



cern coastal empire
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How the City of Tybee Island is Responding

Alan Robertson, Principal, AWR Strategic Consulting
February 23, 2022



What We've Done: Planning and Execution Amid Chaos

Sea Level Rise Adaptation Plan
Master Plan
Carrying Capacity Study

Oct 2016 Assessment and Plan

Hurricane Matthew

Hurricane Irma & Maria

April 2018 DNR SPA Permit #460 - 19th Street stabilized dune

Hurricane Florence & Michael

Mar 2019 Phase 1 Dune Restoration

Hurricane Dorian

Dec 2019 DNR SPA Permit #473 - beach nourishment

Jan 2020 Phase 1 Dune Vegetation

Feb 2020 Phase 2 Dune Restoration

April 2020 Phase 2 Dune Vegetation

COVID Pandemic

Hurricane Isaias







Six Years Ago....



HURRICANE DAMAGE

STORM SURGE BREACHING UNSTABILIZED DUNES

HURRICANE IRMA STORM SURGE

TYBEE ISLAND DUNE RESTORATION 2019

2ND STREET FOLLOWING HURRICANE IRMA

HURRICANE IRMA STORM SURGE

CENTER STREET FOLLOWING HURRICANE IRMA

9TH STREET DUNE STORM SURGE DEGRADATION

PAGE 4 OF 11

SEAL OF THE CITY OF JEFFERSON DUNES

A collage of six photographs documenting the damage caused by Hurricane Irma. The top-left photo shows a water tower and houses with a wide, sandy beach in front. The top-right photo shows a storm surge breaching dunes. The middle-left photo shows a flooded street with a car. The middle-right photo shows a large building with a sandy area in front. The bottom-left photo shows a flooded street with a car. The bottom-right photo shows a street with a dune that has been degraded. The collage is framed by a blue border. A seal of the City of Jefferson Dunes is in the top right corner. The text 'TYBEE ISLAND DUNE RESTORATION 2019' is written vertically on the left side. The page number 'PAGE 4 OF 11' is in the bottom right corner.



Three months ago...





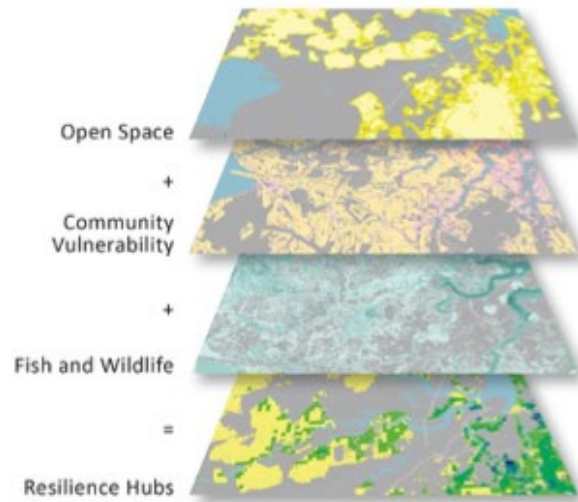
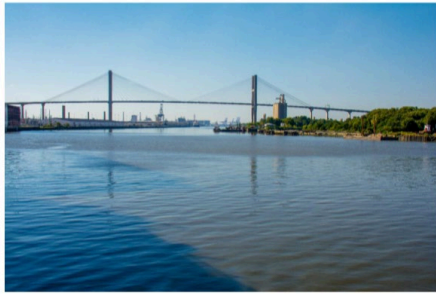
FEMA Lifting Houses



FEMA Stormwater Management Plan



Coastal Resilience Assessment of the Savannah River Watershed



Left: Diagram of the overall approach of this assessment. Human community asset (HCA) vulnerability and fish and wildlife richness are assessed within all areas of public and private open space. Open space areas in proximity to HCAs with high vulnerability **and** high fish and wildlife richness are mapped as Resilience Hubs where efforts to preserve or increase resilience to threats are well-justified. From the set of all such Hubs, those scoring highest by these measures represent priority areas for undertaking resilience projects.

ORGIA
 NT OF NATURAL RESOURCES
 URCES DIVISION



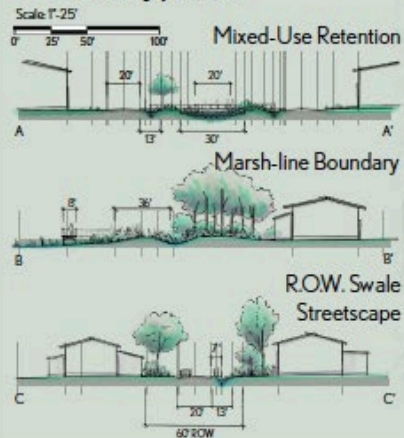
Tybee Island Back River Study

Marsh-line Inundation Park

Project Statement

This design seeks to mitigate the impact of sea level rise and unwanted flooding, two of Tybee Island's largest vulnerabilities. By utilizing green infrastructure and storm water management practices to develop a resilient framework for controlled inundation, a more flexible recovery strategy will help the community adapt to flood events and future sea level rise. Site-scaled design examines the marsh ecosystem between Lewis Street and Miller Ave, but similar methods and strategies should be applied elsewhere on the island.

