







Ashby Nix Worley, CFM

**Coastal Climate Adaptation Director,**  
**The Nature Conservancy,**  
**Georgia Chapter**

# Camden County Resiliency Work Plan

# PARTNERSHIP & FUNDING

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National Fish & Wildlife Foundation (NFWF) Grant

Ashby Worley – The Nature Conservancy

Shana Jones – The University of Georgia Carl Vinson Institute

Scott Pippin – The University of Georgia Carl Vinson Institute

Rob Brown – Goodwyn Mills Cawood

Courtney Reich – Goodwyn Mills Cawood

# RESILIENCY IMPLEMENTATION WORKPLAN



Reflects robust **stakeholder engagement** among all the participating communities,



Is informed by science & **technical expertise**,



Builds upon **existing success**, and



Results in a “**pipeline**” of projects eligible for future design and implementation funding.





# NATIONAL FISH & WILDLIFE FOUNDATION: GRANT PROJECT AND SCOPE

- Under this program, NFWF awarded \$37 million in coastal resilience grants to create and restore natural systems in order to increase protection for communities from coastal storms, sea- and lake-level changes, inundation, and coastal erosion, while improving habitats for fish and wildlife species.

NFWF will invest in projects in four priority areas:

✓ Community Capacity Building and Planning	Current Award: \$75,000 to create a Resiliency Implementation Workplan
✓ Site Assessment and Preliminary Design	Potential award: \$250,000
✓ Final Design and Permitting	Potential award: \$350,000
✓ Restoration and Monitoring	Potential award: \$1 to \$5 million



# CLIMATE CHANGE ON THE GEORGIA COAST



Increase in coastal hazards...

- Tidal flooding
- Hurricane storm surge
- Encroaching sea level rise
- Change in precipitation causing riverine and localized flooding
- Erosional banks & beaches

Increased coastal hazards

+

Increased coastal population

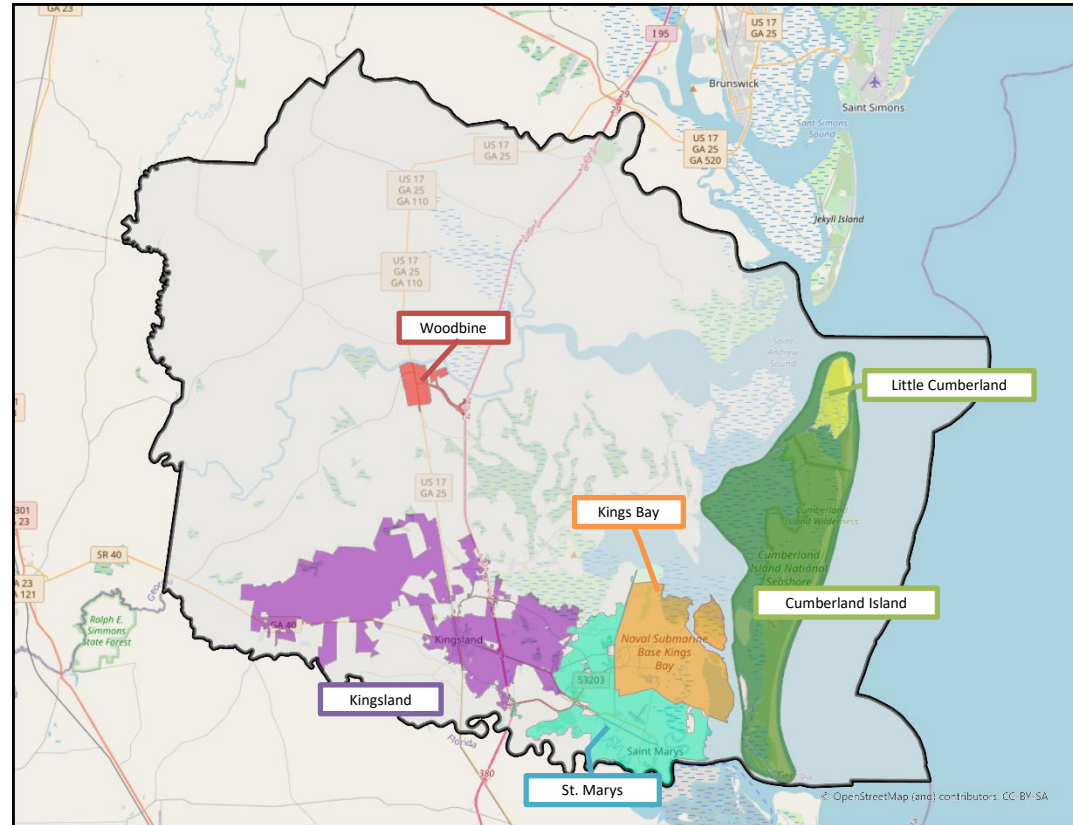
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Increased vulnerability to both human and natural systems



