



## **APPENDIX A**

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### **Community Action Team Materials**



**Community Action Team**  
Meeting #1 Materials



# Beaufort County

## Community Action Team - Meeting #1

### AGENDA

Wednesday, Sept. 15, 2021, 10:00 AM - 12:00 PM

Location: Beaufort County Commissioners Board Room (in Beaufort County Financial Services Center), 136 W 2nd St. Washington, NC 27889

<b>10:00 – 10:15 AM</b>	<b>Introduction to Resilient Coastal Communities Program</b> <ul style="list-style-type: none"><li>▪ Introduction of contractors and team members</li><li>▪ Review of Resilient Coastal Communities Program</li><li>▪ Review of Community Action Team meeting schedule and tasks<ul style="list-style-type: none"><li>▪ See Community Action Team Meeting Framework document</li></ul></li></ul>
<b>10:15 – 10:30 AM</b>	<b>Review of Existing Plans and Ordinances</b>
<b>10:30 – 10:50 AM</b>	<b>Community Vision Statement Exercise</b> <ul style="list-style-type: none"><li>▪ Review Vision Statements from adopted plans and other vision statement examples</li><li>▪ Exercise: Community Vision Statement</li></ul>
<b>10:50 – 11:15 AM</b>	<b>Community Goals Exercise</b> <ul style="list-style-type: none"><li>▪ Review goals from adopted plans and other resiliency goal examples</li><li>▪ Goals should address all three points; economic, environmental, social</li><li>▪ Exercise: Community Goals</li></ul>
<b>11:15 – 11:20 AM</b>	<b>BREAK</b>
<b>11:20 – 11:30 AM</b>	<b>CDC’s Social Vulnerability Index</b>
<b>11:30 – 11:50 AM</b>	<b>Community Engagement Strategy</b> <ul style="list-style-type: none"><li>▪ Public Survey</li><li>▪ Public Open House</li><li>▪ Strategies to engage the community, including vulnerable populations</li></ul>
<b>11:50 AM – NOON</b>	<b>Discussion / Adjournment</b>



# Beaufort County

## Community Action Team - Meeting Framework

*Each meeting is anticipated to be approximately 2-hours in duration. Meeting dates, times, and locations are noted below. Material review and coordination will occur between each meeting. Meeting agendas will be provided in advance of each meeting. Meeting topics are subject to change.*

### PHASE 1 COMMUNITY ENGAGEMENT AND RISK/VULNERABILITY ASSESSMENT

#### MEETING 1

*Date:* Wed. Sept. 15, 2021

*Time:* 10:00 am – 12:00 pm

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

#### VISION AND GOALS, EXISTING PLANS & COMMUNITY ENGAGEMENT

- Develop community-specific Vision Statement and goals
- Identify existing plans, ordinances, policies and programs
- Discuss CDC's Social Vulnerability Index
- Discuss community engagement strategy, including tools, techniques and strategies to engage the community, including vulnerable populations

#### MEETING 2

*Date:* Wed. Oct. 20, 2021

*Time:* 10:00 am – 12:00 pm

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

#### EXISTING CONDITIONS – CRITICAL ASSETS & NATURAL INFRASTRUCTURE

- Review inventory of relevant resources
- Review and discuss critical assets, natural resources, social vulnerability, available risk assessments, and resiliency related projects
- Review draft mapping of critical assets and natural infrastructure
- Select critical assets and natural infrastructure to include in the RCCP Risk and Vulnerability Assessment
- Discuss hazards to include in the Risk and Vulnerability Assessment

#### MEETING 3

*Date:* Wed. Nov. 17, 2021

*Time:* 10:00 am – 12:00 pm

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

#### RISK & VULNERABILITY ASSESSMENT

- Review draft mapping of hazards
- Discuss the draft vulnerability index thresholds and index to measure exposure, sensitivity, and adaptive capacity
- Collaborate to develop a table to quantitatively estimate risk

### PHASE 2 PLANNING, PROJECT IDENTIFICATION, AND PRIORITIZATION

#### MEETING 4

*Date:* Wed. Dec. 8, 2021

*Time:* 10:00 am – 12:00 pm

#### SUITE OF POTENTIAL STRATEGIES & PUBLIC MEETING PLANNING

- Brainstorm a suite of potential solutions
- Collaborate to further define the solutions

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

- Discuss development of resiliency projects and actions portfolio
- Plan for the Public Meeting to obtain input on strategies and priorities

**MEETING 5**

*Date:* TBD

*Time:* 10:00 am – 12:00 pm

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

**PRELIMINARY PROJECT PRIORITIZATION**

- Review preliminary evaluation of strategies and their feasibility
- Discuss the cost-benefit analysis
- Discuss preliminary project priorities
- Plan for the Public Meeting to obtain input on strategies and priorities

**MEETING 6**

*Date:* Wed. Feb. 16, 2022

*Time:* 10:00 am – 12:00 pm

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

**PUBLIC INPUT & DRAFT RESILIENCY STRATEGY ELEMENTS**

- Consider public input and select priority actions
- Identify at least five (5) priority projects per community
- Discuss mapping for each project site
- Review elements of the Draft Resilience Strategy Document
- Discuss Phases 3-4 application process (if available)

**MEETING 7**

*Date:* TBD

*Time:* 10:00 am - 12:00 pm

*Location:* Beaufort County  
Commissioners Board Room  
(in Beaufort County Financial  
Services Building)  
136 W 2<sup>nd</sup> Street  
Washington, NC 27889

**MEETING TO BE ADDED IF NEEDED**

**RESILIENCY STRATEGY DOCUMENT**

Following Meeting 6, the Contractor team will develop the Beaufort County Resiliency Strategy Document. Elements of the document will be shared with the CAT as developed throughout the planning process. The CAT will be provided the entire draft Resiliency Strategy Document for review and comment before the plan is finalized.

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**Thank you for participating on the Beaufort County Community Action Team!**  
**We appreciate your involvement as we plan for a more resilient community.**

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## NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM



## PROGRAM BASICS

**THE ISSUE:** Flooding and other coastal hazards have devastating impacts on the economies and livelihoods of communities across eastern North Carolina. Coastal development and climate change continue to amplify these risks, and several barriers like economic and capacity constraints hinder the actions needed to enhance resilience and reduce vulnerability.

*Building resilience to natural hazards is vital for communities to help maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generations.*

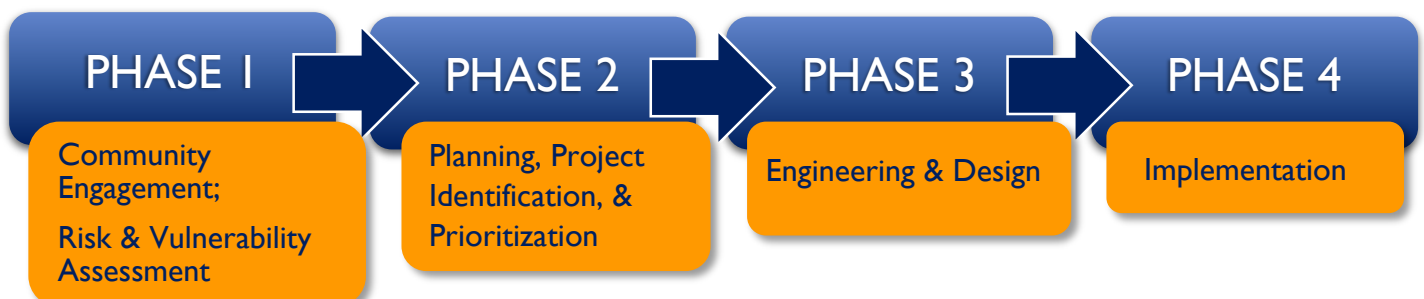
**OBJECTIVES:** The NC Resilient Coastal Communities Program provides **financial grants and technical assistance** to support a proactive, locally-driven, and equitable approach to coastal resilience planning and project implementation.

**ELIGIBILITY:** County and municipal governments in the 20 CAMA counties are eligible to receive assistance through the RCCP. Any qualified organizations may apply to provide technical assistance.

**FRAMEWORK:** The RCCP provides a phased framework to assess coastal risks and vulnerabilities, engage community stakeholders, and develop projects to strategically improve the resiliency of communities and their natural and built infrastructure. The four phases of the program include:

### NC'S FUTURE

Intensity of tropical storms and hurricanes, storm surge flooding, heavy precipitation events, sea level rise, and tidal flooding are all expected to increase in our state (NC Climate Science Report 2020). More must be done to safeguard communities from loss of life, economic hardships, and the destructive impacts of intensifying coastal and climate risks.



## Program Goals:

- Address barriers to coastal resilience in North Carolina at the local level, such as limited capacity, economic constraints, and social inequities;
- Assist communities with risk and vulnerability assessments and developing a portfolio of well-planned and prioritized projects;
- Advance coastal resilience projects to “shovel-ready” status, or ready for implementation; and
- Provide funding for project implementation and link to additional funding streams.

**PROGRAM ORIGINS:** The Resilient Coastal Communities Program is a component of the statewide North Carolina Resilient Communities Program, called for in the North Carolina Climate Risk Assessment and Resilience Plan. It is also a continuation of several years of coastal resiliency work at DCM.

## PROGRAM PARTNERS:



## PROGRAM FUNDERS:



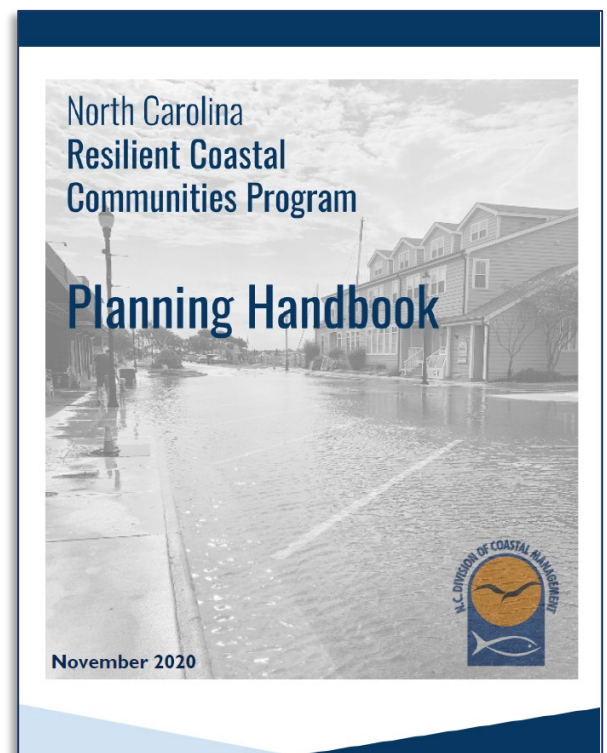
## PROGRAM PLANNING HANDBOOK:

Communities and contractors participating in this program are provided guidance to complete Phases 1 and 2 in DCM’s Program Planning Handbook, available [here](#).

**HOW TO APPLY:** Applications for Phases 1 and 2 are closed for the current round. Applications for grant funding to complete Phases 3 and/or 4 will open in Winter 2021. Communities wishing to receive funding for engineering, design, and/or implementation must complete the requirements of the RCCP Planning Handbook – via Phase I and 2 participation or independently.

**PROGRAM CONTACT:** Email us at [RCCP@ncdner.gov](mailto:RCCP@ncdner.gov) with any questions about the program.

**WEBSITE:** Also visit our website [here](#) for updates.

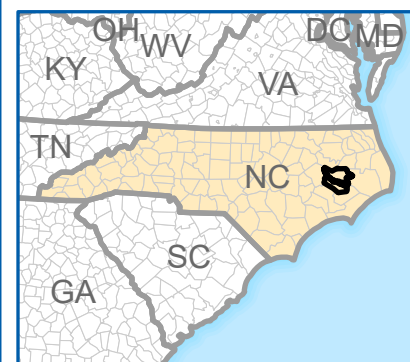
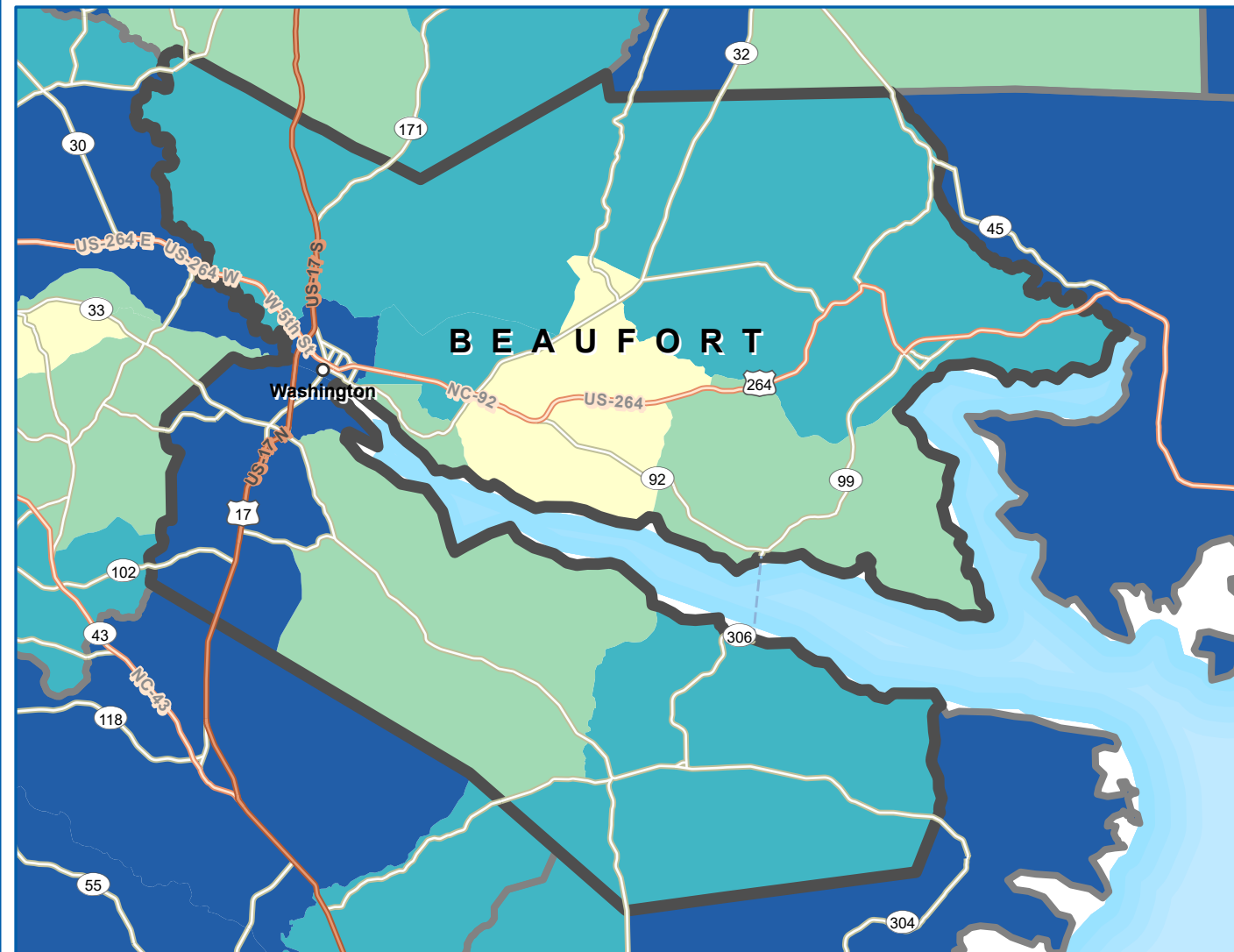


# CDC Social Vulnerability Index 2018

Beaufort County, North Carolina

PART 1

## Overall Social Vulnerability<sup>1</sup>



**Social vulnerability** refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills. The **CDC Social Vulnerability Index (CDC SVI 2018)<sup>4</sup> County Map** depicts the social vulnerability of communities, at census tract level, within a specified county. CDC SVI

2018 groups **fifteen census-derived factors** into **four themes** that summarize the extent to which the area is socially vulnerable to disaster. The factors include economic data as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall Social Vulnerability combines all the variables to provide a comprehensive assessment.

MAP PRODUCED 3/12/2020

Agency for Toxic Substances and Disease Registry  
Division of Toxicology and Human Health Sciences



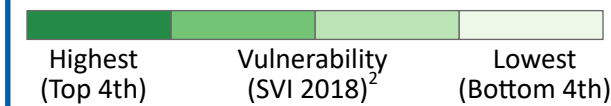
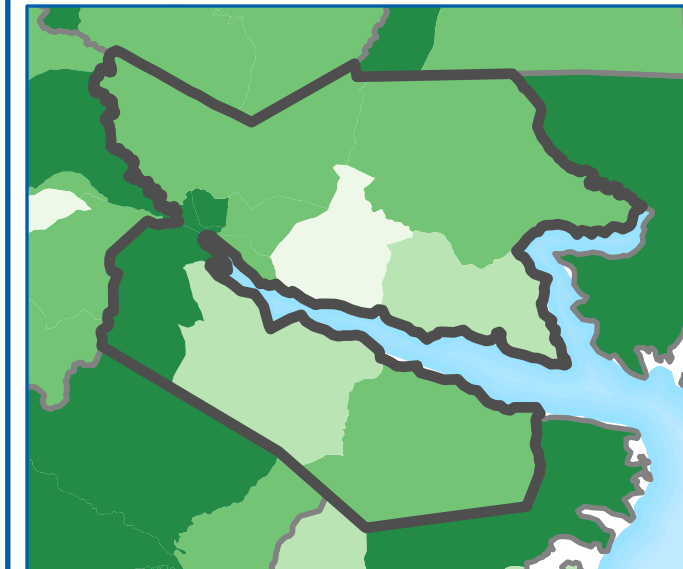
FINAL - FOR EXTERNAL USE

CDC SVI 2018 – BEAUFORT COUNTY, NORTH CAROLINA

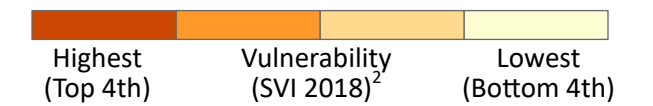
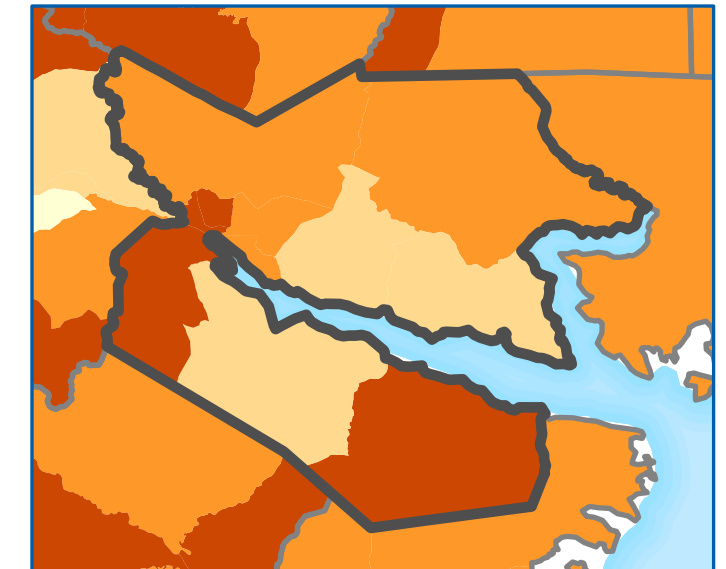
PART 2

## CDC SVI Themes

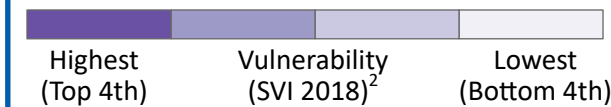
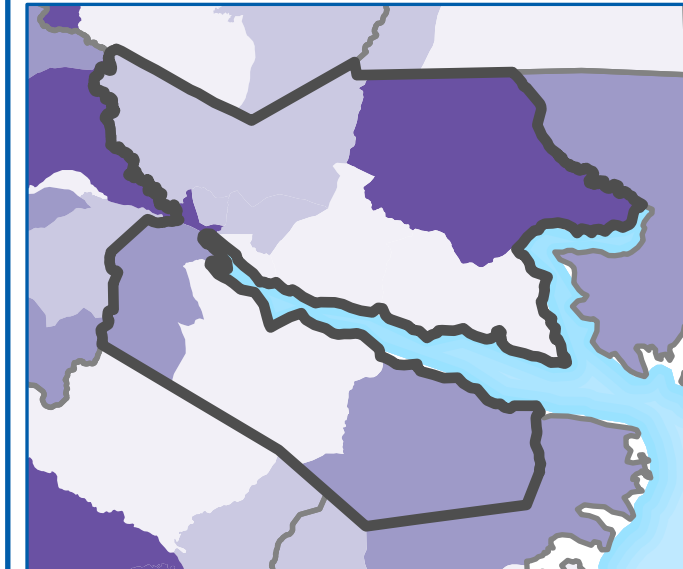
### Socioeconomic Status<sup>5</sup>



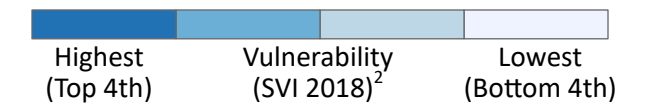
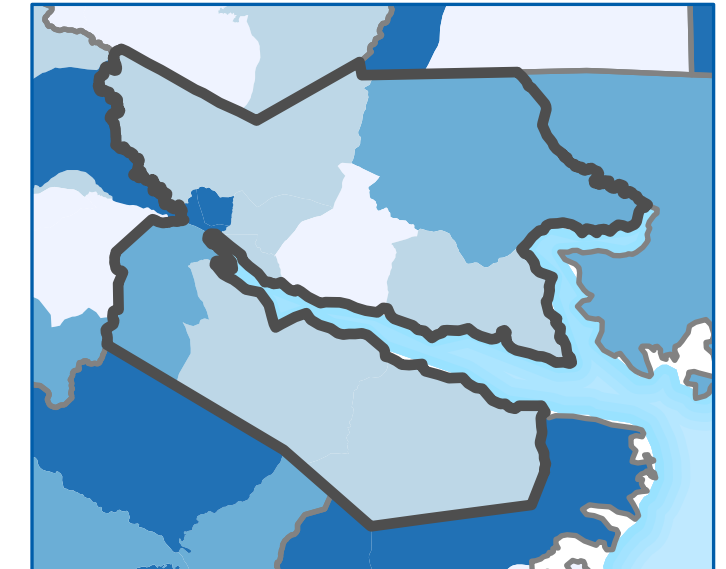
### Household Composition/Disability<sup>6</sup>



### Race/Ethnicity/Language<sup>7</sup>

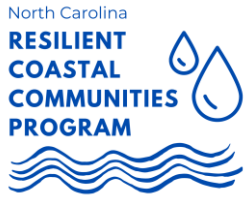


### Housing Type/Transportation<sup>8</sup>



**Data Sources:** <sup>2</sup>CDC/ATSDR/GRASP, U.S. Census Bureau, Esri® StreetMap™ Premium.  
**Notes:** <sup>1</sup>Overall Social Vulnerability: All 15 variables. <sup>3</sup>Census tracts with 0 population. <sup>4</sup>The CDC SVI combines percentile rankings of US Census American Community Survey (ACS) 2014-2018 variables, for the state, at the census tract level. <sup>5</sup>Socioeconomic Status: Poverty, Unemployed, Per Capita Income, No High School Diploma. <sup>6</sup>Household Composition/Disability: Aged 65 and Over, Aged 17 and Younger, Single-parent Household, Aged 5 and over with a Disability. <sup>7</sup>Race/Ethnicity/Language: Minority, English Language Ability. <sup>8</sup>Housing Type/Transportation: Multi-unit, Mobile Homes, Crowding, No Vehicle, Group Quarters.  
**Projection:** NAD 1983 StatePlane North Carolina FIPS 3200.  
**References:** Flanagan, B.E., et al., A Social Vulnerability Index for Disaster Management. *Journal of Homeland Security and Emergency Management*, 2011. 8(1).  
CDC SVI web page: <http://svi.cdc.gov>.

FINAL - FOR EXTERNAL USE



# Beaufort County Community Action Team

## Vision Statement Worksheet

Please list 5 – 10 words or short phrases that should be incorporated into the Community Vision Statement. Remember to include social, environmental, and economic factors.

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# Beaufort County Community Action Team

## Goals Worksheet

Please list 10 - 15 priorities that Resilient Coastal Communities Program goals should address. Remember to include social, environmental, and economic factors.