Section Typical



Site Systems

Axon

Circulatory Structure

Elevated boardwalks create a 1.5 mile loop within the site, providing connectivity even during periods of peak inundation.

Green Infrastructure

Acting as the boundary for planned inundation, the marshline levee provides a layer of protection for residential properties, minimally impacts existing tree canopy

Planned Inundation

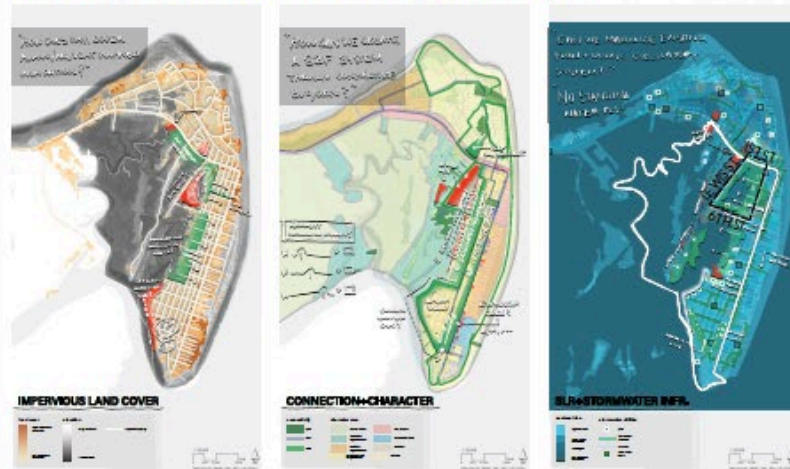
Mixed-Use swales and retention ponds create a matrix of stormwater management features throughout the vulnerable portions of the site. Retention ponds serve as "shock points" for the system, temporarily storing runoff to be discharged into lower elevation marshland. The combination of these protective measures helps mitigate the impact of flood events and promotes rapid community recovery.



Connectivity & Community



Existing Conditions: Inventory & Analysis



Site Context

Inventory and analysis of the Tybee Island's existing conditions revealed numerous opportunities to improve stormwater management and inundation recovery throughout the project boundary. Site scale design approached the marsh ecosystem between Lewis Street and 6th Street, seeking to reduce unwanted flooding and create a flexible inundation recovery system. Elevated housing is recommended for residential properties within this area of focus.

Project Goals

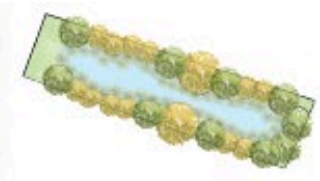
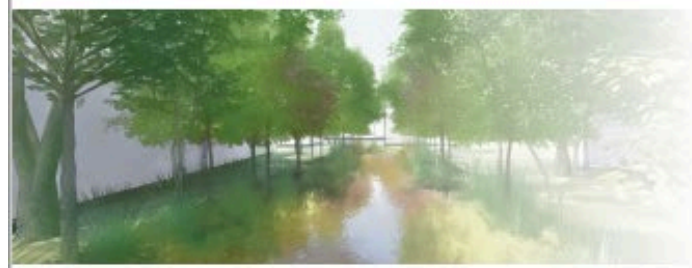
- Protect the residential community from unwanted inundation
- Develop a more responsive flood recovery system
- Improve pedestrian connectivity and engagement to marsh ecosystem

Project Objectives

- Develop R.O.W. Green/Blue Infrastructure
- Connect Mixed-Use swales and retention points
- Establish "Safe-to-fail" marsh greenspace with reinforced boundary
- Engage marshline with elevated boardwalks

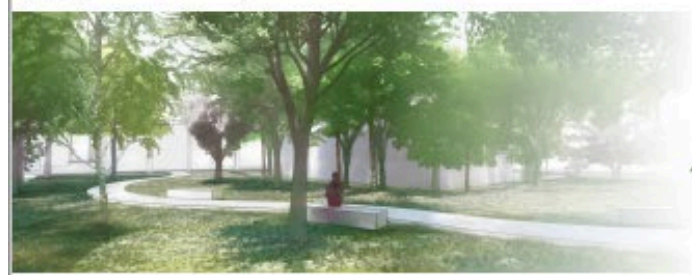


② Bioretention Pond



Scale: 1"=20'

③ Community Park



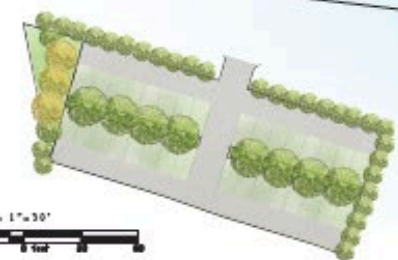
Scale: 1"=30'

④ Rain Garden



Scale: 1"=30'

⑤ Permeable Parking Lot



Scale: 1"=30'