# GIS ANALYSIS & PLAN INVENTORY

- Conducted analysis on seven unique geographic areas
- GIS Layers Analyzed
  - Flood Zone & Storm Surge
  - NOAA SLR Scenarios
    - 1-ft, 3-ft & 5-ft
  - SLAMM Scenarios (from CRD)
    - 1-m & 2-m
  - Marsh Migration
  - High Tide Flooding
  - Shoreline Change Rate



# PUBLIC ENGAGEMENT & FEEDBACK



## Current flooding areas

- King Tide
- Stormwater
- Storm surge
- Riverine

## Other issues

- Repetitive Loss
- Erosion
- Vulnerable communities

## Current plans in place

### Resiliency survey helps county, cities plan for our future needs

Camden County residents are encouraged to participate in a survey to provide input for the creation of a Resiliency Implementation Workplan for Camden County.

The Nature Conservancy, working with Camden County and the Cities of Kingsland, St. Marys, and Woodbine, invite residents to provide feedback that will help inform the creation of the work plan. This project is funded by a National Coastal Resilience Fund grant through the National Fish and Wildlife Foundation, in partnership with the National Oceanic and Atmospheric Administration (NOAA).

"This is an excellent opportunity for Camden County residents to share their knowl-



edge to help improve the future of our community," said Camden County Community Resiliency Survey Coordinator Steve Brantel. "The survey takes a few minutes to complete and covers flooding and other environmental hazards."

Throughout the planning process, the project is designed to bring community voices together to identify actionable steps to assist local, county, and federal decision-makers to improve local resilience and address environmental hazards and to be more comprehensive for future design and implementation grants.

The project will prioritize nature-based solutions by identifying and developing opportunities for infrastructure projects to mitigate flooding, storm surge, sea-level rise risks, and other threats to local infrastructure and facilities.

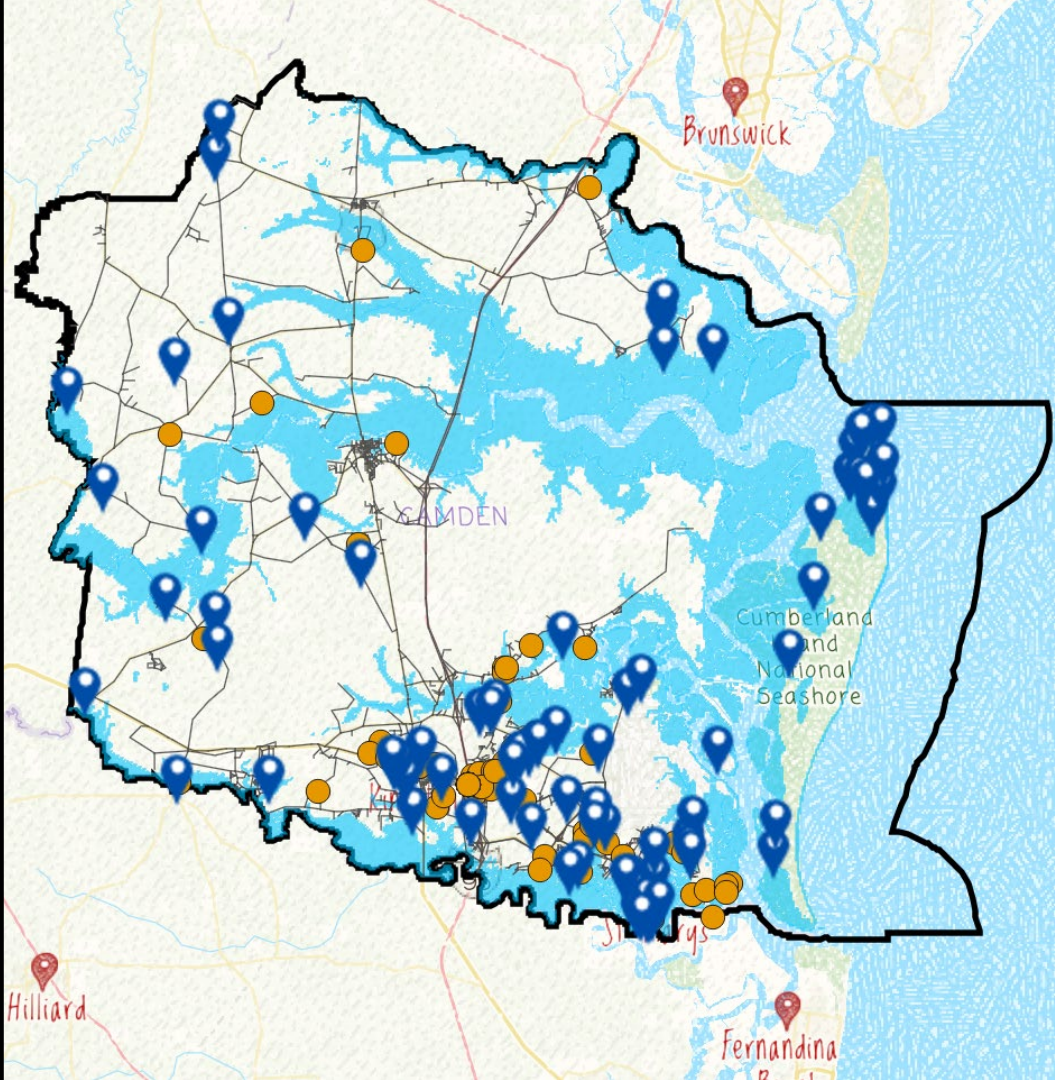
A direct link to the survey is available on the Camden County website at [www.camdencountyga.gov/Workplan](http://www.camdencountyga.gov/Workplan).