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# Beaufort County

Community Action Team Meeting

September 15, 2021

North Carolina

**RESILIENT  
COASTAL  
COMMUNITIES  
PROGRAM**



# RCCP Overview

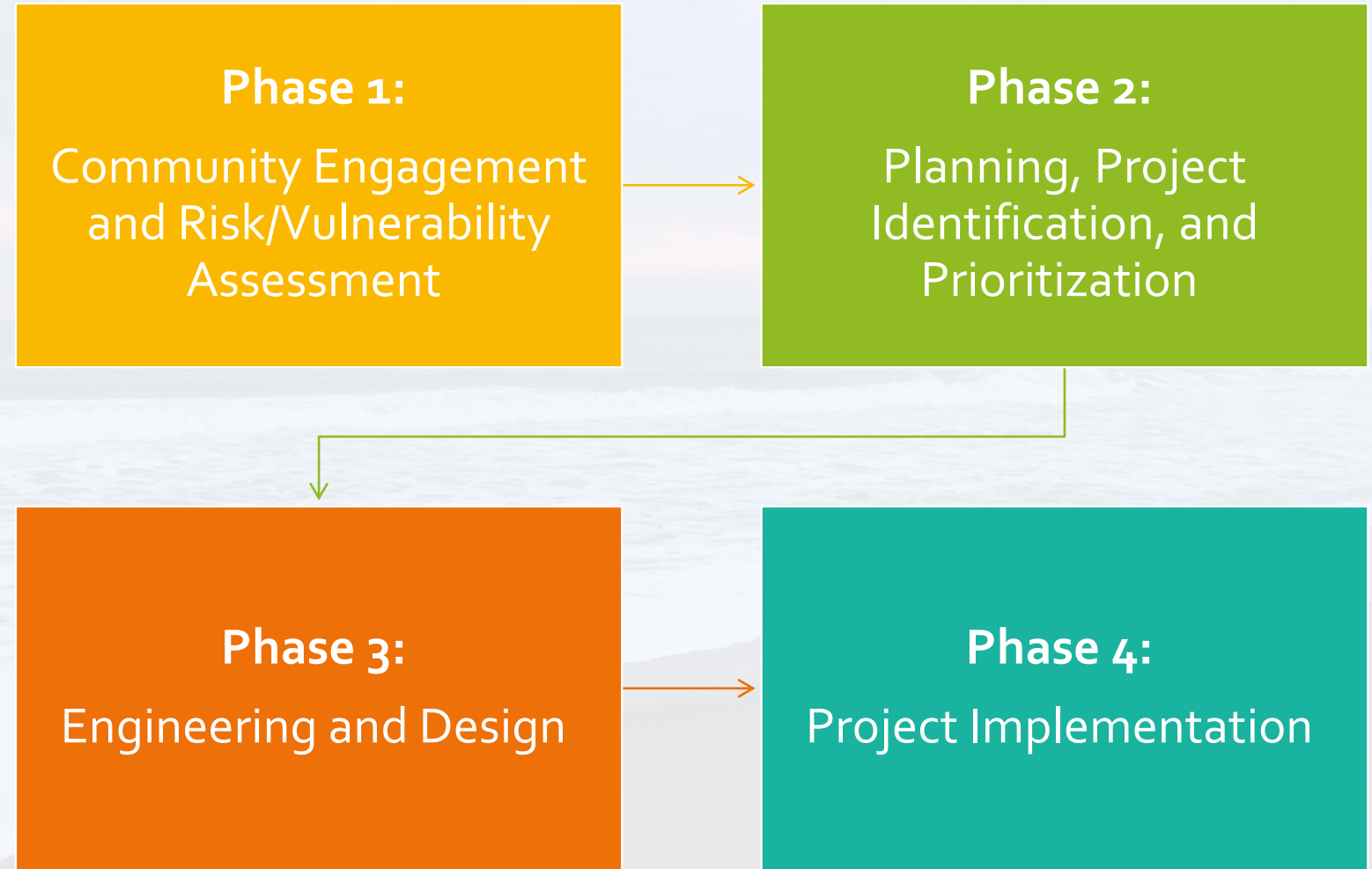
- The **Resilient Coastal Communities Program (RCCP)** is a component of the *2020 North Carolina Climate Risk Assessment and Resilience Plan*
- Funded through the NC General Assembly and National Fish and Wildlife Foundation (NFWF)
- North Carolina Division of Coastal Management (DCM) is implementing the RCCP in coordination with the North Carolina Office of Recovery and Resiliency (NCORR), The Nature Conservancy (TNC), and the North Carolina Sea Grant (NCSG)



# RCCP Overview

- Provide technical and financial assistance to municipal and county governments to advance coastal resilience efforts throughout the 20 coastal counties in North Carolina
- \$600K allocated for RCCP Phases I and II; 20 communities were funded with an average of \$30K per community
- State and local partnership designed to help overcome barriers in coastal resilience and adaptation planning by bolstering local government capacity
- Support a proactive, sustainable and socially equitable approach to coastal resiliency planning and eventual project implementation

# RCCP Phases



# RCCP Phase I and II Objectives

- Perform community-driven, qualitative and quantitative risk and vulnerability assessments with special attention to socially vulnerable populations and critical assets
- Develop a portfolio of prioritized solutions/projects (policy, non-structural, structural, or hybrid) to address risks that reduce exposure and sensitivity or increase adaptive capacity to flooding and other hazards
- The *North Carolina Resilient Coastal Communities Program Planning Handbook* provides guidance for contractors and local governments to complete RCCP Phases I and II (September 2021 – March 2022)

*Once communities complete Phases 1 & 2, they become eligible to apply for Phase 3 funding for project engineering and design, and Phase 4 implementation funding*

# RCCP Objectives

## Address

- Address barriers to coastal resilience in North Carolina at the local level, such as limited capacity, economic constraints, and social inequities;

## Assist

- Assist communities with risk and vulnerability assessments and develop a portfolio of planned and prioritized projects;

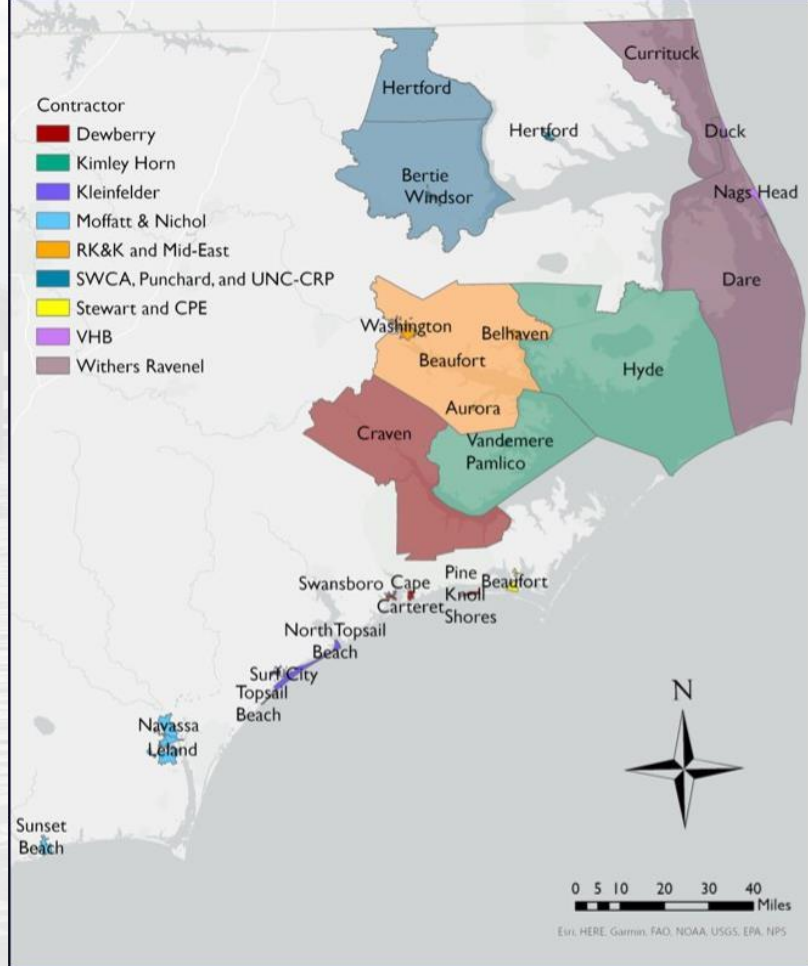
## Advance

- Advance coastal resilience projects to “shovel-ready” status; and

## Link

- Link communities to funding streams for project implementation.

# RCCP Phase I and II Awards



# RCCP Phase I and II Steps

## Phase 1: Community Engagement and Risk/Vulnerability Assessment

Step 1 – Develop a Community Action Team

★ Step 2 – Set Vision and Goals

★ Step 3 – Review Existing Plans and Efforts

★ Step 4 – Develop a Community Engagement Strategy

Step 5 – Map Critical Assets and Natural Infrastructure

Step 6 – Conduct Risk and Vulnerability Assessment

## Phase 2: Planning, Project Identification, and Prioritization

Step 1 – Identify a Suite of Potential Solutions

Step 2 – Consolidate and Prioritize Projects

Step 3 – Develop the Resilience Strategy Document

# RCCP Triple-Bottom Line Approach

The RCCP reflects the **triple-bottom line** approach to resilience, which goes beyond traditional hazard mitigation and disaster recovery to develop a holistic strategy considering **social, environmental, and economic** factors.

# Existing Plans / Resiliency Reports & Studies



## Albemarle-Pamlico National Estuary Partnership (APNEP) Comprehensive Conservation and Management Plan, 2012-2022

- The CCMP is organized by asking and then answering four basic questions: what is a healthy Albemarle-Pamlico system, what is the current condition of the system, what are the most significant challenges facing the system over the next 10 years, and what actions should be implemented to best achieve a healthy system?
- Triple-Bottom Line Approach: Environmental

# Existing Plans / Resiliency Reports & Studies



## Pamlico Peninsula Resilient Regions Report, April 2016

- The International Economic Development Council (IEDC) contracted to assist Beaufort County and nine other Pamlico Peninsula Counties (PPCs) with developing and implementing resiliency measures. IEDC provided specific advice on how to strengthen existing programs and develop new programs or strategies so that county and region can be more resilient from an economic perspective to future crisis.
- Triple bottom line Approach: Economic

# Existing Plans / Resiliency Reports & Studies



## Pamlico Sound Regional Hazard Mitigation Plan, June 2020

- The HMP ensures that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. This plan provides a framework for all interested parties to work together toward mitigation. It establishes the vision and guiding principles for reducing hazard risk and proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.
- Triple bottom line Approach: Economic, Environmental, Social

# Existing Plans / Resiliency Reports & Studies



## Hurricane Matthew Resilient Redevelopment Plan: Beaufort County, May 2017

- The purpose of the plan is to provide a roadmap for community rebuilding and revitalization assistance for the communities that were damaged by the hurricane. The program empowers communities to prepare locally driven recovery plans to identify redevelopment strategies, innovative reconstruction projects, and other needed actions.
- Triple bottom line approach: Economic, Environmental, Social

# Existing Plans / Resiliency Reports & Studies



## Hurricane Matthew Resilient Redevelopment Plan: Northeast Region, August 2017

- As part of the program, NCEM facilitated development of regional resilient redevelopment plans for four “prosperity zones” as identified by the NC Dept of Commerce. Prosperity zones were created to facilitate collaborative and coordinated planning and use of resources.
- Triple bottom line Approach: Economic, Environmental, Social

# Existing Plans / Resiliency Reports & Studies



- **Beaufort County CAMA Land Use Plan, October 2009**
- **Beaufort County Comprehensive Transportation Plan, October 2013**
- **Beaufort County Comprehensive Bicycle Plan, September 2020**

# Existing Ordinances

## Beaufort County Code of Ordinances

- Backflow Water
- Building Regulations
- Business Regulations
- Flood Damage Prevention
- Manufactured Home Parks and Travel Trailer Parks
- Solar Energy Facilities
- Stormwater
- Subdivision
- Volunteer Agricultural Districts

# Vision Statement Guidance

- Where does the community want to be in the future (e.g., the next 10 or more years), particularly in relation to coastal hazards
- Address all three: Economic, Environmental, Social
- Succinct: 1-2 sentences
  - Goals will go into more details, the Vision Statement shows the big picture

# Vision Statement Examples

- To identify, restore, and protect the significant resources of the Albemarle-Pamlico estuarine system. (Albemarle-Pamlico CCMP)
- The vision of the Pamlico Sound Regional Hazard Mitigation Plan is to establish sound public policy to protect life, property, and the quality of the natural environment; to reduce risk and prevent loss from future hazard events.

# Vision Statement Examples

- Beaufort County is an interconnected bicycle-friendly community where residents and visitors alike safely travel by a convenient bicycle network that includes both on and off-road bicycle facilities between all municipalities, townships, major commercial and employment destinations, and scenic and leisure destinations throughout the county. Community health, economic growth, and environmental conditions are improved through strategic investments in increased mobility, recognizing the diversity of resident and visitor needs across the county. (Beaufort County Comprehensive Bicycle Plan)



# Vision Statement Examples

- A resilient North Carolina is a state where our communities, economies, and ecosystems are better able to rebound, positively adapt to, and thrive amid changing conditions and challenges, including disasters and climate change; to maintain quality of life, healthy growth, and durable systems; and to conserve resources for present and future generations. (NC Climate Risk Assessment and Resilience Plan)



# Vision Statement Examples

- Genesee County's communities are resilient to climate-related changes due to an intact network of natural resources, quality municipal infrastructure and services, sustainable businesses, and effective response and recovery capabilities. (Genesee Countywide Resilience Plan)



# Vision Statement Examples

- To reduce the vulnerability to natural hazards in order to protect the health, safety, welfare and economy of the Ada County community. (Ada County Hazard Mitigation Plan)
- To enrich lives through effective and caring service. (County of Los Angeles All Hazard Mitigation Plan)

# Vision Statement Themes

- Natural hazard events such as hurricanes and flooding
- Climate change
- Serving vulnerable and disadvantaged populations
- Protection of natural infrastructure and ecosystem services
- Protection of critical infrastructure
- Economic resilience
- Preparedness
- Partnerships
- Effective response and recovery
- Community engagement
- Future generations
- Construction and restoration
- Strategic investments

# Vision Statement Themes

- Reduce risk and prevent loss
- Sound public policy
- Public education and outreach
- Protect life, property, and the quality of the natural environment
- Rebound, positively adapt to, and thrive amid changing conditions and challenges
- Community health
- Healthy economic growth
- Durable systems
- Recognize diversity of needs
- Intact network of natural resources
- Quality infrastructure and services
- Sustainable businesses

# Vision Statement Worksheet & Draft Vision Statement

- Worksheets will be used to form the **Draft Vision Statement**, which will be sent to the CAT by email within one week (by Wed. Sept. 22<sup>nd</sup>)
  - Available via mail if preferred
- Please reply with any comments on the Draft Vision Statement by **Wed. Sept. 29<sup>th</sup>**
- The Draft Vision Statement will be revisited after receiving public input.

Vision  
Statement  
Word Cloud

- <https://www.wordclouds.com/>

# Resiliency Goal Examples

## Albemarle-Pamlico Comprehensive Conservation and Management Plan

- **Goal 1:** A region where human communities are sustained by a functioning ecosystem
- **Goal 2:** A region where aquatic, wetland, and upland habitats support viable populations of native species
- **Goal 3:** A region where water quantity and quality maintain ecological integrity
- Measurable outcomes are included for each goal.

# Resiliency Goal Examples

## Pamlico Sound Regional Hazard Mitigation Plan

- **Goal 1:** Reduce the risk of loss of life and personal injury from natural hazards through local land development regulations, capital improvements, planning/investment, and proactive long-range planning regarding land use and post-disaster redevelopment.
- **Goal 2:** Provide education and notification to citizens that empowers them to protect themselves and their families from natural hazards.
- **Goal 3:** Fulfill Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance.
- **Goal 4:** Improve interjurisdictional/interagency cooperation and coordination, especially regarding the reduction of natural hazard impacts.

# Resiliency Goal Examples

## Beaufort County Comprehensive Bicycle Plan

- **Goal 1:** Develop a bicycle and greenway network that is an integral part of the transportation system and provides an alternative means of transportation as well as recreation opportunities for citizens and visitors alike.
- **Goal 2:** Recognize the economic benefits of a bicycle-friendly community and capitalize on the return on investment for bicycle facilities and greenways.
- **Goal 3:** Created a robust bicycle program that incorporates engineering, education, encouragement, enforcement, and evaluation programs.
- **Goal 4:** Recognize the environmental benefits of living in a bicycle friendly community.
- **Goal 5:** Provide opportunities for bicycling which promote healthy and active lifestyles.
- **Goal 6:** Create a safe, comfortable, and convenient network of bicycle facilities that aid and encourage cycling for people of all ages, abilities, and interests, in all areas of the county.
- **Goal 7:** Create a culture that promotes and welcomes bicycling.
- **Goal 8:** Increase bicyclist safety by reducing the number of bicycle related accidents each year.

# Resiliency Goal Examples

## NC Climate Risk Assessment and Resilience Plan

- **Principle 1:** Act quickly and decisively to reduce the most harmful impacts of climate change – flooding, drought, landslides and wildfires.
- **Principle 2:** Act thoughtfully and collaboratively to develop equitable solutions for the most socially challenging effects of climate change.
- **Principle 3:** Invest in safe, affordable, and connected communities.
- **Principle 4:** Strengthen regional economies
- **Principle 5:** Support healthy communities, local identity, and recreational access to nature.
- **Principle 6:** Implement resilience best practices

# Resiliency Goal Examples

## Genesee Countywide Resilience Plan (Phase I)

- **Goal 1:** Protect a connected network of undeveloped land including water resources, prime agricultural soils, and forests from adverse impacts, conversion, and development.
- **Goal 2:** Integrate the unique natural assets of Genesee County and resiliency into economic policy and investment decisions.
- **Goal 3:** Improve performance and resiliency of natural systems under normal and extreme conditions.
- **Goal 4:** Provide a foundation for the development of meaningful and achievable conservation goals, measurable objectives, and implementation strategies in Genesee County municipalities with an emphasis on strong inter-municipal relationships and planning.

# Resiliency Goal Examples

## Ada County Hazard Mitigation Plan

- **Goal 1:** Protect lives and reduce hazard related injuries
- **Goal 2:** Minimize or reduce current and future damage from natural hazards to property, including critical facilities and environment
- **Goal 3:** Encourage the development and implementation of long-term, cost-effective mitigation projects
- **Goal 4:** Maintain, enhance, and restore the natural environment's capacity to deal with the impacts of natural hazard events.
- **Goal 5:** Improve emergency management preparedness, collaboration, and outreach within the planning area.

# Resiliency Goal Examples

## “OurCounty” – Los Angeles County Sustainability Plan

- **Goal 1:** Resilient and healthy community environments where residents thrive in place.
- **Goal 2:** Buildings and infrastructure that support human health and resilience
- **Goal 3:** Equitable and sustainable land use and development without displacement
- **Goal 4:** A prosperous LA County that provides opportunities for all residents and businesses and supports the transition to a green economy
- **Goal 5:** Thriving ecosystems, habitats, and biodiversity
- **Goal 6:** Accessible parks, beaches, recreational waters, public lands, and public spaces that create opportunities for respite, recreation, ecological discovery, and cultural activities

# Resiliency Goal Examples

## “OurCounty” – Los Angeles County Sustainability Plan (cont’d)

- **Goal 7:** A fossil fuel-free LA County
- **Goal 8:** A convenient, safe, clean, and affordable transportation system that enhances mobility while reducing car dependency
- **Goal 9:** Sustainable production and consumption of resources
- **Goal 10:** A sustainable and just food system that enhances access to affordable, local, and healthy food
- **Goal 11:** Inclusive, transparent, and accountable governance that facilitates participation in sustainability efforts, especially by disempowered communities
- **Goal 12:** A commitment to realize OurCounty sustainability goals through creative, equitable, and coordinated funding and partnerships

# Resiliency Goal Themes

Alternative transportation methods

Ecotourism/bicycle tourism

Healthy and active lifestyles

Recreation opportunities/access to nature

Equitable solutions for social challenges of climate change

Safe, affordable, connected communities

Strengthen the regional economy

Strengthen the local economy and develop/support local identities

Facilitate participation by underserved/disempowered communities

# Resiliency Goal Themes

Protect a connected network of undeveloped land

Improve performance and resiliency of natural systems under normal and extreme conditions

Integrate natural resources into decision making

Creative, equitable, coordinated funding and partnerships

Inclusive, transparent, accountable governance

Interjurisdictional/interagency cooperation and coordination

Development and implementation of long-term, cost-effective mitigation projects

# Resiliency Goal Themes

Maintain, enhance and restore the natural environment's capacity to deal with natural hazards

Improve emergency management and preparedness, collaboration and outreach

Buildings and infrastructure that support resilience

Equitable and sustainable land use and development

Prosperous communities that provide opportunities for all residents and businesses

Transition to green economy

Sustainable production and consumption of resources

# Goals Worksheet & Draft Goals



- Worksheets will be used to form **Draft Goals**
- Worksheets will be sent to the CAT by email within one week (by Wed. Sept. 22<sup>nd</sup>)
- Please respond with any comments on the Draft Goals by **Wed. Sept. 29th**
- **Draft Goals** will be revisited after receiving public input

# CDC's Social Vulnerability Index

- **Social vulnerability** refers to the potential negative effects on communities caused by external stresses on human health.
- Such stresses include natural or human-caused disasters, or disease outbreaks.
- Reducing social vulnerability can decrease both human suffering and economic loss.
- The **CDC/ATSDR Social Vulnerability Index** (CDC/ATSDR SVI) uses 15 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters.

# CDC's Social Vulnerability Index

- The factors assessed in the CDC social vulnerability index include: socioeconomic status (income, political power, prestige), gender, race and ethnicity, age, employment loss, residential property, renters, occupation, family structure, education, medical services and access, social dependence, and special-needs populations.
- These inputs result in maps of four categories of social vulnerability, including socioeconomic status, household composition, race/ethnicity/language, and housing/transportation.

## CDC's Social Vulnerability Index

The RCCP Handbook instructs us “To assess the vulnerability of populations and social systems, build upon the CDC's Social Vulnerability Index (SVI) outlined in your local or hazard mitigation plan. Ground-truth existing data in this index and add community knowledge to supplement and expand upon this vulnerability index.”

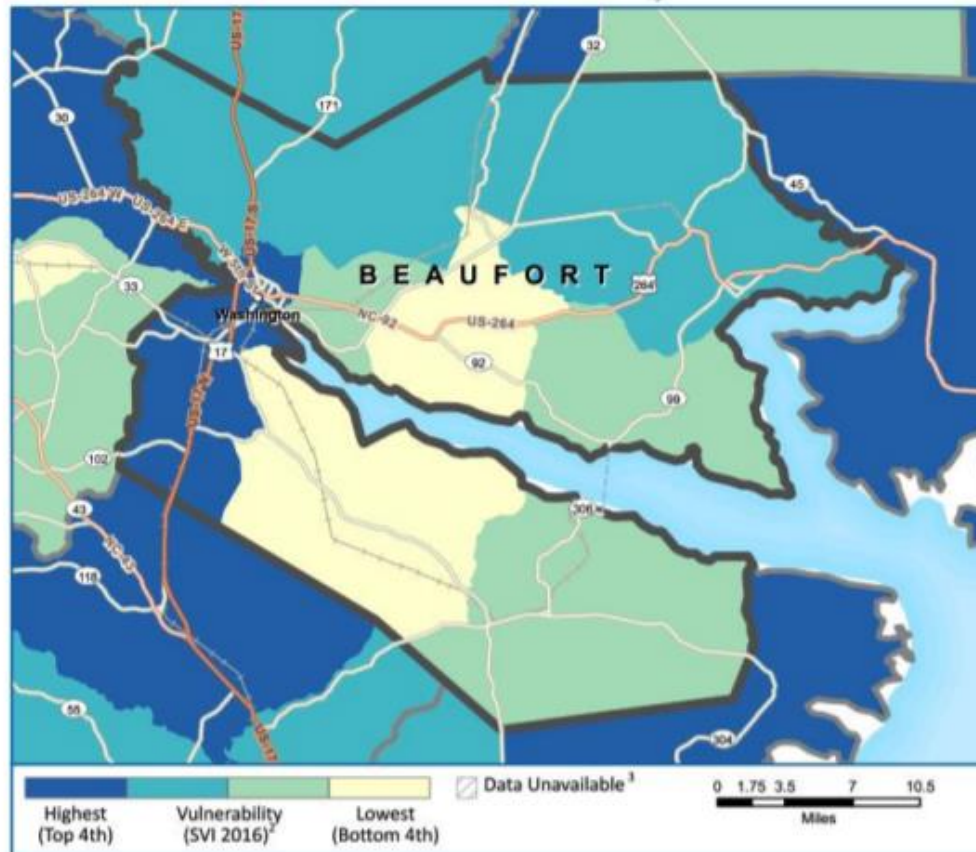
# CDC's Social Vulnerability Index – Pamlico Sound Regional Hazard Mitigation Plan

## Social Vulnerability

Figure 3.5 below displays social vulnerability information for Beaufort County by census tract according to 2016 data and analysis by the Centers for Disease Control and Prevention (CDC). The CDC's Social Vulnerability Index (SVI) indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age, disability, household composition, minority status, language, housing type, and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and municipal jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Overall, Beaufort County has a fairly low SVI index. Central portions of the County have the lowest SVI, while portions of the County within and adjacent to the City of Washington have a much higher SVI than the County overall. The areas around the City of Washington have a much higher development density, higher dollar value per acre and access to services than other portions of Beaufort County.

Figure 3.5 – Beaufort County Social Vulnerability Index



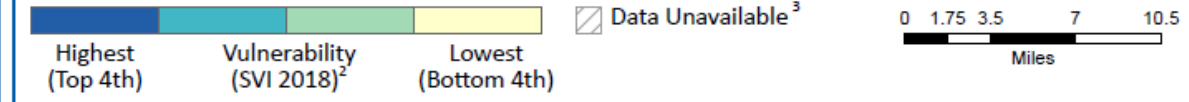
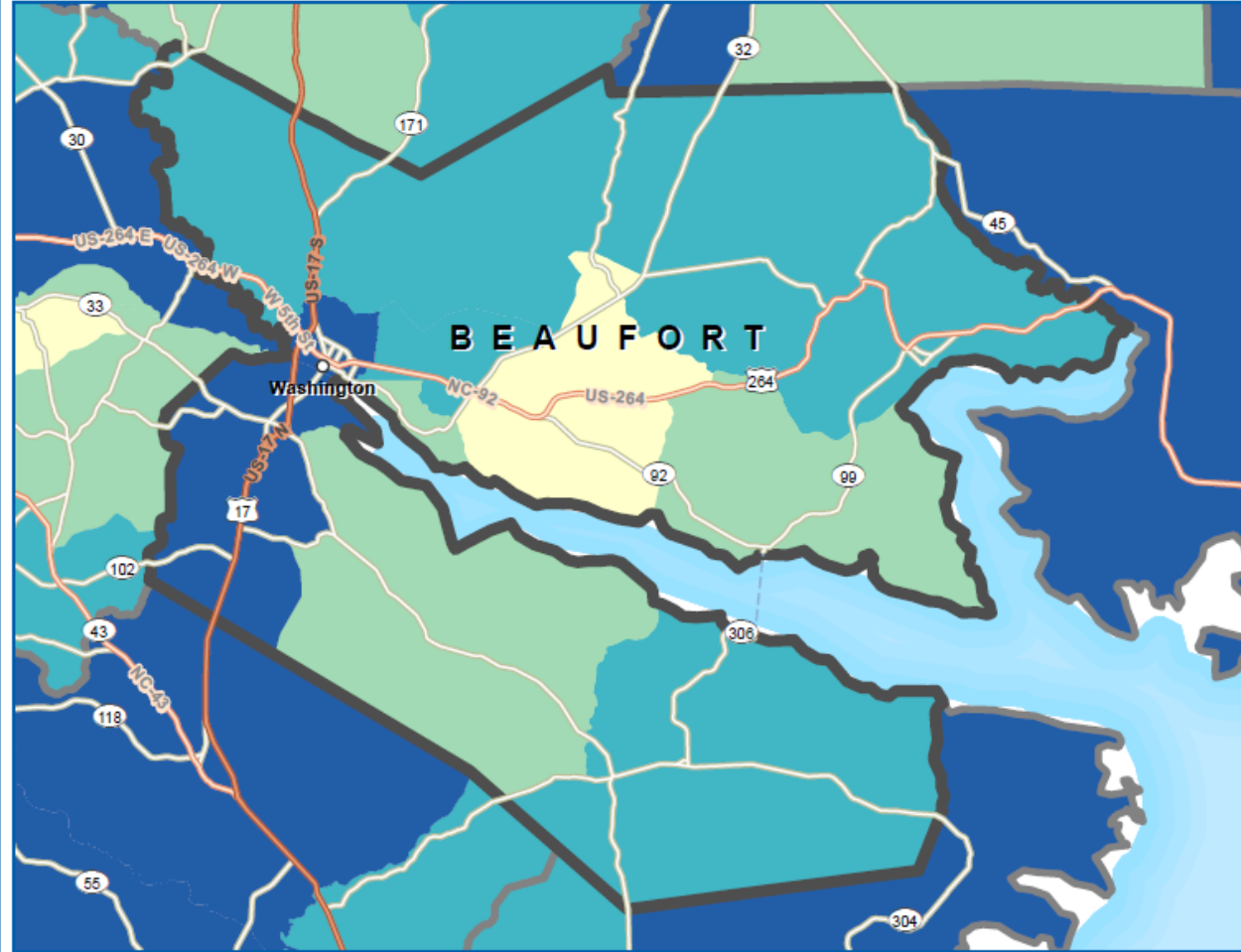
# CDC's Social Vulnerability Index

## CDC Social Vulnerability Index 2018 Beaufort County, North Carolina

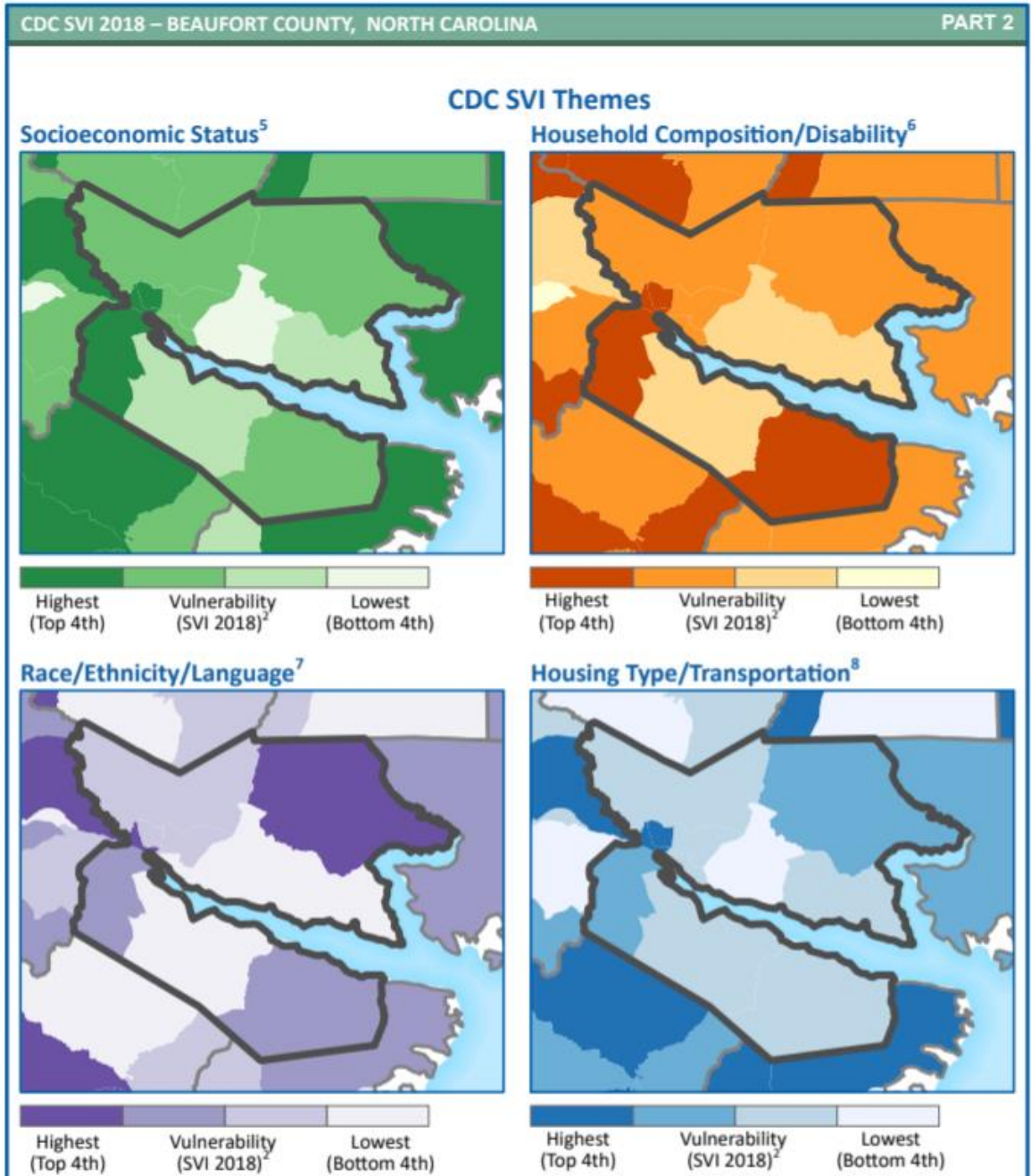
PART 1



### Overall Social Vulnerability<sup>1</sup>



# CDC's Social Vulnerability Index





## Community Outreach Strategy

**The goal of the Community Engagement Strategy is to implement all available outreach resources to engage as many Beaufort County citizens as possible to participate fully in the Resilient Coastal Communities Program.**

- Public survey between meetings 2 and 3 (released in October 2021)
- Public open house between meetings 5 and 6 (January 2022)



# Community Outreach Strategy

## Outreach Tools

- Social Media
- Cable Television Public Announcement Channels
- Television and Print News Media
- Bulk Mail
- Partnership Newsletters / Websites  
(i.e., Sound Rivers, Municipalities, County)
- Faith Based Community (i.e., Bulletin)
- Minority Owned Businesses
- Blind Center
- Senior Centers
- Libraries
- Community Events



## Community Outreach Strategy

### Examples of Identified Vulnerable Populations

**Persons with disabilities including non-readers:**

Ensure active outreach to collect feedback from persons with disabilities. Involve organizations of persons with disabilities in consultation and decision making. Partner with television media to reach non-readers.