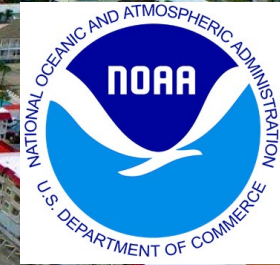
SITE SCALE MASTER PLAN

LEGEND

- Existing + Site Paths
- Closure
- Proposed Green Infrastructure
- Building Footprint
- Proposed Pavement
- Existing Driveway + Roadway

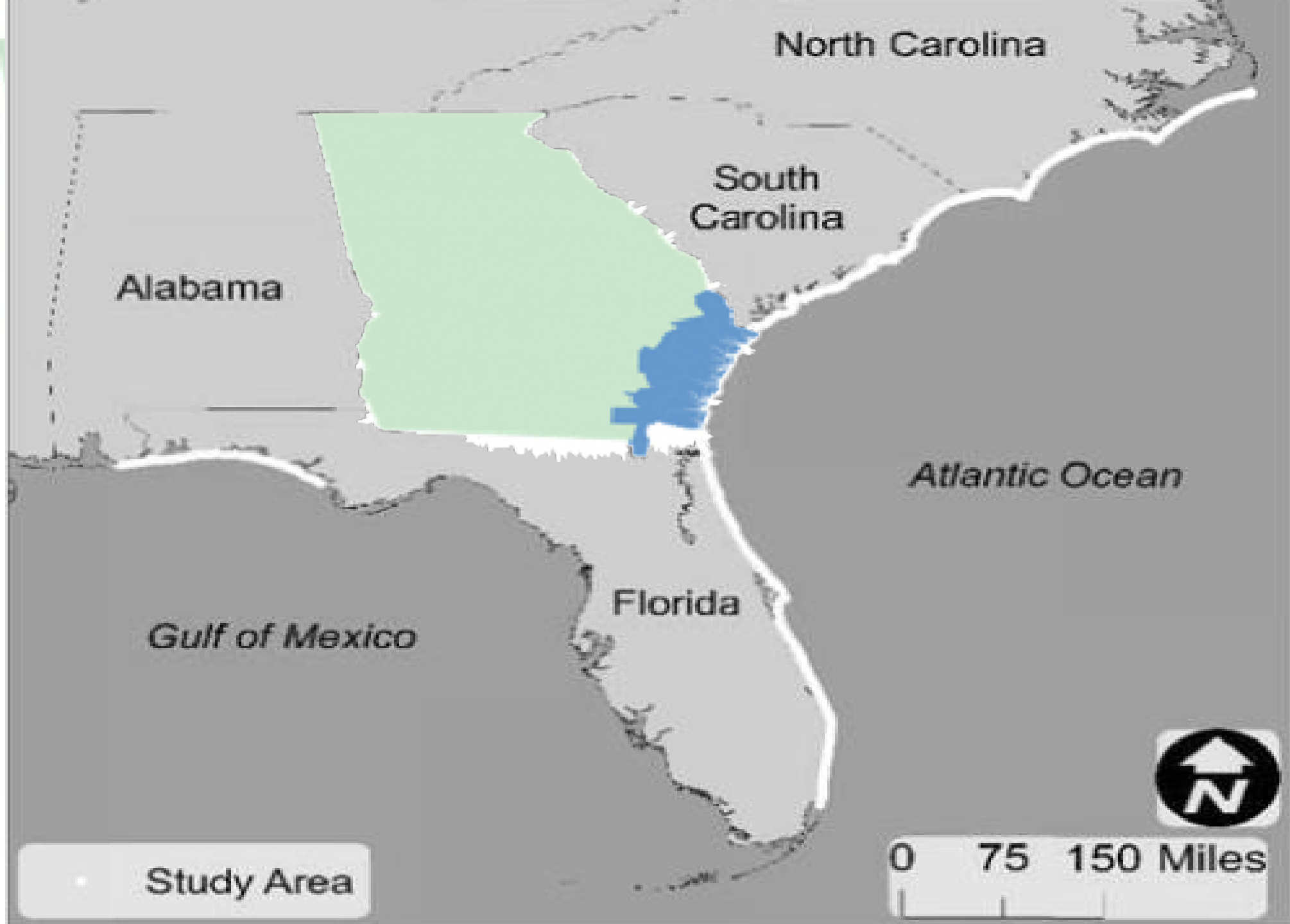


Scale: 1"=40'



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What Tybee Needs...

- ✓ Broader geographic scope
- ✓ Collaboration with Partners
- ✓ The most vulnerable of our communities: What is the community's responsibility?
- ✓ Transportation, Health Care, Telecommunications, Power
- ✓ Financial Risk Management – plugging the holes in our resilience plan
- ✓ Political Will to make hard decisions – public outreach, education, engagement

... What Tybee Offers

- ✓ A “canary in a cage” experiencing most all elements of resilience
- ✓ Island exacerbates issues – literally the “end of the road”
- ✓ Existing collaborations with a broad group of constituents
- ✓ Exploring risk management tools with global reinsurers
- ✓ Experience – assessment, plans, regulatory reviews and approvals, budgets, grant administration



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Looking Forward to Collaborating

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