# VULNERABLE LOCATIONS

**Orange** – survey responses  
**Blue** – interview responses



# PROJECT PRIORITIZATION TOOL MATRIX – FACTORS



## HIGH

- SLR + Floodplain (Army Corps data)
- Type of Infrastructure
- Current Flooding Frequency

## MODERATE

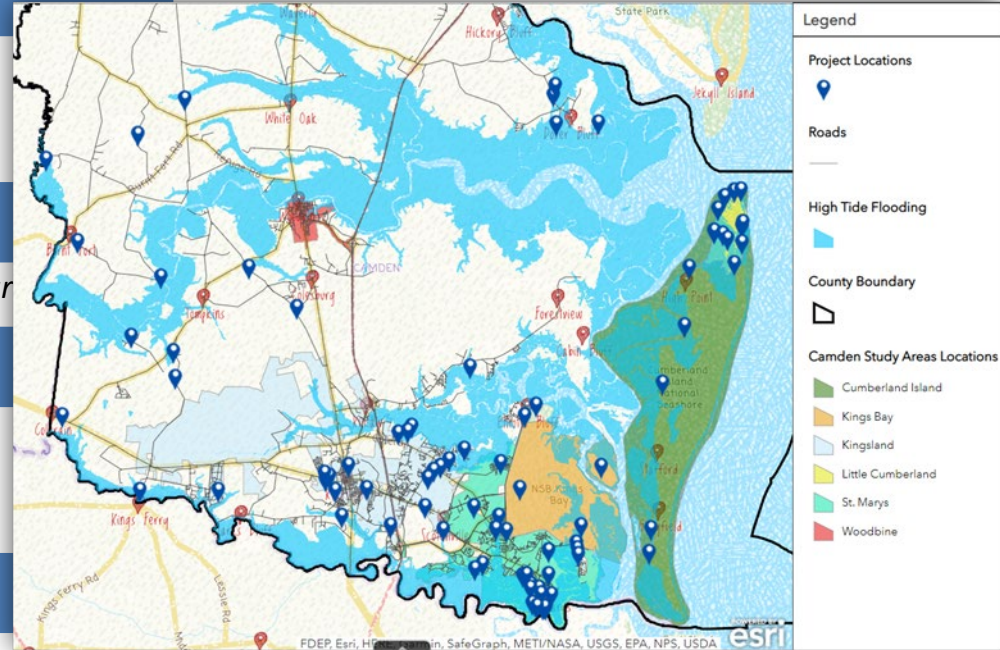
- Erosion Rate (*combined with proximity to key infrastructure*)

## LOW

- Vulnerable Populations
- Ownership
- Special Habitat

## Additional Project Output:

- Relative Cost
- Solutions & Alternatives
- Partners/Project Leads



## NEXT STEPS

- Draft plan by March 2022
- Review and feedback by steering committee
- Town Hall style public engagement events (2) to solicit input & feedback from public on draft plan
- Finalize plan by May 2022
- Implementation of plan (apply for project funding with partners)

### *Contact Info:*

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