**Elderly:**

Diversify communication tools, format and simplify messages. Engage the elderly to address their specific feedback.

**Immigrants including non-English and English as a second language:**

Advocate for inclusion and non-discriminatory access to information by refugees and migrants. Understand unique needs, preferred communication channels and preferred languages. Ensure translation of key messages and materials to the languages people understand.

**Low income and minority communities:**

Ensure active outreach to collect feedback from underserved low income and minority communities. Partner with local community organizations, faith organizations, and businesses on outreach.

**Known flood risk communities:**

Populations living in known high flood risk communities.

# Public Survey Questions

1. Do you live or work in Beaufort County?
2. If yes, how long have you lived or worked in Beaufort County?
3. Please identify your zip code (home, work, or both as applicable).
4. Which of the following statements about coastal storms do you most agree with?
  - I am very worried about coastal storms in the future
  - I am slightly worried about coastal storms in the future
  - I am not worried about coastal storms in the future

# Public Survey Questions

**5. On a scale of 1-5, how significant of a risk do you think flooding currently poses to your community?**

1 – not a concern, 2 – minor challenge, 3 – moderate challenge, 4 – serious challenge, 5 – extreme challenge

**6. On a scale of 1-5, how significant of a risk do you think flooding will pose to your community in the next 20-40 years, given climate change and rising sea levels?**

1 – not a concern, 2 – minor challenge, 3 – moderate challenge, 4 – serious challenge, 5 – extreme challenge

**7. Throughout your time living or working in Beaufort County, has your experience with flooding changed?**

- Yes, I have witnessed increasing flooding issues.
- Yes, I have witnessed decreasing flooding issues
- No, I have not witnessed a difference in flooding conditions
- Not sure

# Public Survey Questions

## 8. What type of coastal hazards have you witnessed in your community? Select all that apply.

- Tidal flooding – flooding caused by daily or extreme high tides
- Coastal erosion – loss or displacement of land or sediment along the coastline
- Storm surge flooding – flooding caused by coastal storms including nor'easters and hurricanes
- Groundwater impacts – changes in the boundary between freshwater and saltwater
- Riverine flooding – flooding caused by overflowing of rivers and streams
- Stormwater flooding – flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall
- Erosion of land under structure
- Direct damage to structure from wave action
- Direct damage to structure from high winds
- Damage from airborne debris
- Contamination from overflowing septic systems or wastewater treatment facilities
- Secondary damage from floating debris
- Secondary damage from natural gas or propane leak
- Other (please specify)
- None

# Public Survey Questions

## 9. Which of those same hazards have directly impacted your home or your business? Select all that apply.

- Tidal flooding – flooding caused by daily or extreme high tides
- Coastal erosion – loss or displacement of land or sediment along the coastline
- Storm surge flooding – flooding caused by coastal storms including nor'easters and hurricanes
- Groundwater impacts – changes in the boundary between freshwater and saltwater
- Riverine flooding – flooding caused by overflowing of rivers and streams
- Stormwater flooding – flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall
- Erosion of land under structure
- Direct damage to structure from wave action
- Direct damage to structure from high winds
- Damage from airborne debris
- Contamination from overflowing septic systems or wastewater treatment facilities
- Secondary damage from floating debris
- Secondary damage from natural gas or propane leak
- Other (please specify)
- None

# Public Survey Questions

**10. Do you have measures in place to prevent or reduce flooding or flood related damage and losses to your property? If yes, what type of actions have you taken? Check all that apply.**

- Elevation of property and utilities
- Use of flood-resistant materials (e.g. using tile in place of carpet)
- Floodproofing of property, including basements
- Installation of flood vents
- Installation of a sump pump
- Use of flood-resistant insulation
- Installation of a sewer-backflow valve
- Use of reinforced caulking of windows and doors
- Other (please specify)
- My property does not have measures in place to prevent or reduce flooding and/or future damage

# Public Survey Questions

**11. Have you ever considered moving to another location (can be inside or outside of Beaufort County) to avoid future flood losses, impacts, or damage?**

- Yes – I am looking at buying/renting at a new location in the near future because of flooding.
- Yes – I am considering buying/renting at a new location in the future if flood events become more frequent.
- Yes – I considered buying/renting at a new location but there are conditions that prevent me from doing so (cost, job, family nearby, etc.)
- No – I considered leaving but I have nowhere to go.
- No – I do not want to leave my current location.
- No – My property never floods so it is not a factor in my decision to stay or leave.

# Public Survey Questions

**12. Aside from any impacts to your home or business, have you experienced any other negative impacts as a result of flooding events? Check all that apply.**

- Damage to transportation networks (e.g., flooded roadways, closure of public transportation systems, transportation delays)
- Loss of electricity
- Lack of access to clean drinking water
- Injury, illness, and/or concerns for personal safety
- Limited access to services (e.g., closure of hospitals, schools, government offices)
- Damage to personal possessions (including vehicles)
- Sewer overflow
- Inability to perform work duties
- Other (please specify)
- I have not experienced any negative impacts as a result of flooding or a coastal hazard event.

# Public Survey Questions

**13. Please rank the following activities, intended to restore daily life after a coastal storm, from most important to you (1) to least important to you (10).**

- Re-opening roads
- Making my home livable
- Repairing damaged buildings
- Restoring water service
- Restoring wastewater collection and disposal (sewer or septic system)
- Restoring communication (telephones, cell phones, internet)
- Restoring electricity
- Tourists returning
- Businesses opening
- Restoring beaches, wetlands, and other coastal landforms

# Public Survey Questions

**14. Do you think any of the following project types would provide benefits to your community? Check all that apply.**

- Beach restoration
- Habitat creation and restoration
- Property buy-outs and land preservation
- Nature-based shoreline stabilization
- Local resilience planning (including climate change plans, sea-level change restrictions, etc.)
- Resilience policy and development standards
- Public education and outreach
- Structural shoreline protection (including floodwalls, levees, tide gates, etc.)
- Critical infrastructure upgrades (including hospitals, police and fire stations, nursing homes, etc.)
- Stormwater drainage improvements
- Road/bridge elevation
- Other (please specify)
- None of the above

# Public Survey Questions

**15. Are there any specific areas of your community vulnerable to coastal hazards?** If so, please list them by location. Please use street intersections or landmarks to describe locations.

**16. Do you have any additional ideas for projects that may help reduce flooding in your community?**

**17. On a scale of 1-5, to what extent do you see the Resilient Coastal Communities Program providing benefits to your community?**

1- not at all, 2 – not very beneficial, 3 – neutral, 4 – somewhat beneficial, 5 – very beneficial

# Public Survey Questions

**18. How do you hope coastal resilience projects might benefit your community?**

**19. Do you have any concerns about these kinds of projects in your community?**

**20. How would you like Beaufort County to communicate with you or your community regarding this project or on similar projects in the future?**

Email, newsletter, social media, webinar/videos, mail, in person or virtual meetings, other (please specify), not interested in further communication

# Public Survey Questions

**21. Are there any local or community groups or organizations you feel we should coordinate with to promote this project or similar projects in the future? If yes, please provide their name, website, and a contact person/email if possible.**

**22. Is there anything else you would like to share with us regarding flooding and coastal resilience planning?**

**23. Optional demographic questions**

- Age brackets
- Gender
- Race
- Annual income

## Next Steps

- This presentation will be emailed to the CAT this week
  - Print copy can be mailed if preferred
- Draft vision statement and draft goals will be emailed by Wed. Sept. 22<sup>nd</sup>
  - Available via mail if preferred
- Comment on **Draft Vision Statement and Draft Goals** by email (or mail) by **Wed. Sept. 29th**
- Next meeting is **Wed. Oct. 20th** from 10:00 am – noon
  - Topic: Existing Conditions

# Contractor Contact Information

## Mid-East Commission

- Jamie Heath, Planner  
jheath@mideastcom.org  
(252)296-1656
- Lisa Williams, Disaster Recovery Coordinator  
lwilliams@mideastcom.org  
(252)974-1843

# Contractor Contact Information

## RK&K

- Paige Cureton, Project Manager  
pcureton@rkk.com  
(984)238-7207
- Tris Ford, Senior Planner  
tford@rkk.com  
(919)653-7335



# BEAUFORT COUNTY

## Community Action Team - Meeting #1

### MEETING SUMMARY

WEDNESDAY, SEPTEMBER 15, 2021, 10:00 AM - 12:00 PM, BEAUFORT COUNTY

COMMISSIONERS BOARD ROOM + VIRTUAL

#### Meeting Purpose:

- To discuss the RCCP program, vision and goals, existing plans, and community engagement.
- Refer to attached meeting agenda.

#### Attendees:

- Refer to attached meeting sign-in sheet.

#### Materials:

- Refer to attached materials:
  - RCCP Overview
  - RCCP CAT Meeting Framework
  - CAT Meeting #1 Agenda
  - CAT Meeting #1 Presentation
  - Vision Statement Worksheet
  - Goals Worksheet
  - Social Vulnerability Index Maps

#### Meeting Discussion:

##### RCCP Overview

- The anticipated budget for Phase 3 – Engineering and Design is estimated to be approximately \$40,000 for one prioritized project per community.
- NCDEQ has not identified the anticipated budget for Phase 4 – Implementation.
- Projects identified during Phases 1 and 2 may be submitted by communities for other funding opportunities, such as the federal BRIC program.
- The Contractors will collaborate with the CAT to identify potential funding opportunities.
- The goal of the County-wide program is to focus on the unincorporated areas of Beaufort County.
- Beaufort County municipalities (Belhaven, Aurora, Washington) will focus within their municipal limits. There may be opportunities to collaborate between the County and municipalities.
- The RCCP Contractors in Beaufort County (Mid-East Commission and RK&K) are the same Contractors for the three municipalities.
- Natural infrastructure (aka green infrastructure) refers to ecosystems or natural systems, including wetlands, forests, beaches, dunes, and rivers or streams.

## Existing Plans, Resiliency Reports & Studies

- Martyn Johnson will share the following information with the team:
  - IEDC Building Resilient Regions Plan 2016
  - Economic Development Workplan for Beaufort County
  - Data by Zip Code plus
  - Town data (if available)

## Vision Statement

- Martyn Johnson provided a Vision Statement example in the Virtual Zoom chat:

*“VISION The BCED will actively promote economic prosperity and sustainable economic development as a priority for Beaufort County and its constituent municipalities. BCED will improve economic prosperity by increasing business activity, whether new businesses or expanding existing businesses, to create new jobs, more income, and a broader tax base. BCED will strive to achieve sustainable economic development by building business development on our existing resource and business base and attracting new businesses that increase industrial diversity to soften the cyclical impacts of individual industry sectors.”*

## Community Goals

- The examples are very broad.
- The Vision Statement and Goals will develop the framework for the RCCP.
- Goals will set the stage to identify potential solutions.
- Goals can be tailored to specific issues related to Beaufort County.

## Social Vulnerability Index

- The Social Vulnerability Index does not appear to align with what we are seeing locally.
- The Aurora area, in the southeast Census tracts, is probably the most vulnerable area of the County, or at least more vulnerable than Washington or Chocowinity.
- Washington should not be most vulnerable.
- The Census tracts do not reflect local conditions well.
- Does the block group level better reflect the conditions?
- Consider using municipal-level data because Zip Code data does not capture demographics well.
- The CAT brings local knowledge and observations about that area to build upon the CDC index.
- The Aurora area is a food desert.
- The Beaufort County school system has a free lunch program because of social vulnerability (low income). We may consider reviewing school free and reduced lunch numbers.
- The Housing Type and Transportation Map does not make much sense for what we are seeing locally. There are major transportation issues in these areas. Perhaps housing type and transportation maps should likely have been separated. (The map shows housing types and zero car households.)
- Household Composition/Disability Map looks more accurate.
- We should consider showing the elevation map as an overlay with the population maps.
- The team will be overlaying hazards with vulnerabilities during Phase 1 of the RCCP process.
- NCDOT has a good tool for demographic data.
- NCDENR also has a tool:  
<https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=1eb0fbe2bcfb4cccb3cc212af8a0b8c8>

## Community Outreach Strategy

### *Public Survey Questions*

- Add to list the direct damage to structures from fallen trees and branches.
- Add to list of choices for whether respondents have any flood protection measures on their building and not applicable because respondents are located on elevated land or land that never floods.

### Next Steps

- Comment on Draft Vision Statement and Draft Goals by email (or mail) by Wed. Sept. 29.
- Next meeting: CAT Meeting #2: Existing Conditions, Wed., Oct. 20, 10:00 am – noon



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 1

**Date** Sept. 15, 2021

**Time** 10:00 AM – 12:00 PM

**Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Brian Alligood	Beaufort County	County Manager	brian.alligood@co.beaufort.nc.us	Brian Alligood
	Christina Smith	Beaufort County	Public Works Director	christina.smith@co.beaufort.nc.us	Christina Smith
	Carlton Gideon	Mid-East Commission	Planner	cgideon@mideastcom.org	Carlton Gideon
	Carnie Hedgepeth	Beaufort County	Beaufort County Emergency Management Director	carnie.hedgepeth@co.beaufort.nc.us	Carnie Hedgepeth (online)
	Ed Booth	Beaufort County	Commissioner	ed.booth@co.beaufort.nc.us	Ed Booth
	John Rebholz	Beaufort County	Commissioner	john.rebholz@co.beaufort.nc.us	John Rebholz (online)
	Bishop James S. McIntyre Sr.	Cornerstone Family Worship Center	Pastor	pastorcfwc@gmail.com	Bishop James S. McIntyre Sr.
	Martyn Johnson	Beaufort County	Economic Development Director	Martyn.johnson@beaufortedc.com	Martyn Johnson (online)
	Heather Deck	Sound Rivers	Executive Director	heather@sounddrivers.org	Heather Deck (online)
	Tom Stroud	NC Estuarium/ Partnership for the Sounds	Deputy Director	tmstroud@embarqmail.com	Tom Stroud
	Dave Loope	Beaufort County Community College	President	dave.loope@beaufortccc.edu	Dave Loope (online)
	Jamie Heath	Mid-East Commission	Contractor	jheath@mideastcom.org	Jamie Heath



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 1

**Date** Sept. 15, 2021

**Time** 10:00 AM – 12:00 PM

**Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Lisa Williams	Mid-East Commission	Contractor	lwilliams@mideastcom.org	
	Paige Cureton	RK&K	Contractor	pcureton@rkk.com	
	Tris Ford	RK&K	Contractor	tford@rkk.com	
	Jim Eisenhardt	RK&K	Contractor	jeisenhardt@rkk.com	
	Gordon Marsh	RK&K	Contractor	gmarsh@rkk.com	
	Tancred Miller	NC DEQ	State/Grant Agency	Tancred.miller@ncdenr.gov	
	Mackenzie Todd	NC DEQ	State/Grant Agency	Mackenzie.todd@ncdenr.gov	online
	Squires, Susan BC Econ Dev			susan.squires@beaufortcdc.com	Susan Squires (online)



**Community Action Team**  
Meeting #2 Materials



# Beaufort County

## Community Action Team - Meeting #2

### AGENDA

Wednesday, Oct. 20, 2021, 10:00 AM - 12:00 PM

Location: Beaufort County Commissioners Board Room (in Beaufort County Financial Services Center), 136 W 2nd St. Washington, NC 27889

**10:00 – 10:05 AM**

#### **Welcome**

- Introduction of contractors and team members

**10:05 – 10:10 AM**

#### **Public Survey**

- Flyer
- Facebook ad
- Hard copies

**10:10 – 10:15 AM**

#### **Review inventory of relevant resources**

- Available risk assessments
- Data sources

**10:15 – 10:45 AM**

#### **Review and discuss critical assets**

- Review critical asset list and map
- Fill in gaps
- Select critical assets to include in the RCCP Risk and Vulnerability Assessment

**10:45 – 11:00 AM**

#### **Review and discuss natural infrastructure**

- Review natural infrastructure list and map
- Fill in any gaps
- Select natural infrastructure to include in the RCCP Risk and Vulnerability Assessment

**11:00 – 11:15 AM**

#### **Review and discuss hazards**

- Discuss which hazards to include in the RCCP Risk and Vulnerability Assessment

**11:15 – 11:30 AM**

#### **Travel to tour site (optional)**

- Vidant Beaufort Hospital (outside tour only)
- Location: 628 E 12<sup>th</sup> St. Washington, NC 27889



# Beaufort County

Community Action Team - Meeting #2

**11:30 AM – NOON**

**TOUR (optional)**

- Vidant Beaufort Hospital (outside tour only)

**NOON**

**Adjournment**

# BEAUFORT COUNTY PUBLIC SURVEY



# shape our future.

HELP US IDENTIFY ISSUES & NEEDS RELATED TO FLOODING & OTHER NATURAL EVENTS



TAKE THE ONLINE SURVEY:

[www.beaufortcountyfloodsurvey.org](http://www.beaufortcountyfloodsurvey.org)

PLEASE COMPLETE THE SURVEY BY NOV. 12, 2021

North Carolina  
**RESILIENT  
COASTAL  
COMMUNITIES  
PROGRAM**



**Request a paper survey  
by contacting:**



**JAMIE HEATH, MID-EAST COMMISSION  
(252) 296-1656**

# PUBLIC SURVEY

# shape our future.

HELP US IDENTIFY ISSUES & NEEDS RELATED TO  
FLOODING & OTHER NATURAL EVENTS

VISIT THE LINK TO TAKE THE  
SURVEY BY NOV 12



North Carolina  
**RESILIENT  
COASTAL  
COMMUNITIES  
PROGRAM**





# BEAUFORT COUNTY

## Public Input Survey

Severe weather events result in flooding and other storm-related effects and can cause widespread damage, displace residents, and restrict access and mobility, impacting the well-being of communities across eastern North Carolina. Climate change continues to amplify these risks, further threatening coastal development. Barriers, such as economic and capacity constraints, often hinder the actions needed to enhance resilience and reduce vulnerability.

Building resilience to natural hazards is vital for communities to help maintain quality of life, sustain healthy economies, and ensure the conservation of resources for present and future generations. The North Carolina Resilient Coastal Communities Program provides financial grants and technical assistance to support a proactive, locally driven, and equitable approach to coastal resilience planning and project implementation.

Please take a few minutes to complete this survey for Beaufort County's Resilient Coastal Communities Program. Your input will help us better understand existing issues and needs in Beaufort County. Thanks for your time!

This survey can also be completed online at: [www.beaufortcountyfloodsurvey.org](http://www.beaufortcountyfloodsurvey.org)

### **Please tell us about yourself.**

1. Do you live and/or work in Beaufort County?
2. If yes, how long have you lived and/or worked in Beaufort County?
3. Do you own and/or rent your property (home, business, or both as applicable)?
4. Please identify your zip code (home, work, or both as applicable).

**Coastal Storms & Flooding**

5. Which of the following statements about coastal storms do you most agree with?
  - I am very worried about coastal storms in the future
  - I am slightly worried about coastal storms in the future
  - I am not worried about coastal storms in the future
  
6. On a scale of 1-5, how significant of a risk do you think flooding currently poses to your community?
  - 1 – not a concern
  - 2 – minor challenge
  - 3 – moderate challenge
  - 4 – serious challenge
  - 5 – extreme challenge
  
7. On a scale of 1-5, how significant of a risk do you think flooding will pose to your community in the next 20-40 years, given climate change and rising sea levels?
  - 1 – not a concern
  - 2 – minor challenge
  - 3 – moderate challenge
  - 4 – serious challenge
  - 5 – extreme challenge
  
8. Throughout your time living and/or working in Beaufort County, has your experience with flooding changed?
  - Yes, I have witnessed increasing flooding issues.
  - Yes, I have witnessed decreasing flooding issues.
  - No, I have not witnessed a difference in flooding conditions.
  - Not sure.

Comments:

**Coastal Hazards & Impacts**

9. What type of coastal hazards have you witnessed in your community? Select all that apply.
  - Tidal flooding – flooding caused by daily or extreme high tides
  - Coastal erosion – loss or displacement of land or sediment along the coastline
  - Storm surge flooding – flooding caused by coastal storms including nor’easters and hurricanes
  - Freshwater/saltwater impacts – changes in the boundary between freshwater and saltwater
  - Riverine flooding – flooding caused by overflowing of rivers and streams
  - Stormwater flooding – flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall
  - Erosion of land under structure

- Direct damage to structure from wave action
- Direct damage to structure from high winds
- Direct damage to structure from fallen trees or branches
- Damage from airborne debris
- Contamination from overflowing septic systems or wastewater treatment facilities
- Secondary damage from floating debris
- Secondary damage from natural gas or propane leak
- Mold
- All of the above
- Other (please specify) \_\_\_\_\_
- None

Comments:

10. Which of those same hazards have directly impacted your home or your business? Select all that apply.

- Tidal flooding – flooding caused by daily or extreme high tides
- Coastal erosion – loss or displacement of land or sediment along the coastline
- Storm surge flooding – flooding caused by coastal storms including nor’easters and hurricanes
- Groundwater impacts – changes in the boundary between freshwater and saltwater
- Riverine flooding – flooding caused by overflowing of rivers and streams
- Stormwater flooding – flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall
- Erosion of land under structure
- Direct damage to structure from wave action
- Direct damage to structure from high winds
- Direct damage to structure from fallen trees or branches
- Damage from airborne debris
- Contamination from overflowing septic systems or wastewater treatment facilities
- Secondary damage from floating debris
- Secondary damage from natural gas or propane leak
- Mold
- All of the above
- Other (please specify) \_\_\_\_\_
- None

Comments:

11. Do you have measures in place to prevent and/or reduce flooding or flood-related damages and losses to your property? If yes, what type of actions have you taken? Check all that apply.
- Elevation of property and/or utilities
  - Use of flood-resistant materials (e.g., using tile in place of carpet)
  - Floodproofing of property, including basements
  - Installation of flood vents
  - Installation of a sump pump
  - Use of flood-resistant insulation
  - Installation of a sewer-backflow valve
  - Use of reinforced caulking of windows and doors
  - Other (please specify) \_\_\_\_\_
  - My property does not have measures in place to prevent and/or reduce flooding and/or future damage.
  - Not applicable. My property never floods and/or I do not anticipate future flooding.
12. Have you ever considered moving to another location (can be inside or outside of Beaufort County) to avoid future flood losses, impacts, or damages?
- Yes – I am considering buying/renting at a new location in the near future because of past and/or potential future flooding.
  - Yes – I considered buying/renting at a new location but there are conditions that prevent me from doing so (e.g., cost, job, family nearby, etc.)
  - No – I considered leaving but I have nowhere to go.
  - No – I do not want to leave my current location.
  - No – My property never floods so it is not a factor in my decision to stay or leave.
13. Aside from any impacts to your home or business, have you experienced any other negative impacts as a result of flooding events? Check all that apply.
- Damage to transportation networks (e.g., flooded roadways, closure of public transportation systems, transportation delays)
  - Loss of electricity
  - Lack of access to clean drinking water
  - Injury, illness, and/or concerns for personal safety
  - Limited access to services (e.g., closure of hospitals, schools, government offices)
  - Damage to personal possessions (including vehicles)
  - Sewer overflow
  - Inability to perform work duties
  - Other (please specify) \_\_\_\_\_
  - I have not experienced any negative impacts as a result of flooding or a coastal hazard event.

Comments:

14. Are there any specific areas of your community vulnerable to coastal hazards? If so, please list them by location. Please use street intersections or landmarks to describe locations.

15. Please rank the following activities, intended to restore daily life after a coastal storm.

	1 – Not at all important	2	3	4	5 – Very important	No opinion
Re-opening roads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making my home livable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repairing damaged buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring water service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring wastewater collection and disposal (sewer or septic system)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring communication (telephones, cell phones, internet)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tourists returning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Businesses reopening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring beaches, wetlands, and other coastal landforms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Is there anything else you would like to share with us regarding flooding and coastal resilience in Beaufort County?

**Stakeholder Engagement**

17. How would you like Beaufort County to communicate with you and/or your community regarding this program or on similar programs in the future?

