# Chatham County Sea Level Rise Study

#### September 14, 2021





THE INSTITUTE FOR WATER AND ENVIRONMENTAL RESILIENCE STETSON DIMENSITY Presentation By: Courtney Reich, AICP, CFM Goodwyn Mills & Cawood









COASTAL RESOURCES DIVISION



### 2 MAIN CAUSES OF RISING SEA LEVELS



## Historic Sea Levels



How will climate change increase our vulnerability and risk?



## Historical Sea-Level Rise Trend



Current Trend: Approximately 1 foot rise in sea level over 100 years

## ... but rate of rise is accelerating



| Year  | SLR       |
|-------|-----------|
| Range | Rate      |
| 1940- | 0.85 ft / |
| 1979  | 100 yr    |
| 1980- | 1.48 ft / |
| 2020  | 100 yr    |

## Sea Level Rise Projection





## The Impacts How will Sea Level Rise affect us?



## Tidal Flooding

9/12/2021

ArcGIS - Georgia Coastal Hazards Portal



SKIO Viewer

Savannah Area GIS, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | Dr. Clark Alexander



## Erosion

## Drainage System Impacts



## Drainage System Impacts



![](_page_12_Picture_0.jpeg)

RE 4.6: STORMWATER DRAIN WITH SALTWATER DISCHARGE IER FLOODING OF YARDS AND STREETS FROM STORMWATER DRAIN DISCHARGE DURING K

## Sunny Day Road Flooding

Projected days of future flooding with sea level rise at Fort Pulaski,GA

![](_page_13_Figure_2.jpeg)

## Drainage System Impacts

![](_page_14_Figure_1.jpeg)

## Drainage System Impacts

# **STORM FLOODING STORM WATER SEWER**

![](_page_16_Picture_0.jpeg)

## What Can the County Do?

Prepare and Adapt

![](_page_17_Picture_0.jpeg)

Disaster Response and Redevelopment Plan

## 1. Understand Vulnerabilities

Drainage Infrastructure Condition Assessment

2. Mitigate Risk

3. Plan forResponse &Recovery

![](_page_17_Picture_6.jpeg)

Hazard Mitigation Plan

![](_page_17_Picture_8.jpeg)

Floodplain Management – Building/Freeboard Requirements

#### Sea Level Rise Study

## 1. Understand Vulnerabilities

2. Mitigate Risk

3. Plan forResponse &Recovery

Disaster Response and Redevelopment Plan

Drainage Infrastructure Condition Assessment

Hazard Mitigation Plan

Floodplain Management – Building/Freeboard Requirements

Sea Level Rise Study

## Project Funding

Coastal Incentive Grant from Coastal Resources Division, GA DNR

Phase 1 : October 2018 – March 2020 Phase 2 : August 2020 – September 2021

Grant Manger: Chatham County Engineering Department

Grant Partners: City of Savannah, Stetson University, Coastal GA CRS Users Group

## Phase 1 Project Goals

| Assess   | Assess impacts of sea level rise (SLR) on stormwater infrastructure and critical facilities |
|----------|---|
| Perform  | Perform study in accordance with ISO/CRS for CRS Class 4.                                   |
| Identify | Identify potential best management practices to address vulnerable drainage systems.        |
| Update   | Update drainage Capital Improvement Program (CIP) based<br>on the results from this study   |

## Phase 2 Project Goals

| Update   | Update SLR model to include mitigation measures such as pump stations & tide gates.                                    |
|----------|--|
| Identify | Identify opportunities for Nature Based Solutions (Green<br>Infrastructure) upstream of vulnerable stormwater systems. |
| Assess   | Assess the vulnerability of roadways in the County to SLR.   |
| Research | Research best practices for tide gates to mitigate SLR impacts to stormwater systems.                                  |

## Stormwater System Vulnerability & GI/LID

## Sea-Level Rise Projections versus Ft. Pulaski tide gauge since 1992

Ft. Pulaski Tide Gauge Record and Sea-Level Rise Projections January 1992 - July 2021, 12-month Rolling Average

![](_page_23_Figure_2.jpeg)

DNR High 6.56 ft @ 2100 NOAA Intermediate High 6.4 ft @ 2100

![](_page_24_Figure_0.jpeg)

![](_page_25_Figure_0.jpeg)

![](_page_26_Figure_0.jpeg)

![](_page_27_Figure_0.jpeg)

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## GI/LID Assessment

- Vulnerable Infrastructure
- Publicly-owned property
- ♦ Soils appropriate for GI/LID

![](_page_28_Figure_4.jpeg)

## Jacob G Smith Elementary School Green Infrastructure Retrofit

![](_page_29_Picture_1.jpeg)

#### Savannah looks to fix flooding issues

The city of Savannah has received a federal grant to implement flood mitigation tactics in neighborhoods

![](_page_29_Picture_4.jpeg)

Sean Compton

# Roadway Vulnerability Analysis

![](_page_30_Picture_2.jpeg)

#### Chatham County Road Vulnerability

![](_page_31_Figure_3.jpeg)

enterline Data Analysis • Centerline Data with DOT classifications • LIDAR (2009) • Sea Level Rise Projections 2020, 2050, 2075, and 2100

2020, 2050, 2075 and 2100 (DNR high)

Sunny day flooding only

Storm surge is not considered

TIDE GATES BEST PRACTICES FOR COASTAL GEORGIA

Chatham County, Georgia Draft: June, 2021

# TIDE GATE GUIDANCE

## Tide Flex "Duckbill" Check Valves

**Recommended Maintenance** Semi-Annual

![](_page_33_Picture_2.jpeg)

| Pros   | Cons   |
|--|--|
| Very durable and reliable; simple operation                      | The device is virtually water-tight and<br>does not allow any backflow for tidal<br>flushing |
| No Leakage inflow; debris will<br>not prevent gate from closing  | Does not open very wide under low<br>flow and only passes very small<br>floating debris      |
| Silent; no slamming.   | Manual removal of debris is very difficult   |
| Unaffected by rust, freeze,<br>corrosion, or lack of lubrication | Head loss at this type of valve may be unacceptable  |
| Negligible maintenance and repairs needed                        | Rodents (muskrats) have been reported<br>to chew on the tide gate                            |
|  | Accumulated debris may have to be removed periodically                                       |

## Recommendations

- 1. Participate in the Georgia Tech Smart Sea Level Sensors Project
- 2. Include SLR projections as a design consideration for drainage capital projects and other critical facilities
- 3. Upgrade stormwater infrastructure (including pump stations) to maintain functioning at a higher tidewater elevation

## Next Steps

![](_page_35_Picture_1.jpeg)

Run Road Vulnerability Analysis with updated LIDAR

![](_page_35_Picture_3.jpeg)

Establish criteria for prioritizing roads

![](_page_35_Picture_5.jpeg)

Install Green Infrastructure

![](_page_35_Picture_7.jpeg)

Communication tools

![](_page_36_Picture_0.jpeg)