- E-mail
- Newsletter
- Social media
- Webinar/videos
- Mail
- In person or virtual meetings
- Other (please specify) \_\_\_\_\_
- Not interested in further communication

18. Are there any local or community groups or organizations you feel we should coordinate with to create awareness of this program or similar programs in the future? If yes, please provide their name, website, and contact information if possible.

19. Are there any upcoming events where we could share information about this program?

**Demographic Information (Optional)**

**Tell us your age.**

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75+

**What race/ethnicity best describes you? Select all that apply.**

- White/Caucasian
- Black or African American
- Asian
- American Indian or Alaskan Native
- Native Hawaiian/Pacific Islander
- Hispanic/Latino
- Multiple races or ethnicities
- Other (please specify): \_\_\_\_\_

**Which type of housing best describes your home?**

- Single-family, detached from other homes
- Townhome, attached to other homes
- Apartment or condominium
- Other (please specify): \_\_\_\_\_

**How do you travel in Beaufort County? Select all that apply.**

- Walk
- Bicycle
- Beaufort Area Transit System (BATS)
- Driving a personal vehicle
- Taxi or rideshare
- Carpool / Vanpool
- Motorcycle
- Other (please specify): \_\_\_\_\_

**Beaufort County**  
**Critical Assets and Natural Infrastructure**

**Critical Assets**

Emergency Management

- Beaufort County Emergency Management (county owned)  
1420 Highland Dr.  
Washington, NC 27889

Law Enforcement/Security

- Beaufort County Sheriff's Office (county owned)  
210 N Market St.  
Washington, NC 27889
- Beaufort County Courthouse (county owned)  
112 W 2<sup>nd</sup> St.  
Washington, NC 27889
- Beaufort County Probation and Parole Office (county owned)  
1308 Highland Dr.  
Washington, NC 27889
- Town of Belhaven Police Dept. (municipal owned)  
125 W Main St.  
Belhaven, NC 27810
- Town of Chocowinity Police Department (municipal owned)  
3635 US Hwy 17  
Chocowinity, NC 27817
- Washington Police Department (municipal owned)  
1385 John Small Ave.  
Washington, NC 27889

Fire and EMS Stations

(NC Office of State Fire Marshall data.)

- Aurora Volunteer Fire and Rescue Station 1 (non-profit owned)  
99 Hwy 33 East  
Aurora, NC 27806
- Aurora Volunteer Fire and Rescue Station 2 (non-profit owned)  
49 Labor Camp Rd.  
Edward, NC 27821
- Bath Community Rescue Squad (non-profit owned)  
10774 NC Hwy 99 South  
Bath, NC 27808
- Bath Volunteer Fire Department (non-profit owned)  
430 Carteret St.  
Bath, NC 27808
- Belhaven Volunteer Fire and Rescue (non-profit owned)  
245 Haslin St.  
Belhaven, NC 27810

- Blounts Creek Volunteer Fire Department (non-profit owned)  
13965 NC Hwy 33 East  
Blounts Creek, NC 27814
- Broad Creek Emergency Medical Services, Inc. (private owned)  
7214 Broad Creek Rd.  
Washington, NC 27889
- Bunyan Volunteer Fire Department (non-profit owned)  
8264 Broad Creek Rd.  
Washington, NC 27889
- Chocowinity Fire District Volunteer Fire Department Station 1 (non-profit owned)  
512 NC Hwy 33 East  
Chocowinity, NC 27817
- Chocowinity Fire District Volunteer Fire Department Station 2 (non-profit owned)  
Fire and EMS Stations  
10105 US Hwy 17 South  
Chocowinity, NC 27817
- Clarks Neck Fire and Rescue Department Station 2 (non-profit owned)  
3797 Wharton Station Rd.  
Washington, NC 27889
- Coastal Medical Transport, Inc. (private owned)  
122 West 5th St.  
Washington, NC 27889
- Long Acre Volunteer Fire Department (non-profit owned)  
23177 NC Hwy 32  
Plymouth, NC 27962
- Old Ford Volunteer Fire Department (non-profit owned)  
6050 US Hwy 17 North  
Washington, NC 27889
- Pamlico Beach Fire and Rescue Squad (non-profit owned)  
382 Old Pamlico Beach Rd. West  
Belhaven, NC 27810
- Pantego Community Fire Protection Association (non-profit owned)  
25673 US 264 East  
Pantego, NC 27860
- Pinetown Rescue and Emergency Medical Services (non-profit owned)  
4815 N Boyd Rd.  
Pinetown, NC 27865
- Pinetown Volunteer Firemen's Association, Inc. Station 1 (non-profit owned)  
7262 North Boyd Rd.  
Pinetown, NC 27865
- Pinetown Volunteer Firemen's Association, Inc. Station 2 (non-profit owned)  
23177 NC Hwy 32  
Plymouth, NC 27963
- Pungo River Volunteer Fire Department, Inc. (non-profit owned)  
40 Pike Rd.  
Pantego, NC 27860

- Sidney Volunteer Fire Department Inc. (non-profit owned)  
6755 North Savannah Rd.  
Belhaven, NC 27810
- Tar Heel Medical Transport (non-profit owned)  
425 Grimes Rd.  
Washington, NC 27889
- Washington Fire-Rescue-EMS Station 1 (municipal owned)  
410 N Market St.  
Washington, NC 27889
- Washington Fire-Rescue-EMS Station 2 (municipal owned)  
2064 W 15<sup>th</sup> St.  
Washington, NC 27889

#### 911 Dispatch

- Beaufort County 911 Communications Center (county owned)  
(in Beaufort County Sheriff's Office)  
210 N Market St.  
Washington, NC 27889

#### Government Services

- Aurora/Richland Chamber of Commerce (non-profit owned)  
474 Main St.  
Aurora, NC 27806
- Aurora Town Hall (municipal owned)  
295 Main St.  
Aurora, NC 27806
- Bath Town Hall (municipal owned)  
109 S Main St.  
Bath, NC 27808
- Beaufort County Animal Control (county owned)  
3931 US-264  
Washington, NC 27889
- Beaufort County Developmental Center (county owned)  
1534 W 5<sup>th</sup> St.  
Washington, NC 27889
- Beaufort County Economic Development (county owned)  
705 Page Rd.  
Washington, NC 27889
- Beaufort County Extension Office (county owned)  
155-A Airport Rd.  
Washington, NC 27889
- Beaufort County Financial Services Center (county owned)  
132 W 2<sup>nd</sup> St.  
Washington, NC 27889
- Beaufort County Inspections/Environmental Health/Tax Departments (county owned)  
220 N Market St.  
Washington, NC 27889

- Beaufort County Manager's Office (county owned)  
121 W 3<sup>rd</sup> St.  
Washington, NC 27889
- Beaufort County Social Services (county owned)  
632 W 5<sup>th</sup> St.  
Washington, NC 27889
- Beaufort County Veteran's Services (county owned)  
1308 Highland Dr.  
Washington, NC 27889
- Belhaven Chamber of Commerce (non-profit owned)  
265 E Water St. Suite 101  
Belhaven, NC 27810
- Belhaven Town Hall (municipal owned)  
315 E Main St.  
Belhaven, NC 27810
- Board of Elections (county owned)  
1308 Highland Dr. Suite 104  
Washington, NC 27889
- Chocowinity Town Hall (municipal owned)  
3391 US-17 South  
Chocowinity, NC 27817
- DMV (state owned)  
1821 Carolina Ave.  
Washington, NC 27889
- Mid-East Commission Council of Governments (non-profit owned)  
1502 N Market St. Suite A  
Washington, NC 27889
- NC DEQ Regional Office (state owned)  
943 Washington St.  
Washington, NC 27889
- NC Division of Vocational Rehabilitation (state owned)  
953 Washington Square Mall  
Washington, NC 27889
- NC License Plate Agency (state owned)  
127 N Market St.  
Washington, NC 27889
- NC Works Career Center (state owned)  
1502 N Market St. Suite B  
Washington, NC 27889  
Tax value: (included in 1502 N Market St. complex tax value)
- Pantego Town Hall (municipal owned)  
142 Swamp Rd.  
Pantego, NC 27860
- Social Security Office (state owned)  
1633 John Small Ave.  
Washington, NC 27889

- Washington-Beaufort County Chamber of Commerce (non-profit owned)  
102 W Stewart Pkwy  
Washington, NC 27889
- Washington City Hall (municipal owned)  
102 E 2<sup>nd</sup> St.  
Washington, NC 27889
- Washington Harbor District Alliance (non-profit owned)  
140 W Main St.  
Washington, NC 27889
- Washington Park Town Hall (municipal owned)  
408 Fairview Ave.  
Washington, NC 27889
- Washington Tourism Development Authority (non-profit owned)  
108 Gladden St.  
Washington, NC 27889

## Food

### Grocery Stores

- Acre Station Meat Farm Pinetown (private owned)  
17076 NC 32 Hwy  
Pinetown, NC 27865
- Food Lion (Belhaven) (private owned)  
998 US Hwy 264 Bypass  
Belhaven, NC 27810
- Food Lion (Chocowinity) (private owned)  
160 Town Center Plaza  
Chocowinity, NC 27817
- Food Lion (Washington #1) (private owned)  
851 Washington Square Mall  
Washington, NC 27889
- Food Lion (Washington #2) (private owned)  
1318 John Small Ave.  
Washington, NC 27889
- Food Pride (private owned)  
981 NC Hwy 33  
Chocowinity, NC 27817
- Piggly Wiggly (private owned)  
626 River Rd.  
Washington Park, NC
- Walmart (private owned)  
570 Pamlico Plaza  
Washington, NC 27889

### Dollar Stores (Only included for food desert areas.)

- Dollar General (Aurora) (private owned)  
24811 NC-33 East

- Aurora, NC 27806
- Dollar General (Blounts Creek) (private owned)  
13812 NC 33 Hwy  
Blounts Creek, NC 27814
- Family Dollar (Aurora) (private owned)  
150 S 5<sup>th</sup> St.  
Aurora, NC 27806

#### Food Pantries

- Eagle's Wings Food Pantry (non-profit owned)  
932 W 3<sup>rd</sup> St.  
Washington, NC 27889
- Citizens on Southside Together (COST) Food Pantry (non-profit owned)  
17501 NC Hwy 33 East  
Blounts Creek, NC 27814
- St. John MBC (Bread of Life) (non-profit owned)  
953 W Main St.  
Aurora, NC 27806
- Mobile Food Pantry EW Haw Branch Church (non-profit owned)  
1501 Haw Branch Road  
Chocowinity NC 27817
- Mobile Food Pantry EW Snowden (non-profit owned)  
693 N Seventh Street  
Aurora NC 27806
- Mobile Food Pantry Bath (non-profit owned)  
35 Deliah Wallace Rd.  
Bath NC 27808
- Mobile Food Pantry (non-profit owned)  
First Church of Christ  
520 E 10th St.  
Washington NC 27889
- Salvation Army (Beaufort) (non-profit owned)  
112 E 7th St.  
Washington NC 27889
- Washington Area Shelter and Soup Kitchen (non-profit owned)  
114 W Martin Luther King Jr Dr  
Washington NC 27889
- St. Vincent de Paul – Mother of Mercy (non-profit owned)  
112 W 9th St.  
Washington NC 27889
- Word of Life Food Pantry (non-profit owned)  
4449 Market St. Ext. North  
Washington NC 27889
- Deeper Life Ministries (non-profit owned)  
4477 Hwy 264 W  
Washington NC 27889
- St. John Disciples of Christ (non-profit owned)

2283 St. John Church Road  
Washington NC 27889

- Mobile Food Pantry Pantego (non-profit owned)  
150 Swamp Road  
Pantego NC 27860
- Macedonia Church of Christ (non-profit owned)  
1678 Swamp Rd.  
Pantego NC 27860
- Mt. Gilead Outreach Ministry (non-profit owned)  
182 W Pantego St.  
Belhaven NC 27810
- Martha's Project (non-profit owned)  
1014 Hwy 264 East  
Belhaven NC 27810
- Union Grove Church of Christ (non-profit owned)  
6889 NC HWY 99 N  
Pantego NC 27860

#### Water/Wastewater

- Public Works offices
  - Beaufort County Water Dept. Office (county owned)  
111 W 2<sup>nd</sup> St.  
Washington, NC 27889
  - City of Washington Public Works Department (in Washington City Hall) (municipal owned)
  - Washington Utilities Operations Center (municipal owned)  
250 Plymouth St.  
Washington, NC 27889
  - Washington Public Works yard and warehouse (municipal owned)  
203 Grimes Rd.  
Washington, NC 27889
  - Town of Aurora Public Works Department (municipal owned)  
(in Aurora Town Hall)
  - Town of Bath Public Works Department (municipal owned)  
(in Bath Town Hall)
  - Belhaven Public Works Department (municipal owned)  
(in Belhaven Town Hall)
  - Belhaven Town Yard (municipal owned)  
(Includes public works building, water tower, and town warehouse)  
469 Lee St.  
Belhaven, NC 27810
  - Town of Chocowinity Public Works Department (municipal owned)  
(in Chocowinity Town Hall)

- Public Water Supply Water Sources (NC DEQ Div. of Water Resources data)
  - Aurora system (municipal owned)
    - Well #1, located adjacent to water treatment plant
    - Well #2, located south of NC-33 across from 3<sup>rd</sup> St.
  - Bath system (municipal owned)
    - Bath water system well located on Craven St. behind school.
  - Beaufort County system - 14 supply wells (6 owned by county)
    - On north side of river, 8 wells are owned by Washington and county purchases water from them (municipal owned)
    - On south side of river, county owns and operates 6 wells (county owned)
      - “Castle Hayne 62” well, located off Hwy 33, 0.25 miles SE of water treatment plant
      - “Castle Hayne 64” well, located near Hwy 33 and Warren Chapel Rd., 1 mile NW of water treatment plant
      - “Pee Dee 62” well, located off Hwy 33, 0.25 miles SE of water treatment plant
      - “Pee Dee 64” well, located near Hwy 33 and Warren Chapel Rd, 1 mile NW of water treatment plant
      - “Well #1”, located on Old Sand Hill Rd. at water treatment plant site
      - “Well #2”, located on Old Sand Hill Rd., where Hwy 33 turns S onto road
  - Belhaven system (municipal owned)
    - Well #1 Wellfield Rd. at field site
    - Well #2 Wellfield Rd. near house
    - Well #3 665 Harbinger St Ext
  - Chocowinity system (municipal owned)
    - Chocowinity water system – 4 wells
  - Washington system (municipal owned)
    - 8 supply wells owned and operated by City of Washington (water is sold to Beaufort County for their north of the river water services)
      - “Douglas Cross Rds” well, located near US Hwy 264 and NC Hwy 32
      - “Forestry Service” well, located near US Hwy 264 at NC Forestry Service
      - “Garris” well, located off NC Hwy 32 South
      - “Hassell” well, located off Harvey Rd. near US Hwy 264
      - “Midway” well, located off US Hwy 264 and Camp Leach Rd.
      - “Regional WTP” well, located at 550 Wells Rd. at water treatment plant
      - “Tankard Farm” well, located off US Hwy 264 at Tankard Farm
      - “Winstead Site” well, located off Neck Rd.
  - Transient non-community public water supply wells (serve 25+ people at least 60 days per year) (private owned)
    - 11 in Beaufort County (6 of these are owned and operated by Nutrien)
- NPDES Wastewater Discharge Permits (NC DEQ Div. of Water Resources data)
  - Aurora system (municipal owned)
    - Aurora Wastewater Treatment Plant
      - Located south of NC 33 Hwy East, near South Creek
  - Beaufort County system (county owned)
    - Chocowinity/Richland Township Water Treatment Plant
      - Located off Fort Hill Dr.

- Richland Water Treatment Plant
      - Located off NC 33 Hwy East, near South Creek
  - Belhaven system (municipal owned)
    - Belhaven Water Treatment Plant
      - Located off West Pantego St.
    - Belhaven Wastewater Treatment Plant
      - Located off Plant Rd.
  - Chocowinity system (municipal owned)
    - Chocowinity Water Treatment Plant
      - Located off NC 33 Hwy East
  - Washington system (municipal owned)
    - Washington Water Treatment Plant
      - Located off Shady Banks Rd.
    - Washington Wastewater Treatment Plant
      - 1399 W 2<sup>nd</sup> St. Washington, NC 27889
  - 12 wastewater discharge permits held by private companies/organizations in Beaufort County. (private owned)

#### Solid Waste

Beaufort County Landfill Transfer Site (county owned)  
450 Flander's Filters Rd.  
Washington, NC 27889

#### Electric Power Grid

Beaufort County has 5 electric utilities; Duke, Dominion, City of Washington, Town of Belhaven, Tideland EMC.

- Duke Energy transmission easements (private owned)  
(Duke Energy data acquired)
- Town of Belhaven (municipal owned)  
(data not acquired)
- City of Washington (municipal owned)  
(data not acquired)
- Dominion (private owned)  
(data not acquired)
- Tideland EMC (non-profit owned)  
(data not acquired)

#### Natural Gas

- Natural gas pipelines (private owned)  
Serve Chocowinity Industrial Park  
5372 US Hwy 17 S  
Chocowinity, NC 27817  
Others in county can be viewed here but not downloaded:  
<https://pvnpm.phmsa.dot.gov/PublicViewer/>

#### Transportation

- Road network (state owned, municipal owned)  
(Beaufort County data)

- Bridges (state owned)  
(NCDOT data)  
119 in Beaufort County
- Rail (private owned)  
(NCDOT data)
- Aurora Ferry Terminal (state owned)  
At Hickory Point Rd. and NC-306 intersection
- Bayview Ferry Terminal (state owned)  
229 NC-306  
Bath, NC 27808
- Beaufort Area Transit System (BATS) (county owned)  
1537 W 5<sup>th</sup> St.  
Washington, NC 27889
- NC DOT Division 2 Office (state owned)  
1701 W 5<sup>th</sup> St.  
Washington, NC 27889
- Beaufort County NC DOT Maintenance Yard (state owned)  
803 Grimes Rd.  
Washington, NC 27889
- Washington-Warren Airport (private owned)  
200 Airport Rd.  
Washington, NC 27889

Fuel availability (sources used by county in emergencies):

- City of Washington garage (municipal owned)  
1460 W 2<sup>nd</sup> St.  
Washington, NC 27889
- Beaufort County Schools Bus Garage (county owned)  
947 Hudnell St.  
Washington, NC 27889

Other:

- Beaufort County Community College Driving Pad (state owned)  
5337 US Hwy 264 E  
Washington, NC 27889
- National Guard Armory (non-profit owned)  
(provide high water vehicles)  
399 Minuteman Ln.  
Washington, NC 27889

## Medical

### Hospital

- Vidant Hospital (non-profit owned)  
628 E 12<sup>th</sup> St.  
Washington, NC 27889

### Health Dept.

- Beaufort County Health Dept. (county owned)  
1436 Highland Dr.  
Washington, NC 27889

### Doctor's Offices

In areas with multiple providers, the largest facilities were selected.

- Vidant Family Medical Center (non-profit owned)  
151 Third St.  
Aurora, NC 27806
- Vidant Multispecialty Clinic (non-profit owned)  
598 W Old County Rd.  
Belhaven, NC 27810
- Pungo Family Medicine (private owned)  
245 Allen St.  
Belhaven, NC 27810
- Carolina East Medical Associates (private owned)  
1201 Carolina Ave.  
Washington, NC 27889
- Vidant Family Medicine (private owned)  
501 W 15<sup>th</sup> St.  
Washington, NC 27889
- Vidant Family Medicine (private owned)  
740 Bragaw Ln.  
Chocowinity, NC 27817
- Washington Pediatrics (private owned)  
1206 Brown St.  
Washington, NC 27889

### Pharmacies

- CVS Pharmacy (private owned)  
1020 John Small Ave.  
Washington, NC 27889
- Express Care Pharmacy (private owned)  
505 Hackney Ave.  
Washington, NC 27889
- O'Neal's Drugstore Pharmacy (Belhaven) (private owned)  
820 W Main St.  
Belhaven, NC 27810
- O'Neal's Drugstore Pharmacy (Chocowinity) (private owned)  
633 NC Hwy 33  
Chocowinity, NC 27817
- Pungo River Pharmacy (private owned)  
892 US Hwy 264

Belhaven, NC

- Tayloe's Pharmacy (private owned)  
601 E 12<sup>th</sup> St.  
Washington, NC 27889
- Walgreens Pharmacy (Belhaven) (private owned)  
418 US Hwy 264 Bypass  
Belhaven, NC 27810
- Walgreen's Pharmacy (Washington) (private owned)  
627 E 12<sup>th</sup> St.  
Washington, NC 27889
- Walmart Pharmacy (private owned)  
570 Pamlico Plaza  
Washington, NC 27889

### Schools

#### Post-Secondary

- Beaufort County Community College (state owned)  
5337 US Hwy 264 East  
Washington, NC 27889

#### High Schools

- Early College High School (at Beaufort County Community College) (state owned)
- Northside High School (county owned)  
7868 Free Union Church Rd.  
Pinetown, NC 27865
- Southside High School (county owned)  
5700 NC Hwy 33  
Chocowinity, NC 27817
- Washington High School (county owned)  
400 Slatestone Rd.  
Washington, NC 27889

#### Elementary & Middle Schools

- Bath Elementary School (county owned)  
110 King St.  
Bath, NC 27808
- Old PS Jones High School (not currently active) (county owned)  
820 Bridge St.  
Washington, NC 27889
- Chocowinity Middle School (county owned)  
3831 US Hwy 17 S  
Chocowinity, NC 27817
- Chocowinity Primary School (county owned)  
606 Gray Rd.  
Chocowinity, NC 27817
- Eastern Elementary School (county owned)  
947 Hudnell St.  
Washington, NC 27889

- Inner Banks STEM Center (private owned)  
201 Airport Rd.  
Washington, NC 27889
- JC Tayloe Elementary School (county owned)  
910 Tarboro St.  
Washington, NC 27889
- John Small Elementary School (county owned)  
4103 N Market St. Ext.  
Washington, NC 27889
- Northeast Elementary School (county owned)  
21000 US Hwy 264  
Pinetown, NC 27865
- PS Jones Middle School (county owned)  
4105 N Market St. Ext.  
Washington, NC 27889
- Pungo Christian Academy (private owned)  
983 W Main St.  
Belhaven, NC 27810
- SW Snowden Elementary School (county owned)  
693 Seventh St.  
Aurora, NC 27806
- Terra Ceia Christian School (private owned)  
4428 Christian School Rd.  
Pinetown, NC 27860
- Washington Montessori Public Charter School (private owned)  
2330 Old Bath Hwy  
Washington, NC 27889

#### Administrative Offices

- Beaufort County Schools Administration Office (county owned)  
321 Smaw Rd.  
Washington, NC 27889
- Beaufort Hyde Partnership for Children (non-profit owned)  
979 Washington Square Mall  
Washington, NC 27889

#### Libraries

- Aurora BHM Regional Library (non-profit owned)  
524 Main St.  
Aurora, NC 27806
- Belhaven BHM Regional Library (non-profit owned)  
333 E Main St.  
Belhaven, NC 27810
- BHM Regional Library Headquarters (non-profit owned)  
158 N Market St.  
Washington, NC 27889

- Brown Library (non-profit owned)  
122 Van Norden St.  
Washington, NC 27889

Community Response Partners (Beaufort County Emergency Management Dept. data)

Aurora:

- White Hill FWB (252-322-5846; 9204 Old Sandhill Rd, Aurora, NC 27806) (non-profit owned)
- Dublin Grove Original FWB (614 Bay City Rd, Aurora, NC 27806) (non-profit owned)

Bath:

- Old Bath Elementary School (110 King St, Bath, NC 27808) (county owned)
- Bath Christian Church (252-923-4140; 107 Harding St, Bath, NC 27808) (non-profit owned)

Belhaven:

- The Wilkinson Center (252-943-7463; 144 W Main St, Belhaven, NC 27810) (private owned)
- West Belhaven Church of Christ (252-943-2286; 1080 W Main St, Belhaven, NC 27810) (non-profit owned)

Blounts Creek:

- Smyrna Church (252-322-5552; 154 Flat Swamp Rd, Blounts Creek, NC 27814) (non-profit owned)

Bunyan:

- Beaufort Community College (252-946-6194; 5337 US-264, Washington, NC 27889) (state owned)
- Bunyan Ruritan Club (60 Glenn Haven Rd, Washington, NC 27889) (non-profit owned)

Chocowinity:

- Haw Branch Church of Christ (252-946-5083; 1501 Haw Branch Rd, Chocowinity, NC 27817) (non-profit owned)

Clark's Neck:

- Second Baptist Church (252-946-4433; 2516 W 5<sup>th</sup> St, Washington, NC 27889) (non-profit owned)

Old Ford:

- Old Ford Church of Christ (252-946-5883; 6040 US-17, Washington, NC 27889) (non-profit owned)

Pamlico Beach:

- Life Gate FWB (16 Old Pamlico Beach Rd, Belhaven, NC 27810) (non-profit owned)

Pantego:

- Pantego Ruritan Club (26094 NC-99, Pantego, NC 27860) (non-profit owned)
- Morning Star Church of Christ (252-943-3560; 924 Morning Star Rd, Pantego, NC 27860) (non-profit owned)

- Covenant United Reformed Church (252-943-2200; 46 Academy St, Pantego, NC 27860) (non-profit owned)
- Broad Creek Church (7814 Terra Ceia Rd, Pantego, NC 27860) (non-profit owned)

Pinetown:

- Pinetown Church of Christ (252-927-2039; 710 Main St, Pinetown, NC 27865) (non-profit owned)
- Long Acre Chapel Church (252-927-3939; 24597 NC-32 Pinetown, NC 27865) (non-profit owned)
- Shiloh FWB (252-927-3293; 7099 N Boyd Rd, Pinetown, NC 27865) (non-profit owned)
- Terra Ceia Christian School (252-943-2485; 4428 Christian School Rd, Pantego, NC 27860) (private owned)

Pungo River:

- Pikes Road Church of Christ (252-935-5310; 43 Pike Rd, Pantego, NC 27860) (non-profit owned)

Sydney:

- St. Clair's Church of Christ (252-964-4343; 9814 NC-99, Bath, NC 27808) (non-profit owned)

Washington:

- First Church of Christ (252-946-5236; 520 E 10<sup>th</sup> St, Washington, NC 27889) (non-profit owned)
- First Christian Church (252-946-4293; 307 E 3<sup>rd</sup> St, Washington, NC 27889) (non-profit owned)
- Cornerstone Church (252-946-6109; 1918 W 5<sup>th</sup> St, Washington, NC 27889) (non-profit owned)
- First United Methodist Church (252-946-3311; 304 W 2<sup>nd</sup> St, Washington, NC 27889) (non-profit owned)
- WIMCO Corporation (252-946-5175; 2533 W 5<sup>th</sup> St, Washington, NC 27889) (private owned)

Community Buildings and Facilities

- Beaufort County Boys and Girls Club (non-profit owned)  
1089 Bridge St.  
Washington, NC 27889
- Aurora Community Center (non-profit owned)  
442 Third St.  
Aurora, NC 27806
- COST Community Center (non-profit owned)  
17501 NC Hwy 33 East  
Blounts Creek, NC 27814
- Belhaven Civic Center (municipal owned)  
257 W Pungo St.  
Belhaven, NC 27810
- Belhaven Boys and Girls Club (non-profit owned)  
225 W Pantego St.  
Belhaven, NC 27810
- Belhaven Senior Center (non-profit owned)  
274 E Main St.  
Belhaven, NC 27810
- Washington Civic Center (municipal owned)  
110 Gladden St.  
Washington, NC 27889

- Bobby Andrews Recreation Center (municipal owned)  
231 E 7<sup>th</sup> St.  
Washington, NC 27889
- Grace Martin Harwell Senior Center (non-profit owned)  
310 W Main St.  
Washington, NC 27889

### **Hazardous**

- Leaking underground storage tanks (NC DEQ data)
  - 260 identified in Beaufort County
- Toxic release inventory (EPA data)
  - 4 identified in Beaufort County
- Hazardous waste sites (NC DEQ data)
  - 11 identified in Beaufort County

### **Natural Infrastructure**

#### Wetlands

- Wetlands (US Fish and Wildlife Service data)  
5510 (192,225 ac.)  
Rate schedule from Div. of Mitigation Services: \$67,442.06 per acre  
 $192,225 \text{ acres} \times \$67,442.06 = \$12,964,049,983.50$
- Compensatory Mitigation Sites
  - Included under NC Natural Heritage Program's Managed Areas data, below.
- Conservation Easements/Projects
  - Included under NC Natural Heritage Program's Managed Areas data, below.

#### Forests

- Working forest lands (NC Natural Heritage Program data)
- Rural forest landscape (NC Natural Heritage Program data)
- Urban forest landscape (NC Natural Heritage Program data)

#### Floodplains

- 100-year floodplain (FEMA data)
- 500-year floodplain (FEMA data)

#### Surface Water Hydrology

- Rivers and streams (NC DEQ data)  
Rate schedule from Div. of Mitigation Services: \$603.87 per linear foot of stream  
948 miles = 5,195,520 ft.  
 $5,195,520 \text{ ft.} \times \$603.87 = \$3,137,419,662.40$
- High Quality Waters (NC DEQ data)
  - 81 in Beaufort County
- 303(d) listed impaired waters (US EPA data)
  - 130 in Beaufort County

- Primary Nursery Areas (NC DEQ data)
  - 8 in Beaufort County
- Secondary Nursery Areas (NC DEQ data)
  - 7 in Beaufort County

### Parks/Public Land

#### County jurisdiction

- Camp Boddie/Pamlico Sea Base (Scouts)  
419 Camp Bonner Boy Scout Rd.  
Blounts Creek, NC 27814
- Beaufort County Community College Frisbee Golf Course/Fitness Trail  
5337 US Hwy 264 East  
Washington, NC 27889
- Goose Creek State Park  
2190 Camp Leach Rd.  
Washington, NC 27889
- Voice of America Gamelands  
10000 Cherry Run Rd.  
Washington, NC 27889
- Wright's Creek future county park site  
1922 Wilkin's Rd.  
Belhaven, NC 27810

#### Belhaven

- Charlie Smith Community House and Pungo River public access/picnic area aka "The Beach"  
914 E Main St.  
Belhaven, NC 27810
- Cooperage Landing/Belhaven Town Docks  
268 E Water St.  
Belhaven, NC 27810
- Northside Park  
Railroad St.  
Belhaven, NC 27810

#### Washington

- Downtown Washington Waterfront  
Stewart Parkway  
Washington, NC 27889
- Haven's Gardens Park and Boat Ramp  
1001 Park Dr.  
Washington, NC 27889
- 7th Street Playground and Park/PCM Skate Park  
231 E 7<sup>th</sup> St.  
Washington, NC 27889
- Beebe Memorial Park/PS Jones Memorial Park  
1101 Bridge St.

Washington, NC 27889

- Bug House Park  
121 N Charlotte St.  
Washington, NC 27889
- Festival Park  
119 Water St.  
Washington, NC 27889
- Jack's Creek Greenway  
One mile greenway along Jack's Creek adjacent to downtown  
Washington, NC 27889
- Off-Leash Dog Park  
601 E 4<sup>th</sup> St.  
Washington, NC 27889
- Pierce St./3rd St. Mini-Park  
W 3<sup>rd</sup> St. and Pierce St.  
Washington, NC 27889
- Susiegray McConnell Sports Complex  
101 Airport Rd.  
Washington, NC 27889
- Todd Maxwell Sports Complex  
245 Plymouth St.  
Washington, NC 27889
- Veteran's Park  
404 E 3<sup>rd</sup> St.  
Washington, NC 27889

#### Bath

- Bonner's Point  
207 Front St.  
Bath, NC 27808

#### Chocowinity

- Chocowinity Recreation Complex  
Hwy 33 East  
Chocowinity, NC 27817

#### Pantego

- Pantego Community Park  
Swamp Rd.  
Pantego, NC 27860

#### Public Boat Ramps

- Boating Access Areas (NC Wildlife Resources Commission data)
  - Aurora Boat Ramp and Fishing Pier  
1 Main St.  
Aurora, NC 27806
  - Belhaven Boat Ramp

- 135 W Water St.  
Belhaven, NC 27810
- Blounts Creek Boat Ramp and Fishing Pier  
350 Crisp Landing Rd.  
Chocowinity, NC 27817
- Haven's Garden Boat Ramp  
1053 E Main St.  
Washington, NC 27889
- Mason's Landing Boat Ramp  
625 Clarks Neck Rd.  
Washington, NC 27889
- Smith's Creek Boat Ramp  
34783 NC Hwy 33 East  
Aurora, NC 27806
- Wright's Creek Boat Ramp  
1922 Wilkin's Rd.  
Belhaven, NC 27810

#### Natural Areas

- Managed Areas (NC Natural Heritage Program data)
  - Includes nature preserves, registered heritage areas, conservation easements, other protected areas, and lands under federal ownership, state ownership, or local government ownership
- Natural Areas (NC Natural Heritage Program data)
  - Sites that are of special biodiversity significance. A natural area's significance may be due to the presence of rare species, exemplary natural communities, or important animal assemblages, referred to collectively as "elements" of biodiversity.



# BEAUFORT COUNTY

## Community Action Team - Meeting #2

### MEETING SUMMARY

**WEDNESDAY, OCTOBER 20, 2021, 10:00 AM - 12:00 PM, BEAUFORT COUNTY COMMISSIONERS  
MEETING ROOM + VIRTUAL**

#### Meeting Purpose:

- To discuss the public survey, inventory of relevant resources, critical assets, and natural infrastructure.
- Refer to attached meeting agenda.

#### Attendees:

- Refer to attached meeting sign-in sheet.

#### Materials:

- Refer to attached materials:
  - Critical assets inventory list
  - Natural infrastructure inventory list
  - Critical assets map
  - Natural infrastructure map series

#### Meeting Discussion:

##### Public survey

- Details on the public survey were discussed.
- The project-based questions were removed and will be covered at the public open house.
- The survey is now ready to be released in hard copy format and online, and will be available through November 12<sup>th</sup>.
- Jamie will follow-up with county/partner organizations on advertising survey.

##### Critical Assets

- Critical assets and natural infrastructure lists and maps were reviewed.
- For fire and EMS stations, those within municipalities should be included due to mutual aid agreements.
- Food pantries should be added to the food list. Check if the Family Dollar on Hwy 32 is in a food desert area. Email food desert map to group.
- Belhaven and some other towns have water lines running into the county. Chocowinity and Bath both pump wastewater to Washington.
- County wide list may be better representative, and highlight or bold the assets actually owned by the county, rather than having separate lists. All "county resource partners" provided by BC Emergency Management will be included.

- Need to get locations of elevated storage tanks and booster stations from Christina. Need to add the county's solid waste transfer station on Flanders Filter Rd.
- For transportation, need to add the NCDOT maintenance yard, which is behind the DOT Div. 2 office. Also need to add bridges and highlight those known to be vulnerable (such as Cherry Run Rd.) For fuel availability, need to add city garage on Plymouth St. and school bus garage on Small Rd.
- Need to also add skid pad/driving pad at Beaufort County Community College. Available to the county anytime and to Tideland EMC in Cat. 3 and above hurricanes. Cannot accommodate large bucket trucks. The National Guard Armory on Minuteman Ln. is not very active, but they still provide high water vehicles, so it should be added. (There was discussion on whether it was closed.)
- The old PS Jones High School kitchen should be added to schools list.
- Natural gas pipelines to industrial park in Chocowinity should be added. Propane suppliers should be added.
- Under communication, switch stations for Tri County and Century Link telephone should be added, if data can be acquired. Communication towers should be included, if data can be acquired. Try celltowers.com. Radio tower data should be added and is something the county has, see airport maps. County used towers should be protected. Christina has data on which towers are used by the county.
- There was discussion on adding locations of generators, but it was stated that they were all located at the government buildings already listed.
- There was discussion on possibly adding solar farms under electric power grid data. It was mentioned that most of the power from them is being used outside the county.
- There was discussion on possibly adding private taxi rental and car rental businesses under transportation.
- There was discussion on identifying the school bus routes, but since they change frequently it was decided that it would be better to look at the whole road network.
- Wedding venues as emergency locations were mentioned, although, it was decided that we are looking to identify current assets and relationships rather than develop new ones at this stage.
- There is a new emergency management building up for consideration, but no site selected yet.
- Mustering areas for temporary housing should be added (only used in CAT 3+).
- No issues mentioned for Vidant Hospital (tour site).

### Natural Infrastructure

- Conservation projects and compensatory mitigation sites should be added to wetlands list. Nutrien and NCDOT both have sites.
- Under hydrology, 303d listed streams should be listed, highlighting those where a planning process is associated.
- Primary nursery areas and secondary nursery areas should also be added.
- Under conservation easements (Natural Heritage Program data), there seems to be some missing from Land and Water Fund, NCDOT, and Sound Rivers (SR's on west side of Blount's Bay). Those need to be added.
- Golf courses should be removed.

### Next Steps

- Results of public survey will be reviewed at next meeting.
- Draft hazards mapping and draft risk/vulnerability assessment will be reviewed at next meeting.



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 2

**Date** Oct. 20, 2021

**Time** 10:00 AM – 12:00 PM

**Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Brian Alligood	Beaufort County	County Manager	brian.alligood@co.beaufort.nc.us	Brian Alligood
	Christina Smith	Beaufort County	Public Works Director	christina.smith@co.beaufort.nc.us	Christina Smith
	Carlton Gideon	Mid-East Commission	Planner	cgideon@mideastcom.org	Carlton Gideon
	Carnie Hedgepeth	Beaufort County	Beaufort County Emergency Management Director	carnie.hedgepeth@co.beaufort.nc.us	Carnie Hedgepeth (online)
	Ed Booth	Beaufort County	Commissioner	ed.booth@co.beaufort.nc.us	Ed Booth
	John Rebholz	Beaufort County	Commissioner	john.rebholz@co.beaufort.nc.us	John Rebholz (online)
	Bishop James S. McIntyre Sr.	Cornerstone Family Worship Center	Pastor	pastorcfwc@gmail.com	Bishop James S. McIntyre Sr.
	Martyn Johnson	Beaufort County	Economic Development Director	Martyn.johnson@beaufortedc.com	Martyn Johnson (online)
	Heather Deck	Sound Rivers	Executive Director	heather@sounddrivers.org	Heather Deck (online)
	Tom Stroud	NC Estuarium/ Partnership for the Sounds	Deputy Director	tmstroud@embarqmail.com	Tom Stroud
	Dave Loope	Beaufort County Community College	President	dave.loope@beaufortccc.edu	Dave Loope (online)
	Jamie Heath	Mid-East Commission	Contractor	jheath@mideastcom.org	Jamie Heath



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 2

**Date** Oct. 20, 2021

**Time** 10:00 AM – 12:00 PM

**Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Lisa Williams	Mid-East Commission	Contractor	lwilliams@mideastcom.org	
	Paige Cureton	RK&K	Contractor	pcureton@rkk.com	
	Tris Ford	RK&K	Contractor	tford@rkk.com	
	Jim Eisenhardt	RK&K	Contractor	jeisenhardt@rkk.com	
	Gordon Marsh	RK&K	Contractor	gmarsh@rkk.com	
	Tancred Miller	NC DEQ	State/Grant Agency	Tancred.miller@ncdenr.gov	
	Mackenzie Todd	NC DEQ	State/Grant Agency	Mackenzie.todd@ncdenr.gov	online
	Squires, Susan BC Econ Dev			susan.squires@beaufortcdc.com	Susan Squires (online)



**Community Action Team**  
Meeting #3 Materials



# BEAUFORT COUNTY

Community Action Team - Meeting #3

## AGENDA

Wednesday, Dec. 01, 2021, 10:00 AM - 12:00 PM

Location: Beaufort County Commissioners Board Room (in Beaufort County Financial Services Center), 136 W 2nd St. Washington, NC 27889

- |                         |   |
|-------------------------|---|
| <b>10:00 – 10:05 AM</b> | <b>Welcome</b>  |
| <b>10:05 – 10:25 AM</b> | <b>Public survey</b> <ul style="list-style-type: none"><li>▪ Review results</li></ul>   |
| <b>10:25 – 10:45 AM</b> | <b>Review draft hazards mapping</b> <ul style="list-style-type: none"><li>▪ Floodplains overlaid with critical assets (FEMA)</li><li>▪ Sea level rise scenarios overlaid with critical assets (NOAA)</li><li>▪ Potential storm surge with depths (NOAA)</li><li>▪ Potential storm surge overlaid with critical assets (NOAA)</li><li>▪ Sea level rise scenarios overlaid with natural infrastructure (NOAA)</li></ul> |
| <b>10:45 – 11:30 AM</b> | <b>Review draft risk and vulnerability assessment</b> <ul style="list-style-type: none"><li>▪ Provide overview of risk and vulnerability assessments</li><li>▪ Discuss risk and vulnerability thresholds</li><li>▪ Review draft vulnerability assessment data sheets</li><li>▪ Review draft risk assessment data sheets</li><li>▪ Exercise: Work with CAT to fill in some items on data sheets</li></ul>              |
| <b>11:30 AM - NOON</b>  | <b>Project discussion</b> <ul style="list-style-type: none"><li>▪ What site(s) are the community's highest priority?</li><li>▪ Begin discussion on potential resiliency projects for project portfolio, informed by draft risk and vulnerability assessment</li></ul>   |
| <b>NOON</b>             | <b>Adjournment</b>  |

# Beaufort County, NC: Resilient Coastal Communities Program

51 responses

Please tell us about yourself.

## Do you live and/or work in Beaufort County?

- Yes (50 responses)
- No (1 response)

## If yes, how long have you lived and/or worked in Beaufort County?

- Less than one year (3 responses)
- 2-4 years (4 responses)
- 5-7 years (3 responses)
- 8-10 years (1 response)
- 11-15 years (5 responses)
- 16-20 years (7 responses)
- 21-30 years (3 responses)
- 31-40 years (4 responses)
- 41-50 years (2 responses)
- 50+ years (11 responses)
- All my life/lifetime (3 responses)
- Yes (1 response)

## Do you own and/or rent your property (home, business, or both as applicable)?

- Own (23 responses)
- Own home (9 responses)
- Rent (3 responses)
- Rent an apartment (1 response)
- Rent home (1 response)
- I own my home and rent my business space (1 response)
- Own home/rent property (1 response)
- Home (1 response)
- Yes (8 responses)
- No (1 response)

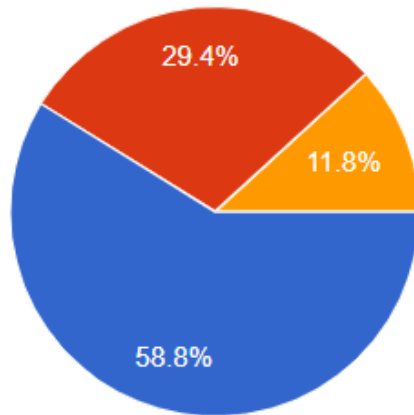
Please identify your zip code (home, work, or both as applicable).

- 27889 (21 responses)
- 27814 (13 responses)
- 27806 (1 response)
- 27808 (5 responses)
- 27810 (2 responses)
- 27817 (2 responses)
- 27806 for home, 27889 for work
- Home 27889, Office 27817
- 27817 Home, 27889 Work
- 28586 (2 responses) (outside county)
- 28556 (1 response) (outside county)
- 27880 (1 response) (outside county)

## Coastal Storms and Flooding

Which of the following statements about coastal storms do you most agree with?

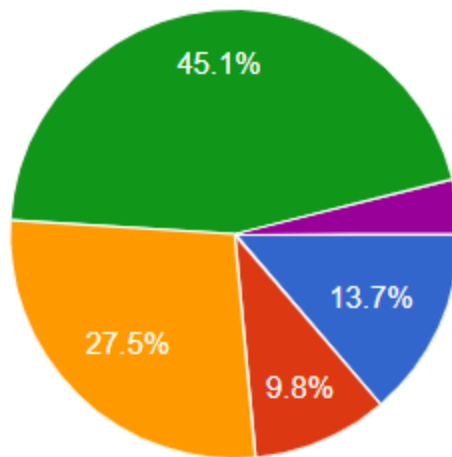
51 responses



- I am very worried about coastal storms in the future.
- I am slightly worried about coastal storms in the future.
- I am not worried about coastal storms in the future.

On a scale of 1-5, how significant of a risk do you think flooding currently poses to your community?

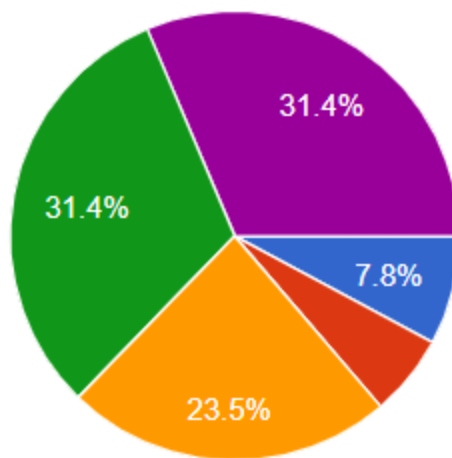
51 responses



- 1 - not a concern
- 2 - minor challenge
- 3 - moderate challenge
- 4 - serious challenge
- 5 - extreme challenge

On a scale of 1-5, how significant of a risk do you think flooding will pose to your community in the next 20-40 years, given climate change and rising sea levels?

51 responses

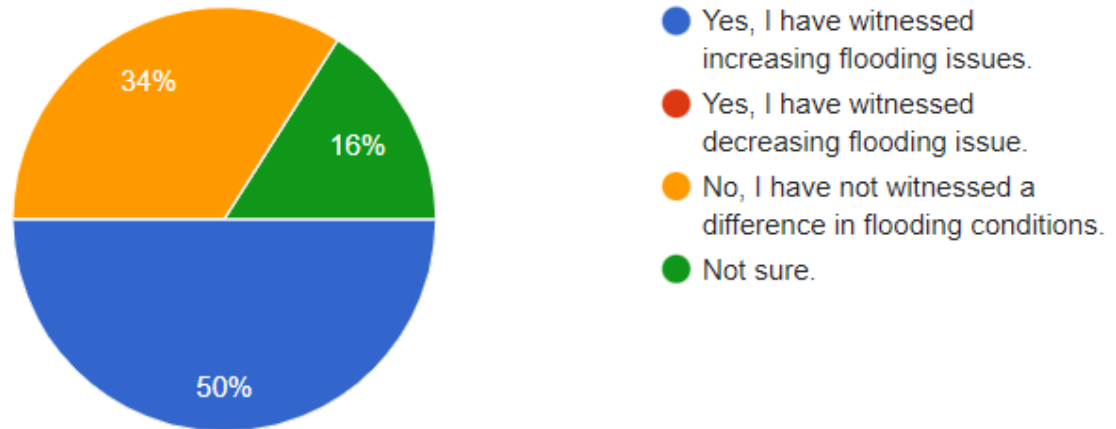


- 1 - not a concern
- 2 - minor challenge
- 3 - moderate challenge
- 4 - serious challenge
- 5 - extreme challenge

Throughout your time living and/or working in Beaufort County, has your experience with flooding changed?



50 responses



#### Comments on previous question (optional).

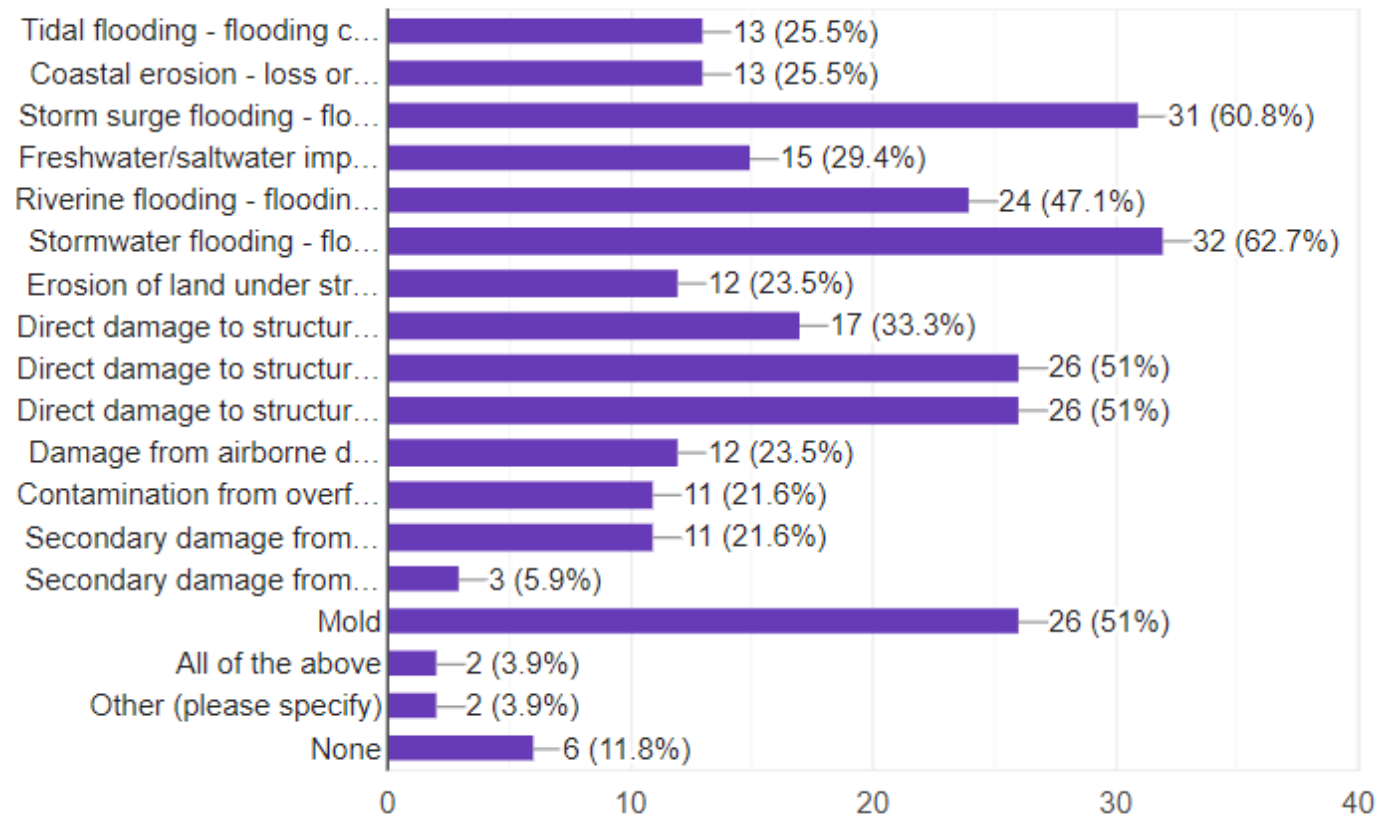
- I'm too new to the area
- I've seen frequent shallow street flooding around Havens Gardens, but major, hurricane associated flooding, hasn't seemed to have increased (lucky, I guess)
- I was very involved in helping the Aurora area after Hurricane Irene and was overwhelmed by the devastation that I saw.
- I have not experienced flooding yet in this area since we have lived here a short time.
- My house in Washington Park was flooded during Hurricane Florence; the garage of my previous house in Washington flooded during Hurricane Irene.
- Impacted by hurricane Florence
- Shoreline erosion, more casual flooding with runoff issues growing
- It appears that we continue to build in the OBX, then have the roads flood and fail and then fix them again. The same thing just keeps happening. STOP BUILDING on the coast and in flood plains. If there is flooding, develop ways to lessen or eliminate the flooding issues. Engineer you way out of the flooding problems.
- loss of beaches/sand along river banks. Increases water covering roads during king tides and strong winds
- None
- I live on the Pamlico and in the 16 years that we have lived here, the ambient water level has risen 3" above a mark I placed on one of our pier pilings when the pair was being built!
- The majority of Washington is in a flood zone. What if anything can be done to ensure that families will not lose their possessions or have to worry everytime there is a storm or heavy rain.
- We still flood living on the river. But downtown floods more often. Stewart Parkway is often flooded.
- From the early 1970s-1995 I am not aware of a single significant hurricane-related flooding event in Beaufort County. Since 1996 I can remember at least 8 serious floods from tropical storms/hurricanes, and a significant increase in nuisance level flooding from extremely heavy rains in recent years.
- I used to live on 12th Street, Washington. Flooding got progressively worse over the years so I moved.

## Coastal Hazards and Impacts

What type of coastal hazards have you witnessed in your community?

Select all that apply.

51 responses



### Comments on previous question (optional).

To new to the area

Erosion from rushing water.

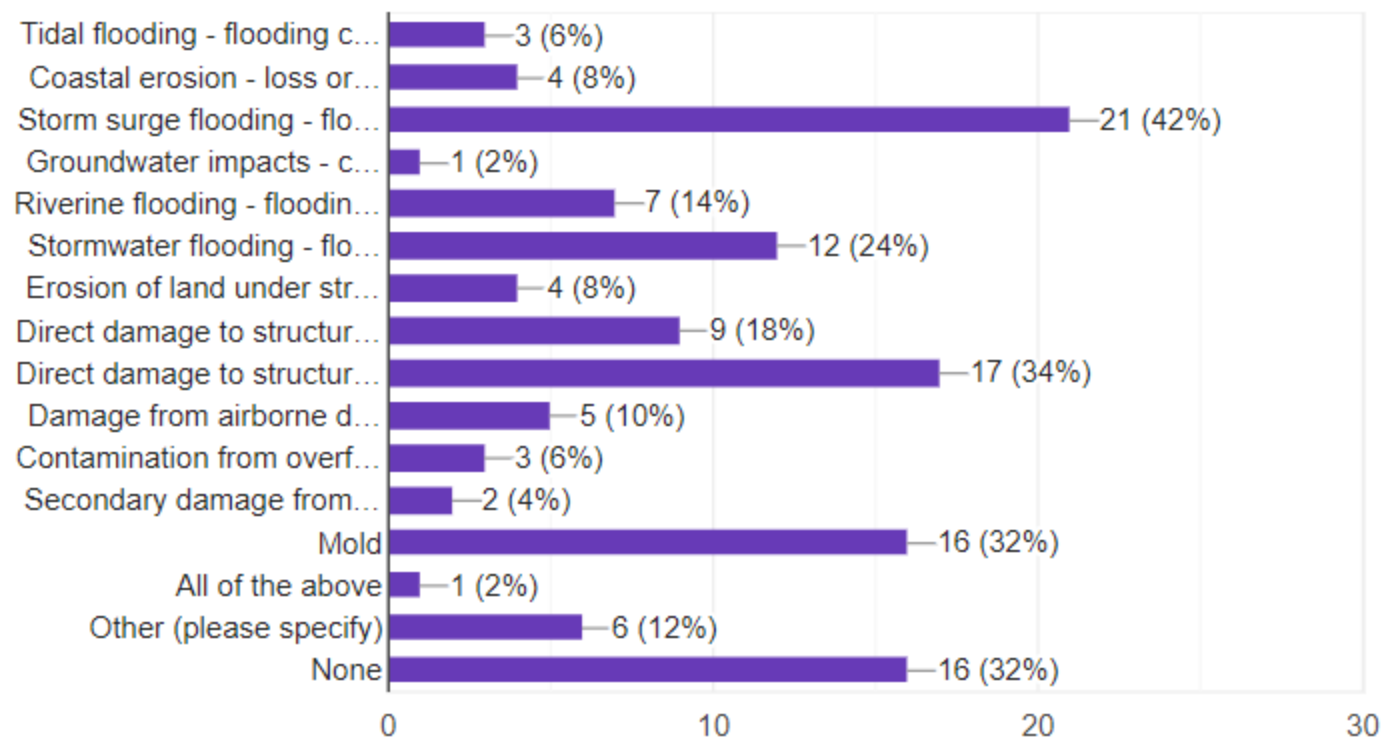
Length of storms has been a much greater concern.

None

Other: Constantly replacing duct work. Eventually went with ductless HVAC.

Which of those same hazards have directly impacted your home or your business? Select all that apply.

50 responses

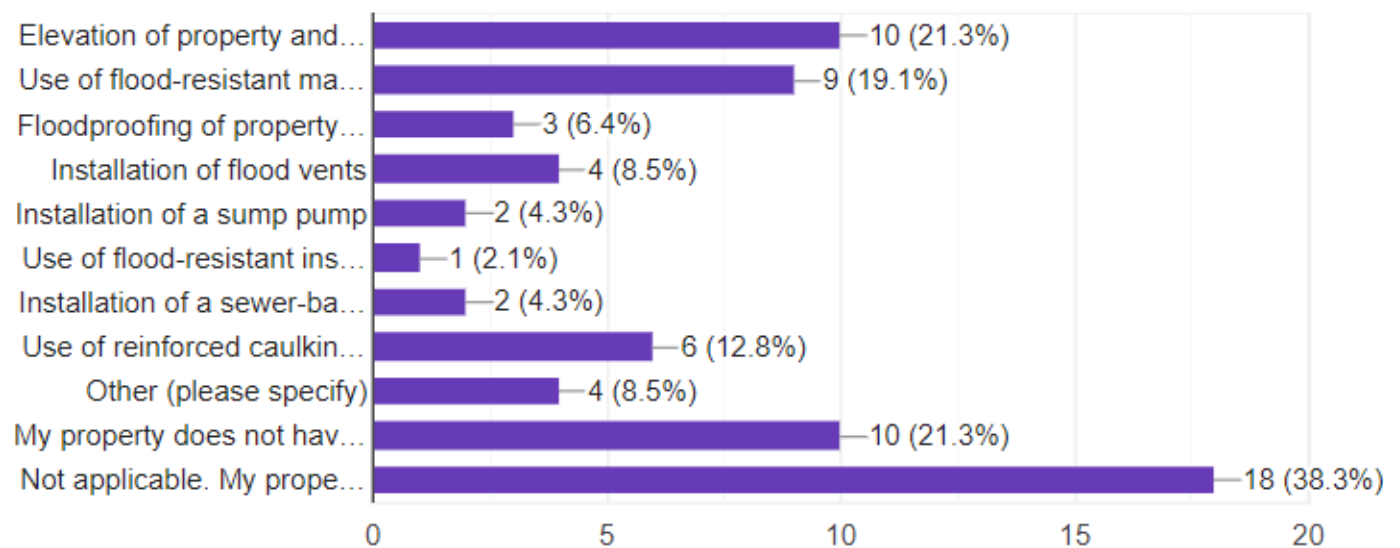


**Comments on previous question (optional).**

- Direct damage to structure from high winds (3 responses)
- Luck we are high up in elevation and do not get directly effected by the rise in water levels. This is how you solve flooding. Don't build in land with an elevation under 15-20 feet.
- None
- What can I do as a home owner, if that neighbor's tree is constantly losing limbs and falling on the top of my house and in the yard. By law is there anything that he can be made to do?
- below - hurricane rated windows
- below - Installed basement dehumidifier

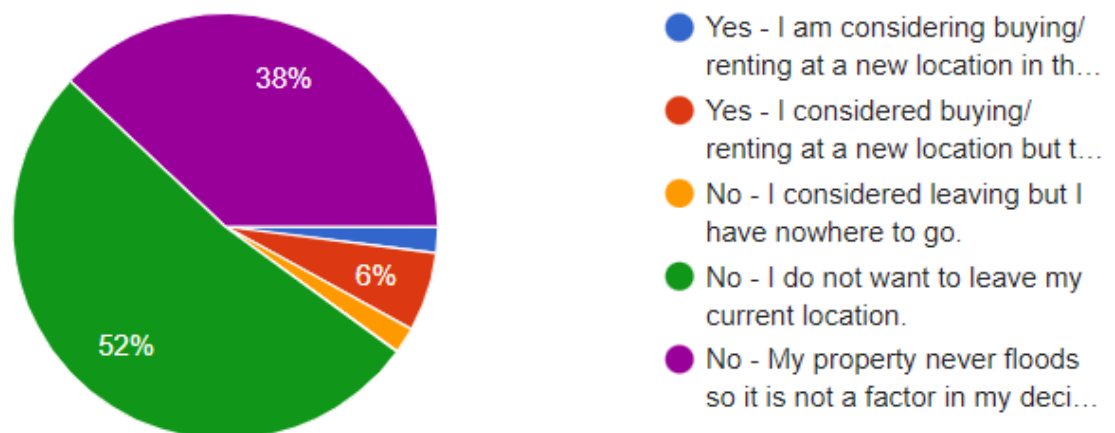
Do you have measures in place to prevent and/or reduce flooding or flood-related damages and losses to your property? If yes, what type of actions have you taken? Check all that apply.

47 responses



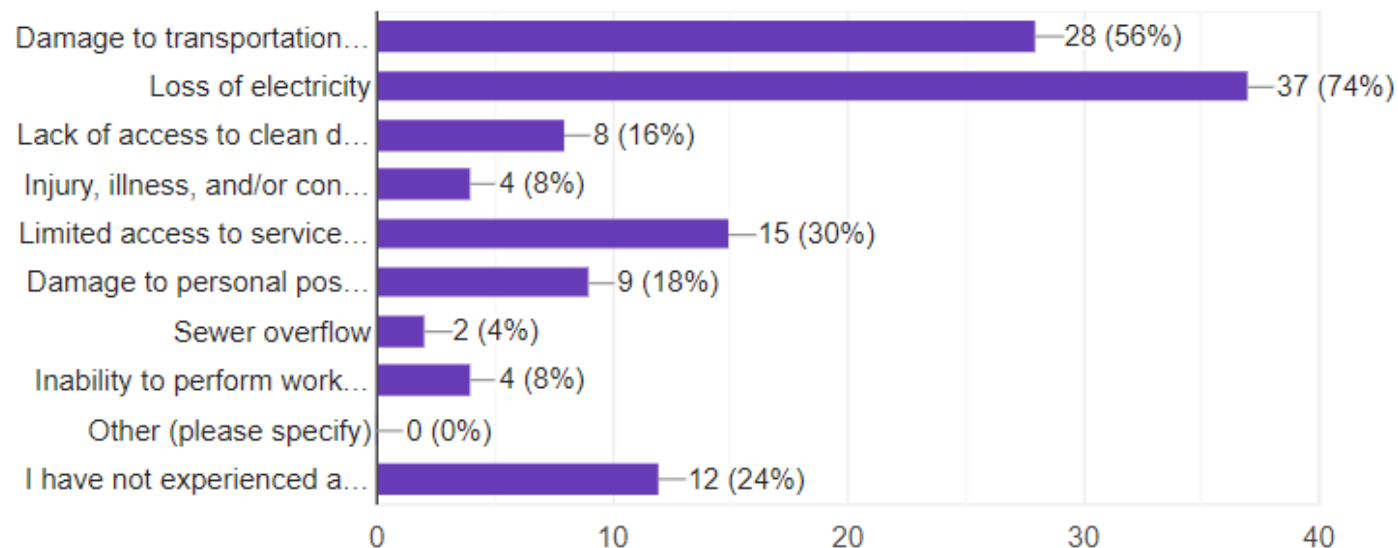
Have you ever considered moving to another location (can be inside or outside of Beaufort County) to avoid future flood losses, impacts, or damages?

50 responses



Aside from any impacts to your home or business, have you experienced any other negative impacts as a result of flooding events? Check all that apply.

50 responses



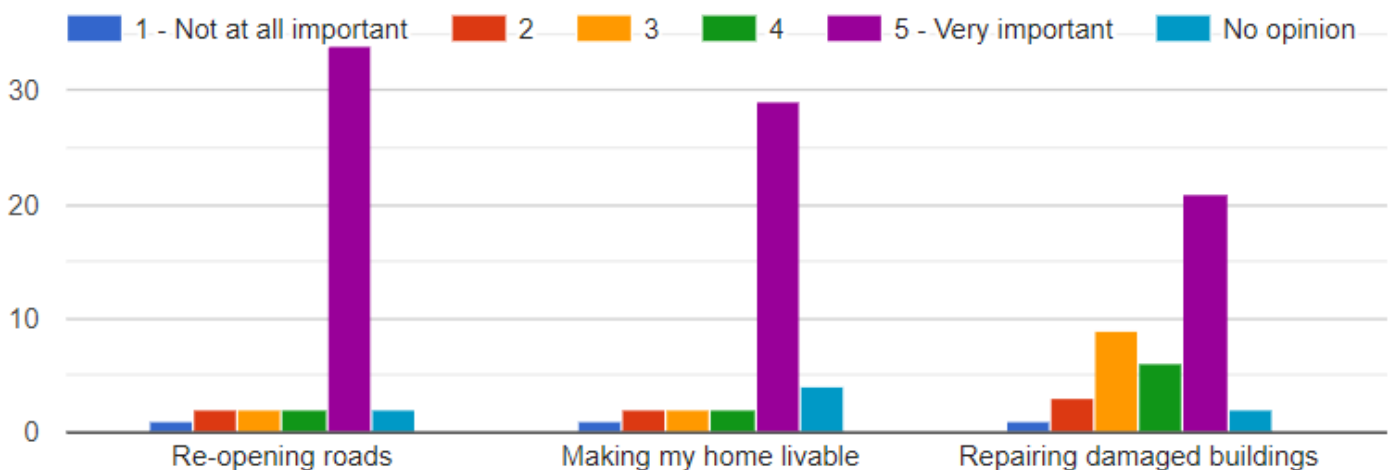
#### Comments on previous question (optional)

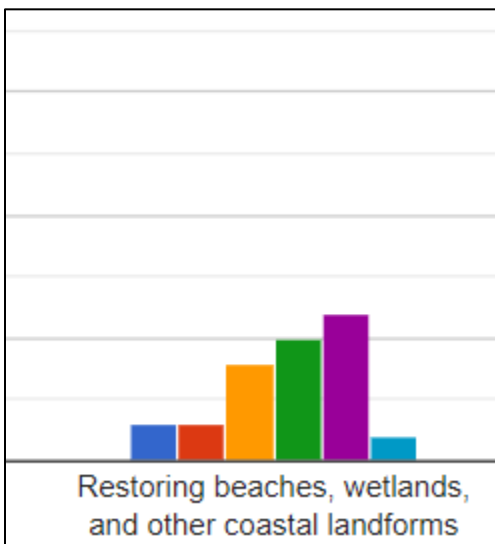
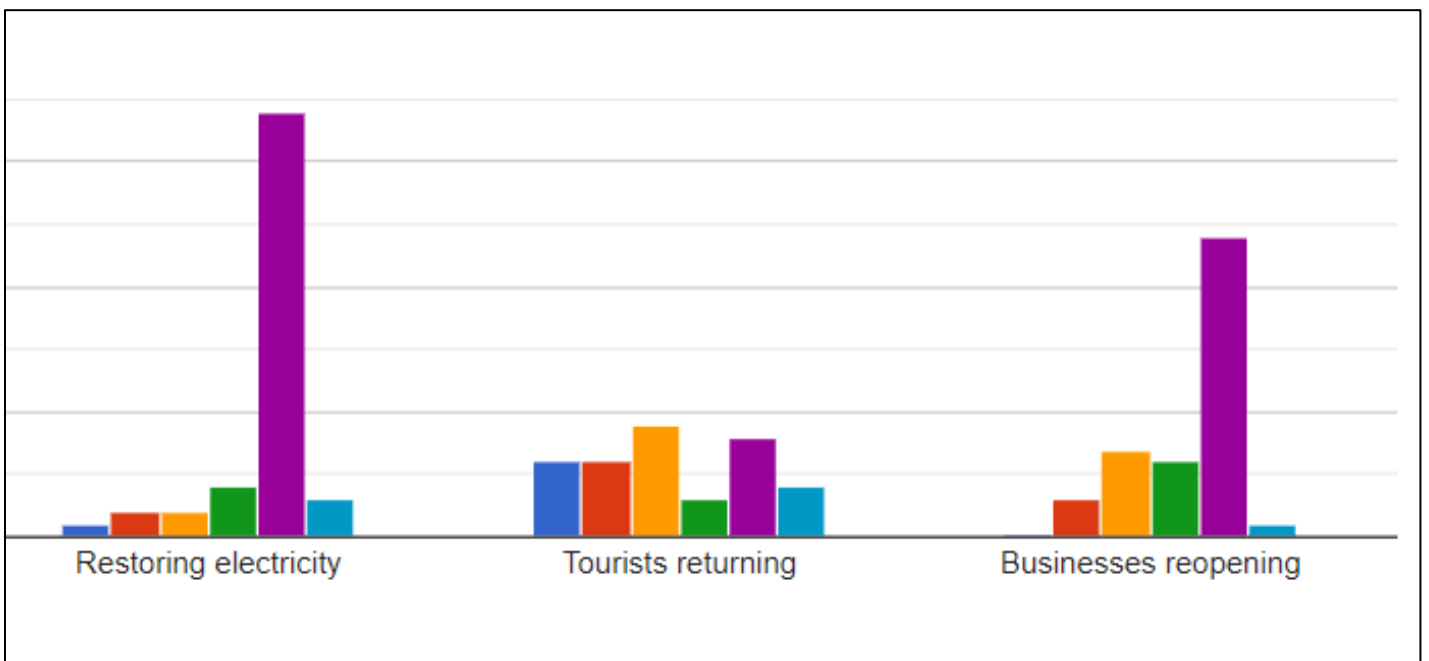
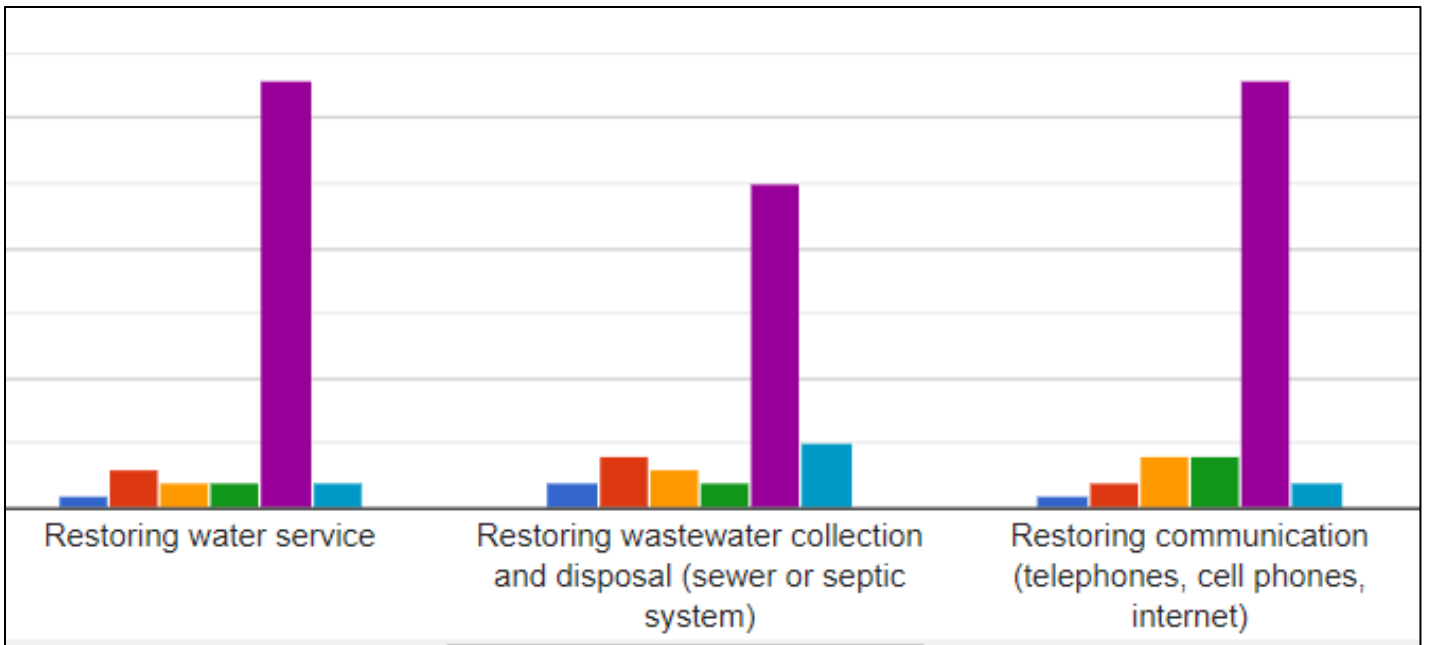
- The nonprofit with which I volunteered as director in Aurora was flooded and became unusable after Irene. This was just before my current vocation.
- I have yet to experience a major flooding event.
- Storm damage and wind resulting in downed power lines. It happens often so we installed a whole house generator.
- Power outages due to hurricanes
- During "Irene" we were on Generator for over 4 days and had no running water for nearly 6
- flooded roadways
- Everyone needs to be concerned about a storm. They are very dangerous.

Are there any specific areas of your community vulnerable to coastal hazards? If so, please list them by location. Please use street intersections or landmarks to describe locations.

- No
- Washington 15th st corridor and residential streets flooding sometimes impassible between 15th and 11th
- There seems to be increased erosion under the boardwalk along the eastern side of Moss Landing
- Main Street across 1st through 5th Sts. and the streets to the north in Aurora. All of the waterfront communities. Washington's waterfront. The parsonage on E. 12th has a history of flooding all the way up the street. I believe work has been done in the past few years to mitigate this problem.
- My husband and I work down near the waterfront so I am worried about travelling to work or missing work/income if there is extreme flooding.
- The roads to and from Belhaven are flooded after storms or high rains. Beaufort County schools have been closed because of flooding in Belhaven. That area is very vulnerable.
- All of Washington Park is vulnerable, but especially the area framed by College Avenue to the south; Spruce Street to the east; Bank Street to the north; and Pine Street to the west.
- Whichards Beach Road
- No, community elevation is over 15 feet above Chocowinity Bay.
- Downtown Washington, Parking at IBXO and Backwater Jacks, River Acres road at swamp crossing
- I live in Pamlico Dty. Flooded streets and loss of power are always a concern.
- None
- All of the Pamlico Beach area, our privater road (Chambers Point Rd) is often under water in places during big storms, sometimes for days.
- Not aware of any
- Tetterton Road and Snode Creek flooding over road
- 12th St, Washington and run off from the hospital parking lots make the area very flood prone.

Please rank the following activities, intended to restore daily life after a coastal storm.





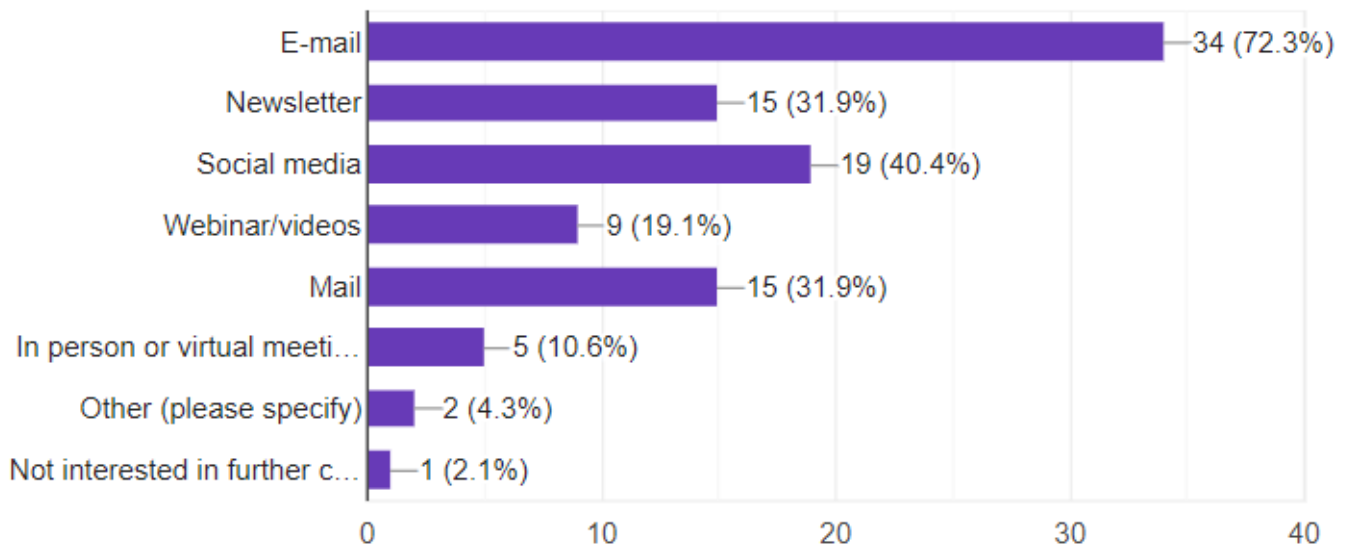
## Is there anything else you would like to share with us regarding flooding and coastal resilience in Beaufort County?

- Thank you for your efforts
- Educating public of damage to shorelines due to high speed power boats.
- If we didn't allow homes to be built near and around low elevation areas such as OBX and other areas, flooding would be kept under control and the resources could be used in those areas where people's homes can not just pick up and move or raise their homes.
- Although we live on the Pamlico, we built up 12' to reduce flooding. We have a generator for power. The first house on this property was destroyed during Fran. It was built in 1951 before hurricanes.
- Protection from future flooding should incorporate as many natural elements as possible and not be highly dependent on bulkheads and other immovable structures.

### Stakeholder Engagement

How would you like Beaufort County to communicate with you and/or your community regarding this program or on similar programs in the future?

47 responses



Comment field. Complete if "Other (please specify)" was checked in previous question.

- If there are ways that I can reasonably support your efforts, I am willing to do so.
- email for communications works fo us.
- News NO

Are there any local or community groups or organizations you feel we should coordinate with to create awareness of this program or similar programs in the future? If yes, please provide their name, website, and contact information if possible.

- Sound Rivers
- City of Washington
- The Creation Care Team of the Beacon District of the NC Conference of the United Methodist Church would like to continue the relationship that we have begun with Heather Deck.
- Sound Rivers, NC Estuarium, City of Washington
- Local churches: specifically St. Thomas Episcopal Church in Bath
- Red Cross
- United States Power Squadron, Coast Guard Auxiliary
- All local cities and town first responders prior to any storm events.
- NC Estuarium
- Sound Rivers only because our "County Commissioners" seldom can't be bothered with issues that effect the people they are supposed to represent! '
- Any information that affects the community should be shared with all businesses and with churches. As a senior, I always watch the news report, it should be shared with all local TV channel, or maybe even downloaded to our cell phones, depending on the seriousness of the issue.
- North Carolina Estuarium

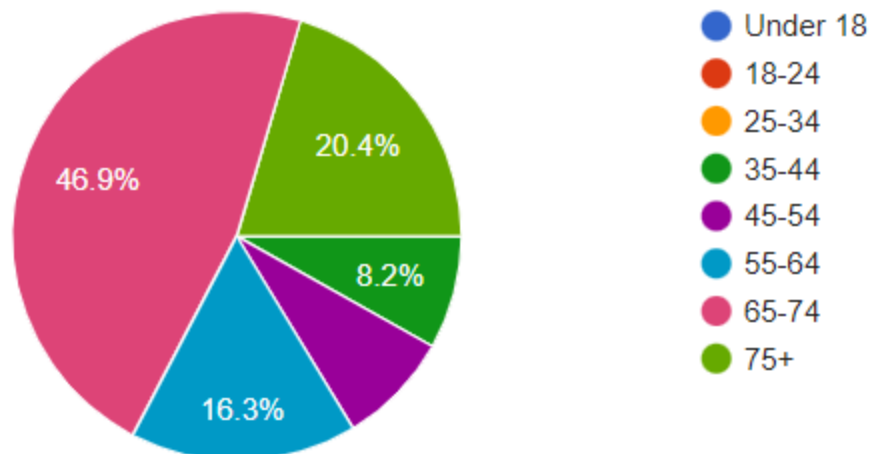
Are there any upcoming events where we could share information about this program?

- Ware Creek Rosenwald School Community Center
- Pirate Fest

## Demographic Information (optional)

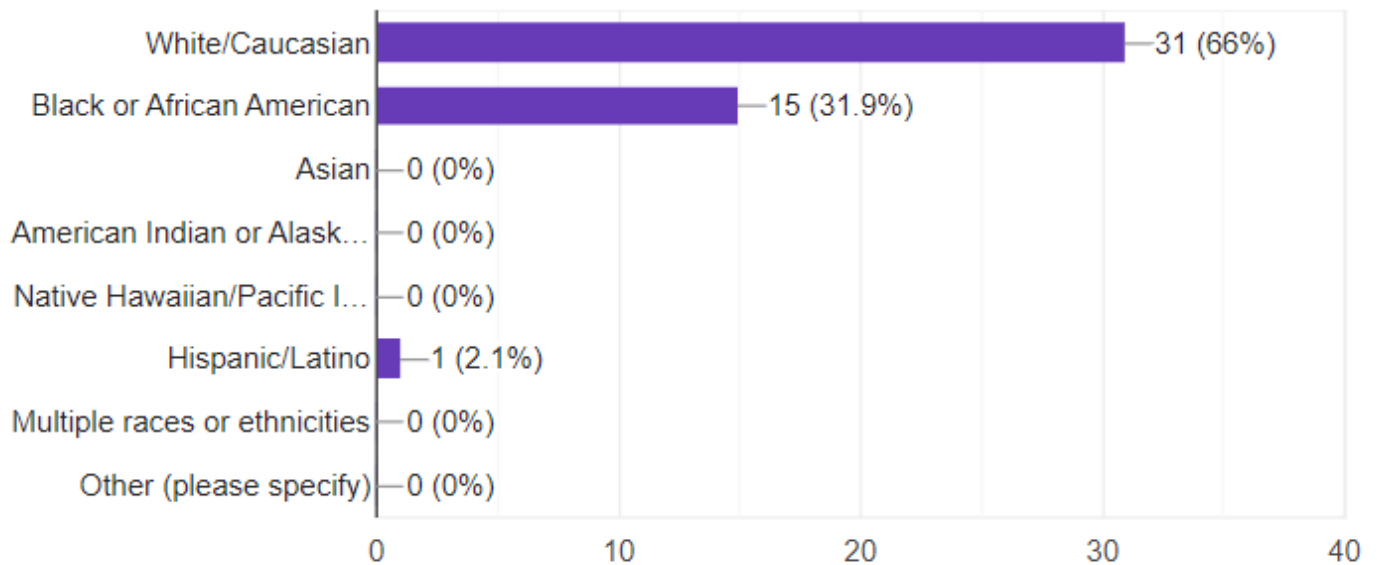
Tell us your age.

49 responses



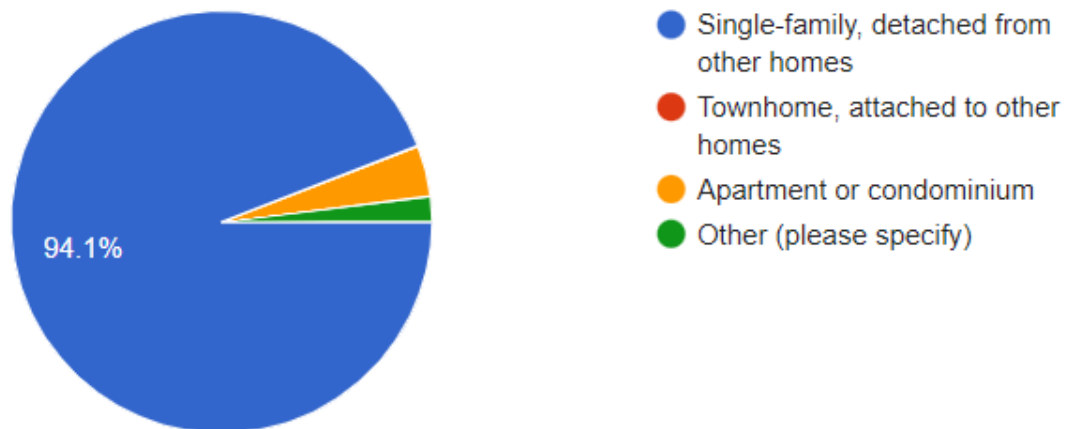
### What race/ethnicity best describes you? Check all that apply.

47 responses



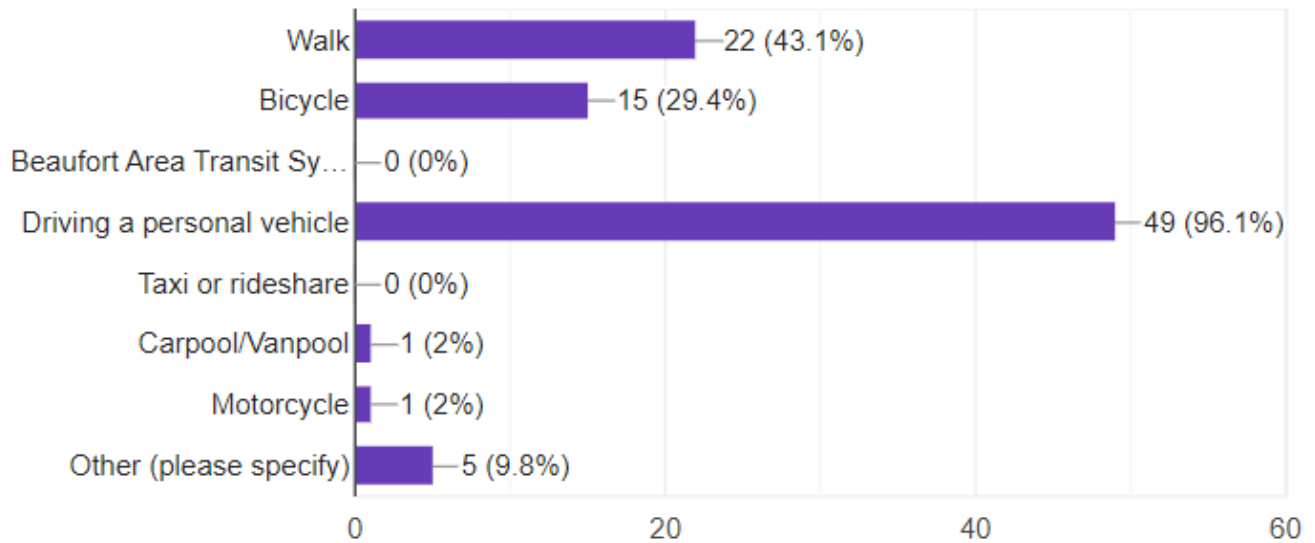
### Which type of housing best describes your home?

51 responses



## How do you travel in Beaufort County? Select all that apply.

51 responses























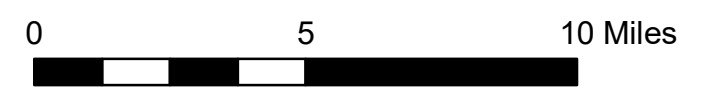
**Comment field. Complete if "Other (please specify)" was checked in previous question.**

- Wheelchair
- Kayak
- Boat
- Get Ride
- Choc.

# NC Resilient Coastal Communities Program Beaufort County Critical Assets & Topography























## Legend

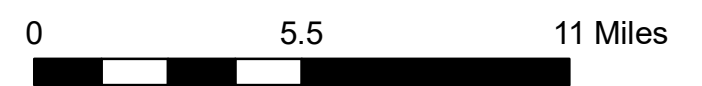
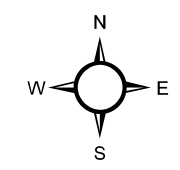
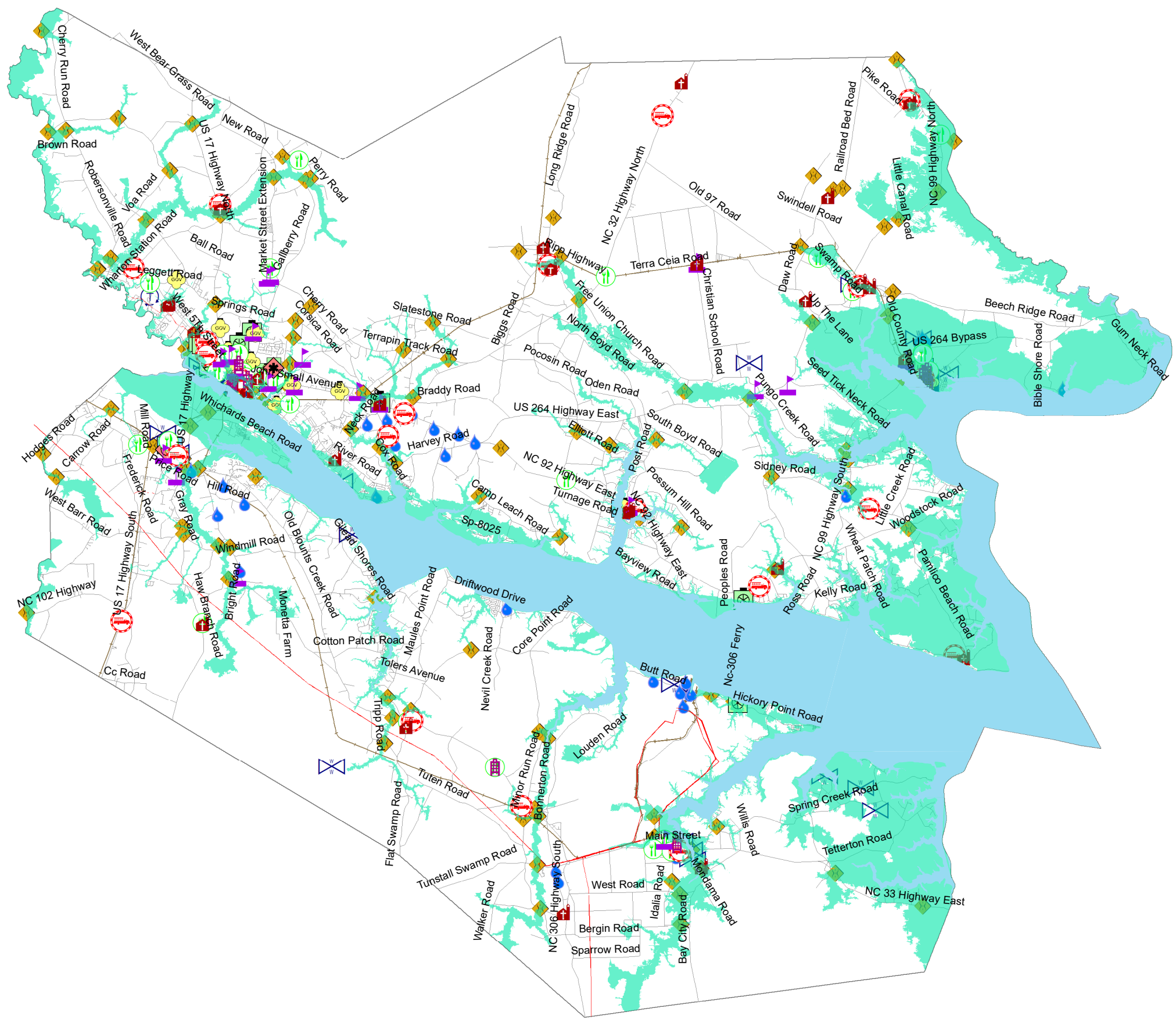
-  Community Buildings and Facilities
-  Community Response Partners
-  Duke Transmission Easements
-  Education
-  Emergency Management
-  Fire and EMS Stations
-  Food
-  Government Services
-  Law Enforcement/Security
-  Libraries
-  Medical
-  Public Water Supply Wells
-  Public Works Offices
-  Solid Waste
-  Transportation Facilities
-  Wastewater Discharge Permits
-  Bridges
-  Surface Water
-  Rail
-  Beaufort County



# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 100-year Floodplain



















## Legend

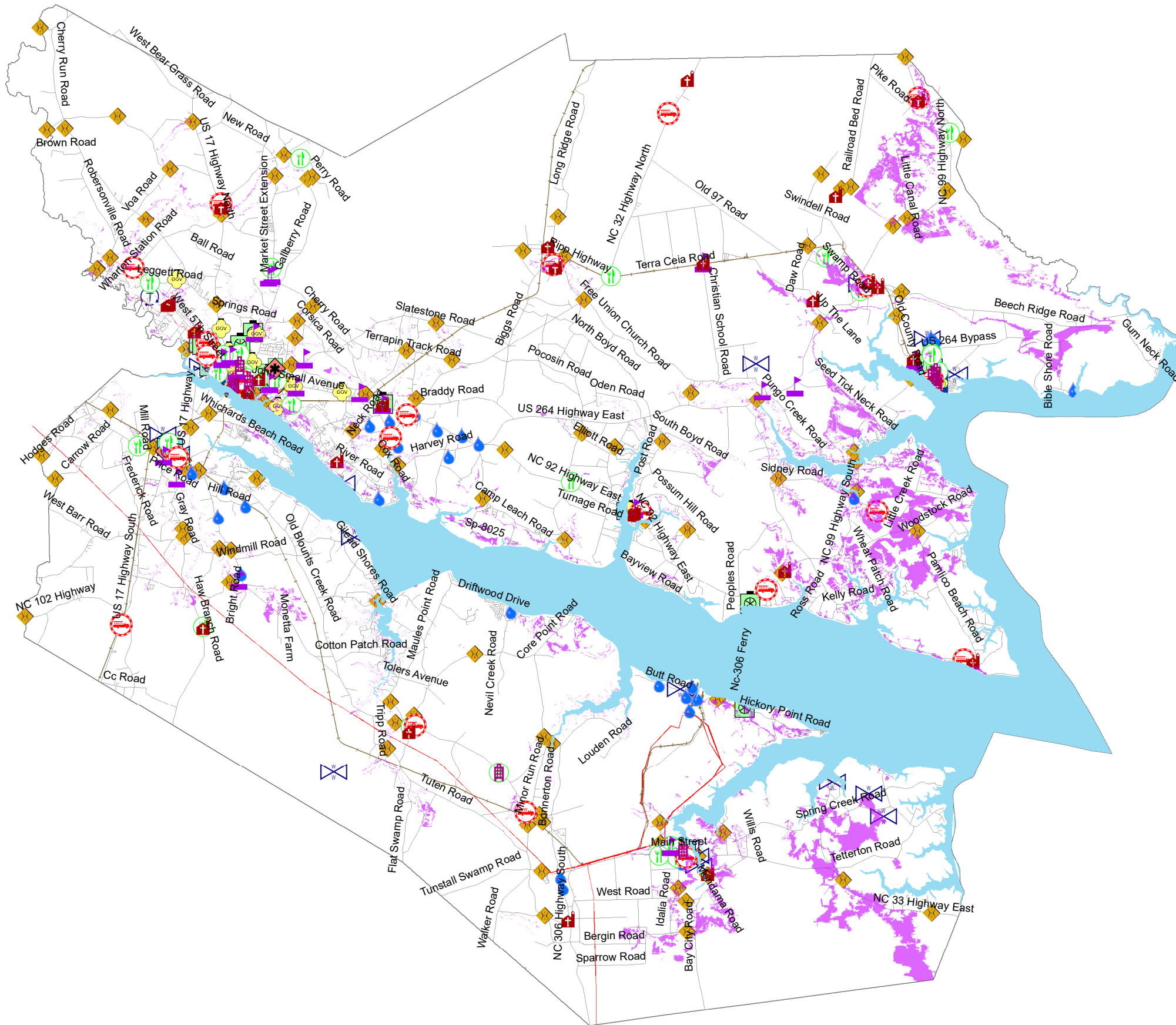
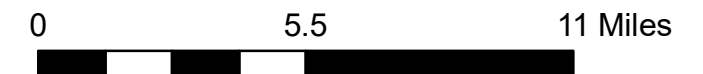
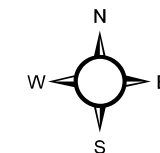
-  100-year Floodplain
-  Surface Water
-  Community Buildings and Facilities (33.3% in 100-yr FP)
-  Community Response Partners (17.9% in 100-yr FP)
-  Duke Transmission Easements (22.8% in 100-yr FP)
-  Education (5% in 100-yr FP)
-  Emergency Management (None in 100-yr FP)
-  Fire and EMS Stations (12.5% in 100-yr FP)
-  Food (17.2% in 100-yr FP)
-  Government Services (14.3% in 100-yr FP)
-  Law Enforcement/Security (16.7% in 100-yr FP)
-  Libraries (25% in 100-yr FP)
-  Medical (27.8% in 100-yr FP)
-  Public Water Supply Wells (22.9% in 100-yr FP)
-  Public Works Offices (16.7% in 100-yr FP)
-  Solid Waste (None in 100-yr FP)
-  Transportation Facilities (None in 100-yr FP)
-  Wastewater Discharge Permits (60% in 100-yr FP)
-  Bridges (81.5% in 100-yr FP)
-  Rail
-  Road Network (34.1% in 100-yr FP)
-  Beaufort County



# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 500-year Floodplain

## Legend










-  500-year Floodplain
-  Surface Water
-  Community Buildings and Facilities (22.2% in 500-yr FP)
-  Community Response Partners (3.6% in 500-yr FP)
-  Duke Transmission Easements (13.9% in 500-yr FP)
-  Education (None in 500-yr FP)
-  Emergency Management (None in 500-yr FP)
-  Fire and EMS Stations (8.3% in 500-yr FP)
-  Food (3.4% in 500-yr FP)
-  Government Services (14.3% in 500-yr FP)
-  Law Enforcement/Security (None in 500-yr FP)
-  Libraries (25% in 500-yr FP)
-  Medical (5.6% in 500-yr FP)
-  Public Water Supply Wells (2.9% in 500-yr FP)
-  Public Works Offices (16.7% in 500-yr FP)
-  Solid Waste (None in 500-yr FP)
-  Transportation Facilities (10% in 500-yr FP)
-  Wastewater Discharge Permits (5% in 500-yr FP)
-  Bridges (0.8% in 500-yr FP)
-  Rail
-  Road Network (19.4% in 500-yr FP)
-  Beaufort County

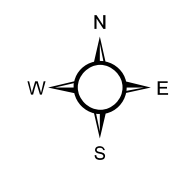
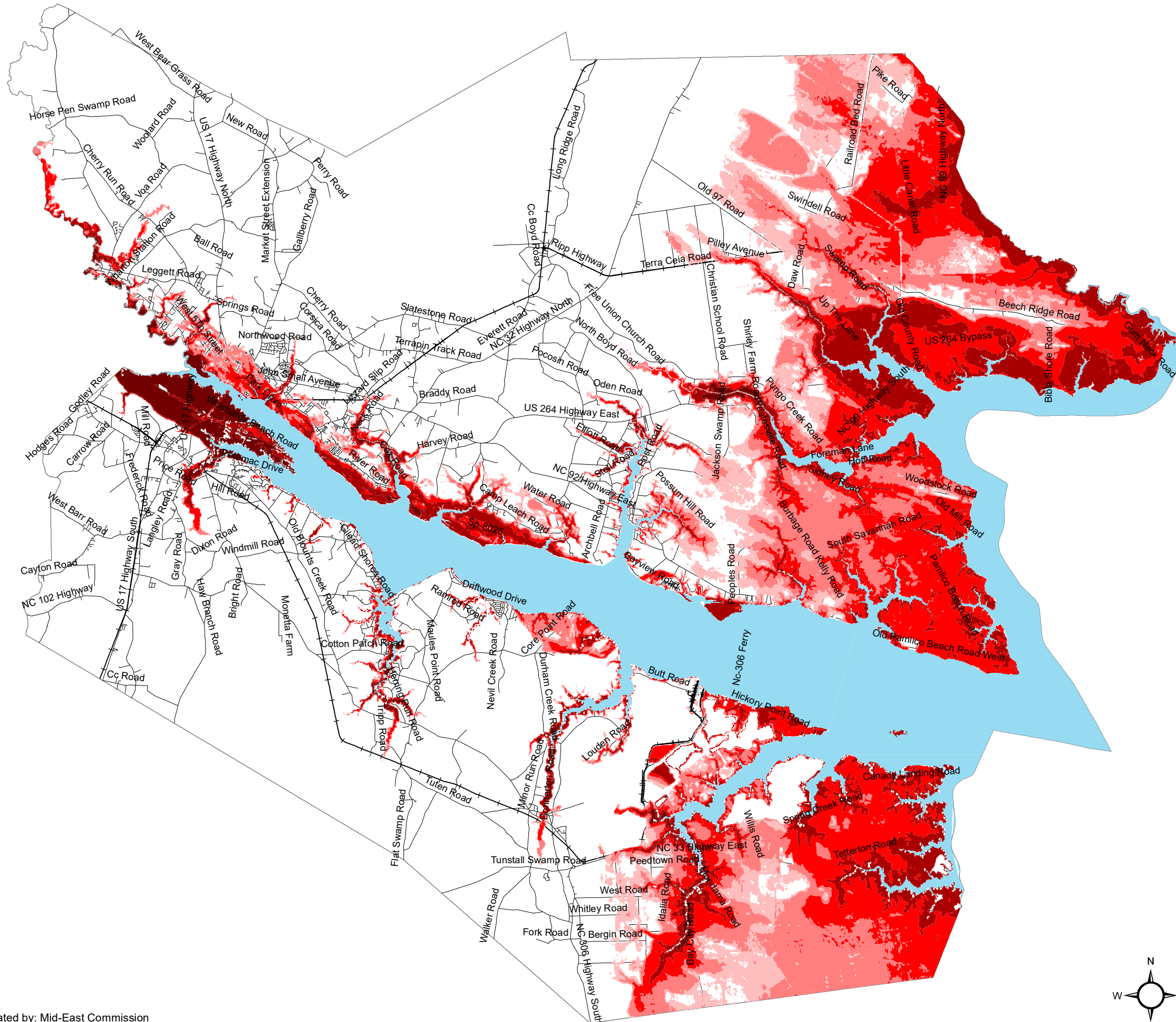


# NC Resilient Coastal Communities Program: Beaufort County Hurricane Florence Storm Surge, 2018

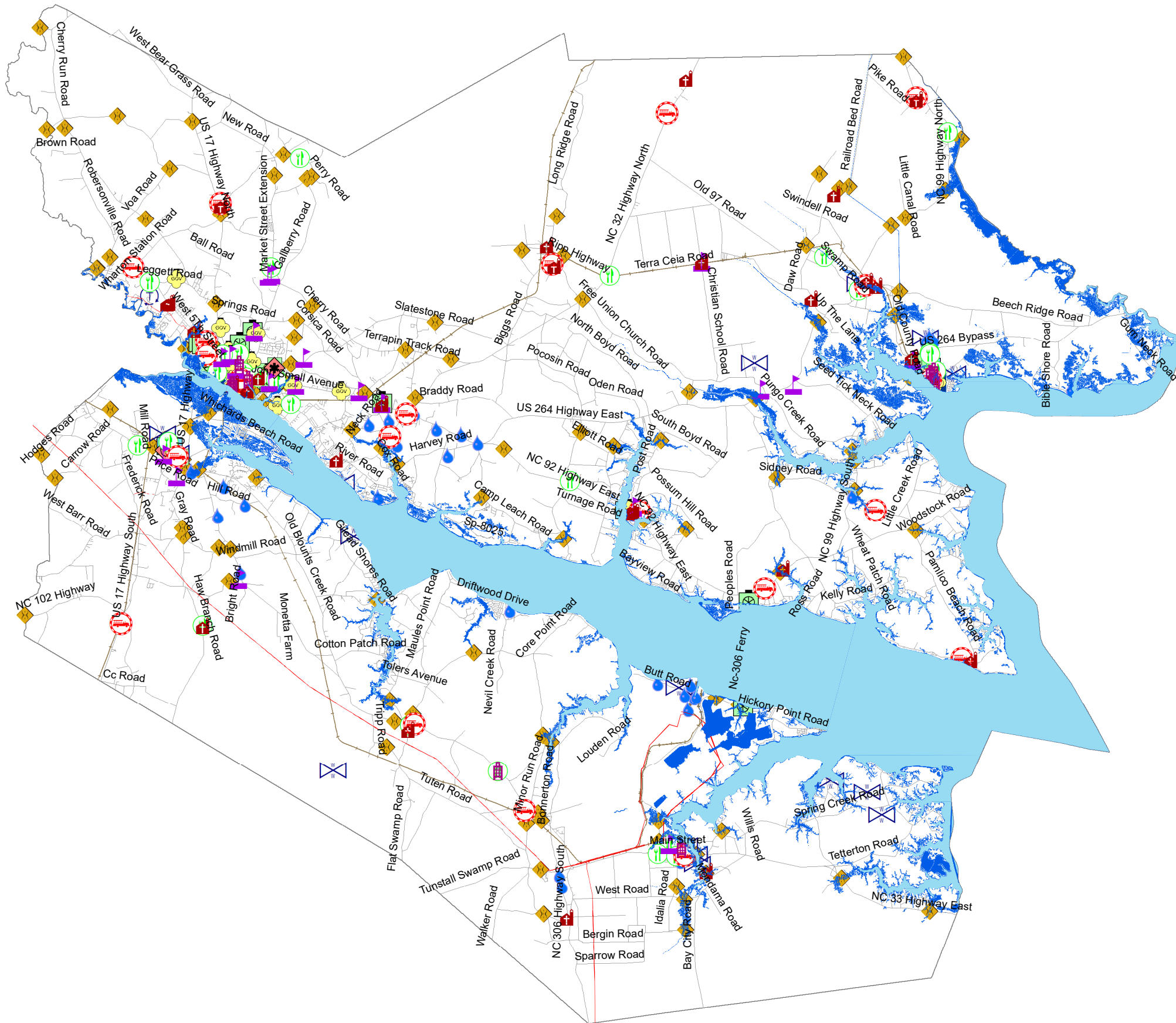
## Legend

### Hurricane Florence Storm Surge

-  Less than 1 ft. above ground
-  Greater than 1 ft. above ground
-  Greater than 3 ft. above ground
-  Greater than 6 ft. above ground
-  Greater than 9 ft. above ground
-  Surface Water
-  Rail
-  Road Network
-  Beaufort County

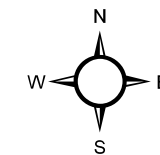


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 1 ft. Sea Level Rise Scenario (30 year projection)

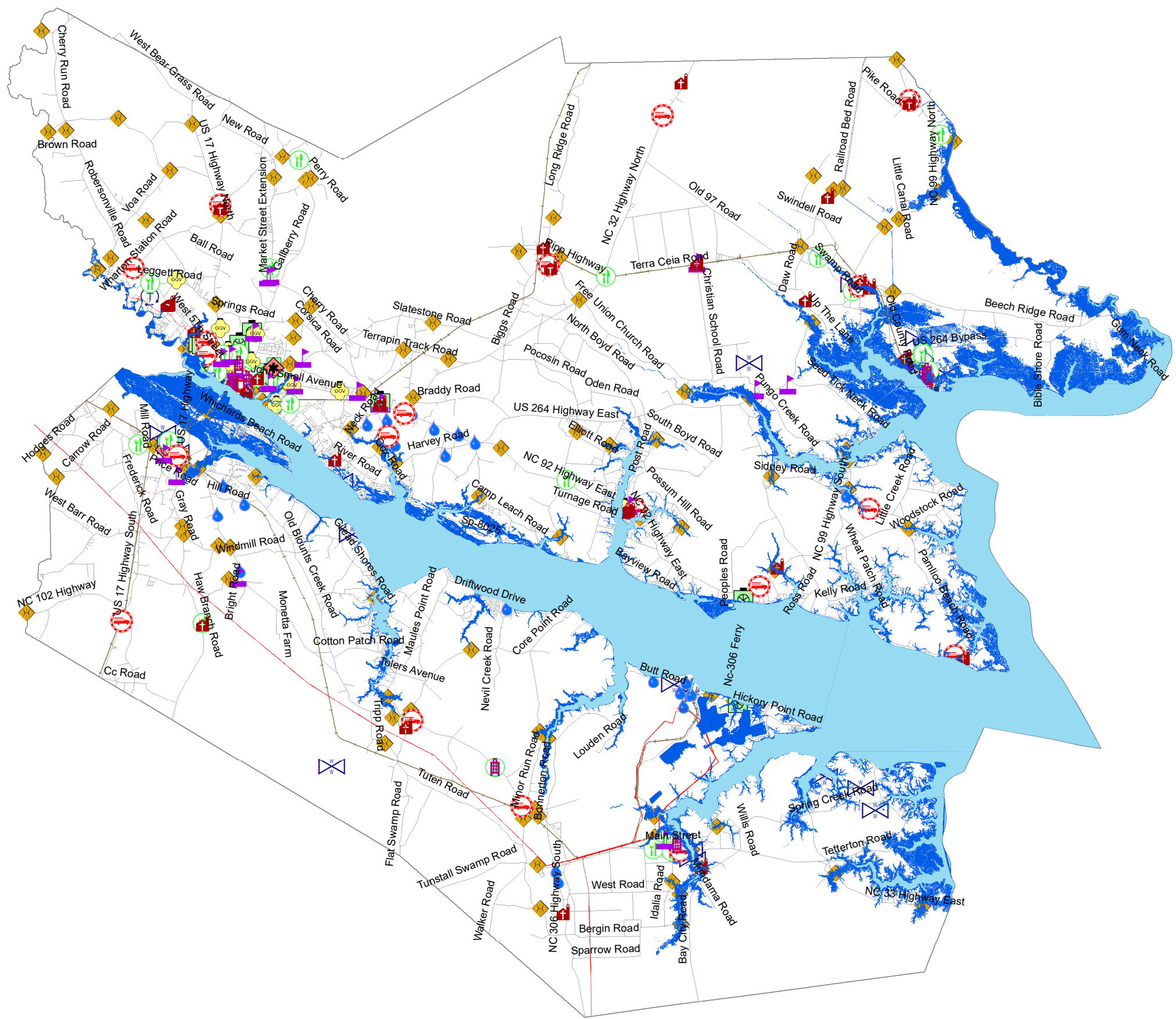


## Legend

- Surface Water
- 1 ft. Sea Level Rise Scenario Area
- Community Buildings and Facilities (None in potential SLR area)
- Community Response Partners (None in potential SLR area)
- Duke Transmission Easements (9.9% in potential SLR area)
- Education (None in potential SLR area)
- Emergency Management (None in potential SLR area)
- Fire and EMS Stations (None in potential SLR area)
- Food (None in potential SLR area)
- Government Services (None in potential SLR area)
- Law Enforcement/Security (None in potential SLR area)
- Libraries (None in potential SLR area)
- Medical (None in potential SLR area)
- Public Water Supply Wells (5.7% in potential SLR area)
- Public Works Offices (None in potential SLR area)
- Solid Waste (None in potential SLR area)
- Transportation Facilities (None in potential SLR area)
- Wastewater Discharge Permits (35% in potential SLR area)
- Bridges (42% in potential SLR area)
- Rail
- Road Network (2.3% in potential SLR area)
- Beaufort County

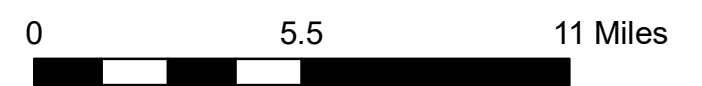
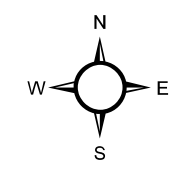


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 2 ft. Sea Level Rise Scenario (60 year projection)

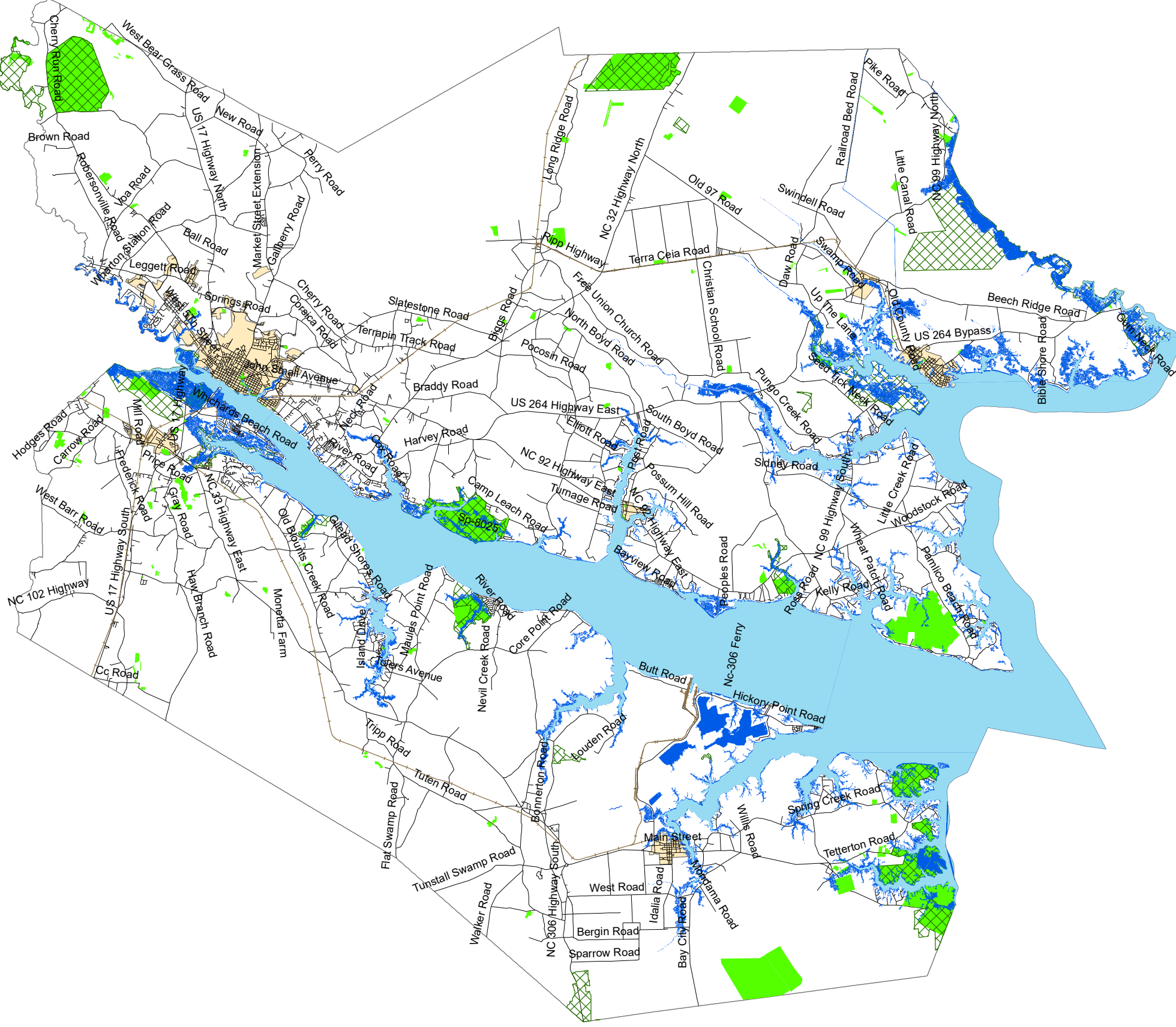


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Community Buildings and Facilities (11.1% in potential SLR area)
- Community Response Partners (None in potential SLR area)
- Duke Transmission Easements (11.6% in potential SLR area)
- Education (None in potential SLR area)
- Emergency Management (None in potential SLR area)
- Fire and EMS Stations (None in potential SLR area)
- Food (None in potential SLR area)
- Government Services (None in potential SLR area)
- Law Enforcement/Security (None in potential SLR area)
- Libraries (None in potential SLR area)
- Medical (None in potential SLR area)
- Public Water Supply Wells (8.6% potential SLR area)
- Public Works Offices (None in potential SLR area)
- Solid Waste (None in potential SLR area)
- Transportation Facilities (None in potential SLR area)
- Wastewater Discharge Permits (40% in potential SLR area)
- Bridges (47.1% in potential SLR area)
- Rail
- Road Network (8% in potential SLR area)
- Beaufort County

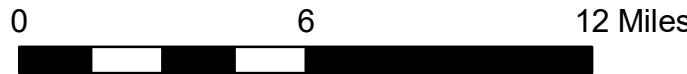
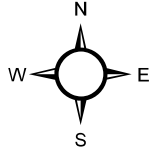


# NC Resilient Coastal Communities Program: Beaufort County Natural/Managed Areas & 1 ft. Sea Level Rise Scenario (30 year projection)











## Legend

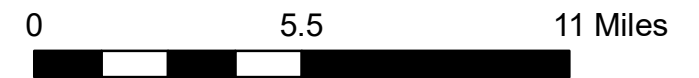
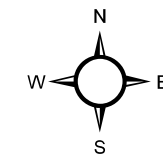
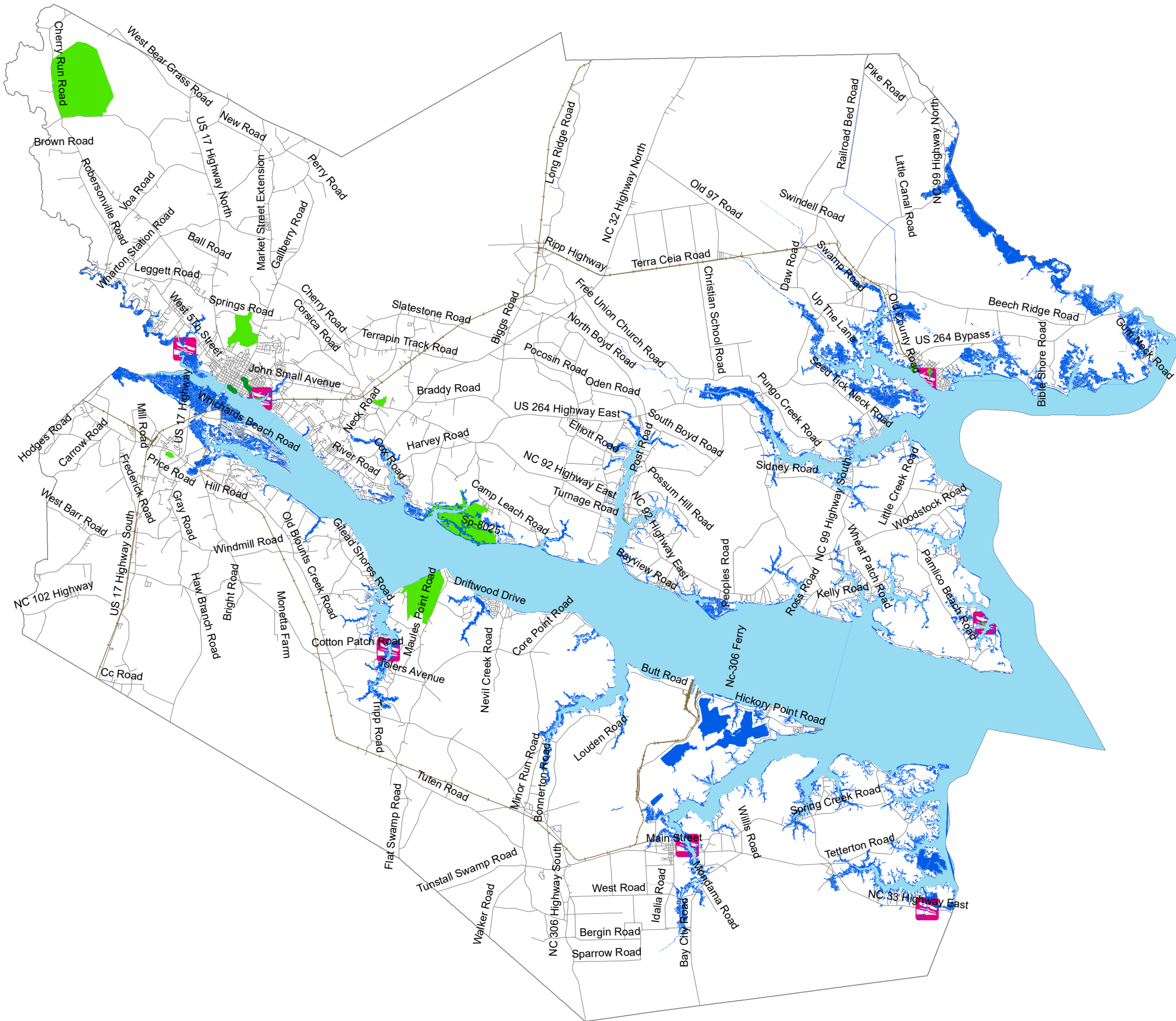
- Surface Water
- 1 ft. Sea Level Rise Scenario
- Natural Areas (69.6% in potential SLR area)
- Managed Areas (24.6% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County



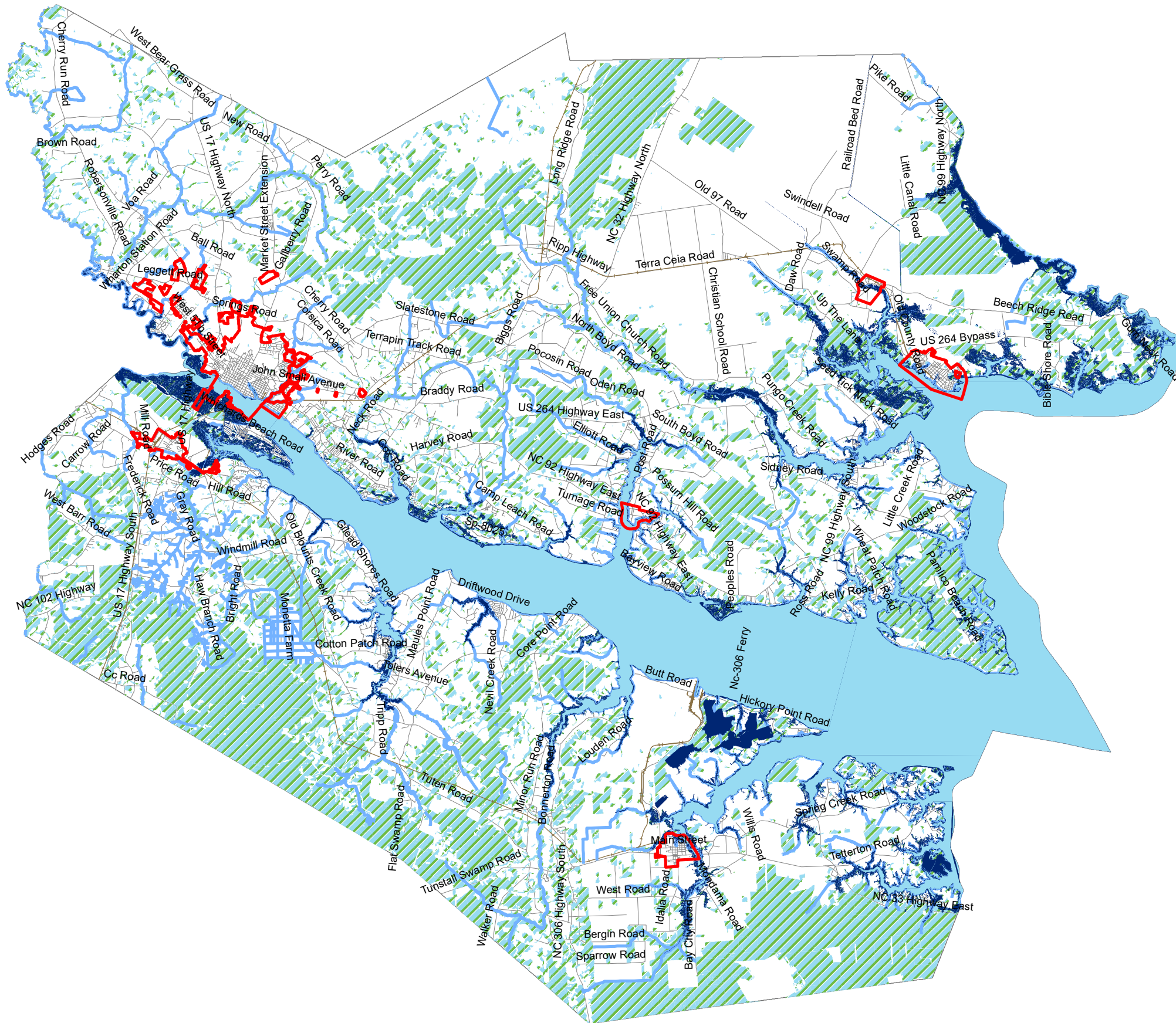
# NC Resilient Coastal Communities Program: Beaufort County Parks/Public Land & 1 ft. Sea Level Rise Scenario (30 year projection)

## Legend

-  1 ft. Sea Level Rise Scenario
-  Surface Water
-  Parks and Public Land (56.8% partially in potential SLR area, None completely in potential SLR area)
-  Greenways (50% in potential SLR area)
-  Public Boat Ramps (None in potential SLR area)
-  Rail
-  Road Network
-  Beaufort County

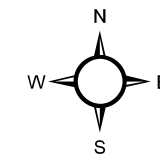


# NC Resilient Coastal Communities Program: Beaufort County Streams/Wetlands & 1 ft. Sea Level Rise Scenario (30 year projection)

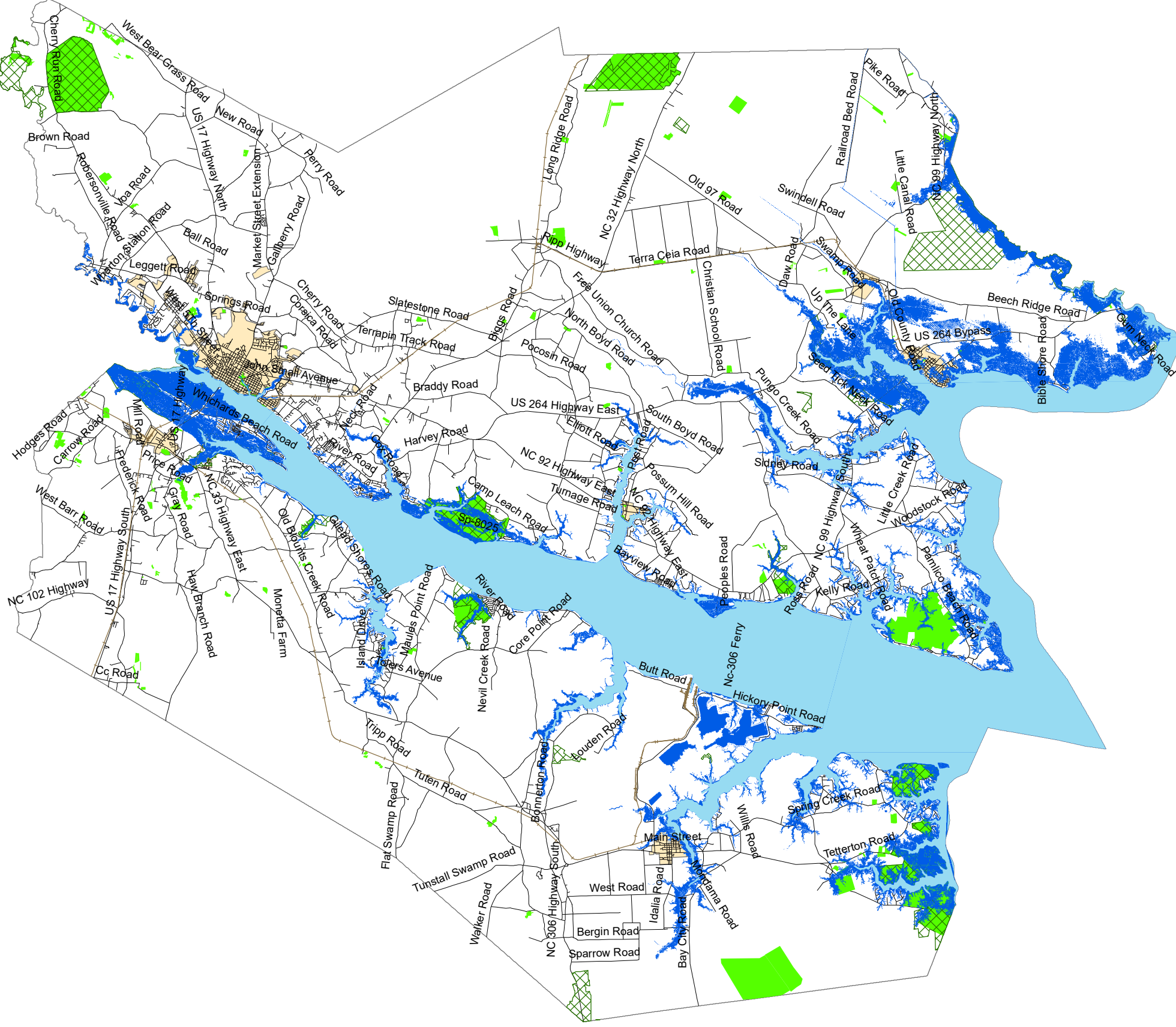


## Legend

-  Surface Water
-  1 ft. Sea Level Rise Scenario
-  Streams (79.9% in potential SLR area)
-  Wetlands (30.4% in potential SLR area)
-  Rail
-  Road Network
-  Municipal Boundaries
-  Beaufort County

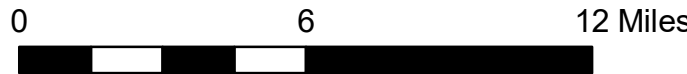
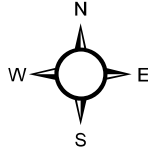


# NC Resilient Coastal Communities Program: Beaufort County Natural/Managed Areas & 2 ft. Sea Level Rise Scenario (60 year projection)

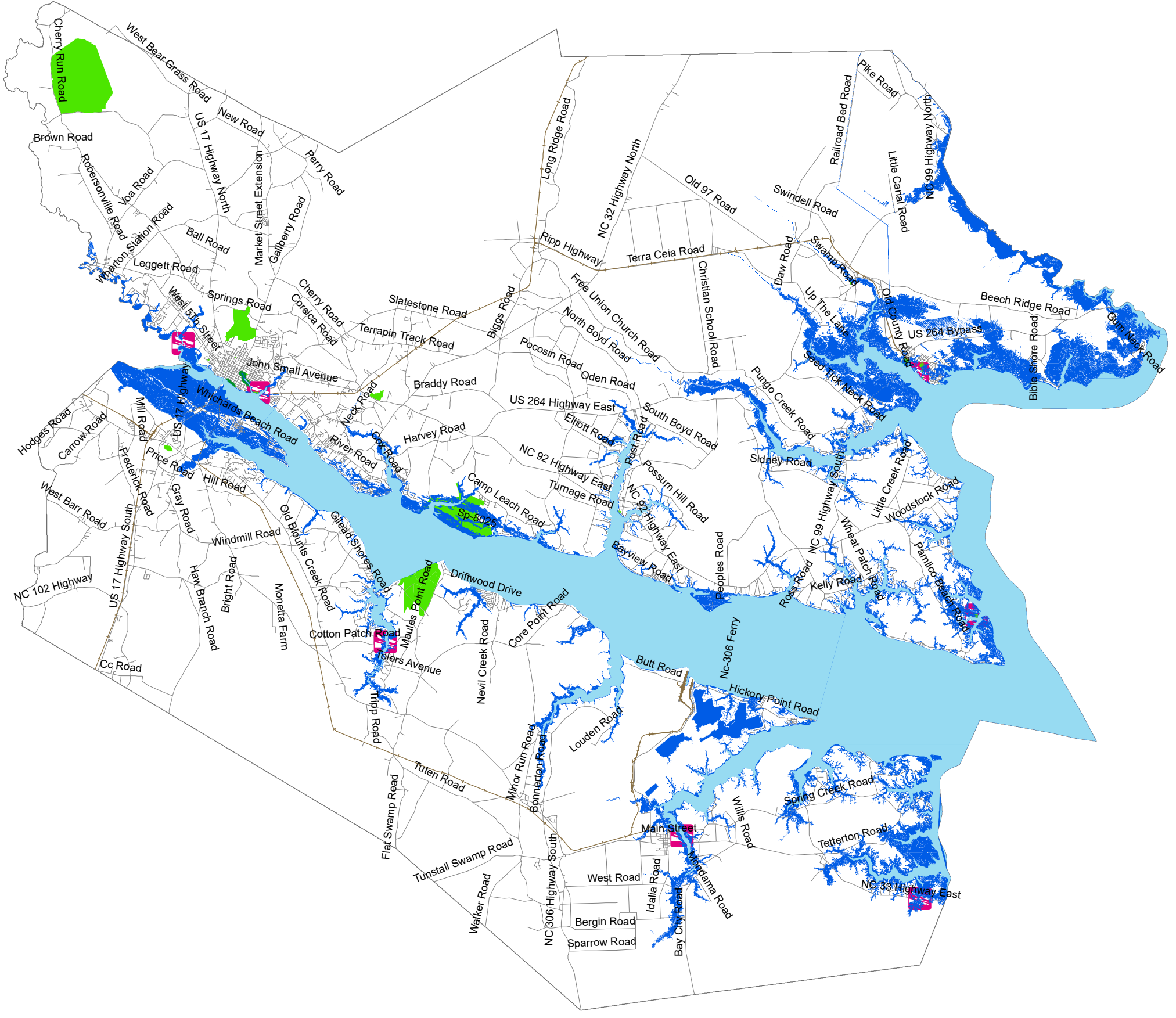


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Natural Areas (69.6% in potential SLR area)
- Managed Areas (28.7% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County

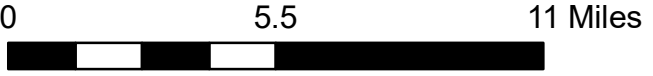
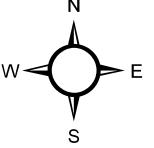


# NC Resilient Coastal Communities Program: Beaufort County Parks/Public Land & 2 ft. Sea Level Rise Scenario (60 year projection)

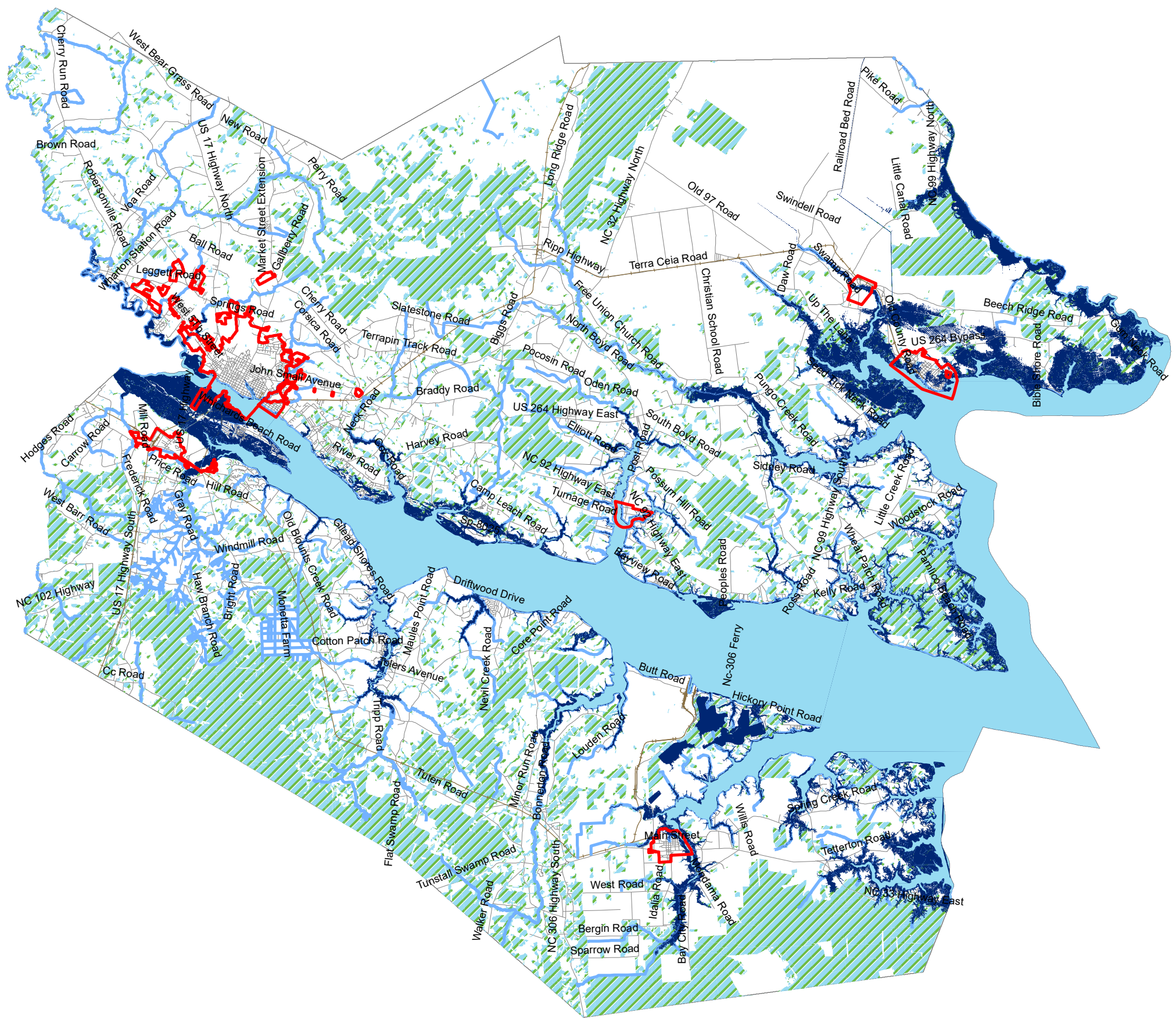


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Parks and Public Land (59.1% partially in potential SLR area, None completely in potential SLR area)
- Public Boat Ramps (42.9% in potential SLR area)
- Greenways (50% in potential SLR area)
- Rail
- Road Network
- Beaufort County

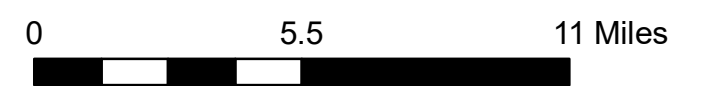
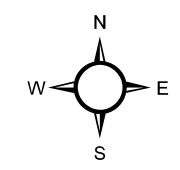


# NC Resilient Coastal Communities Program: Beaufort County Streams/Wetlands & 2 ft. Sea Level Rise Scenario (60 year projection)

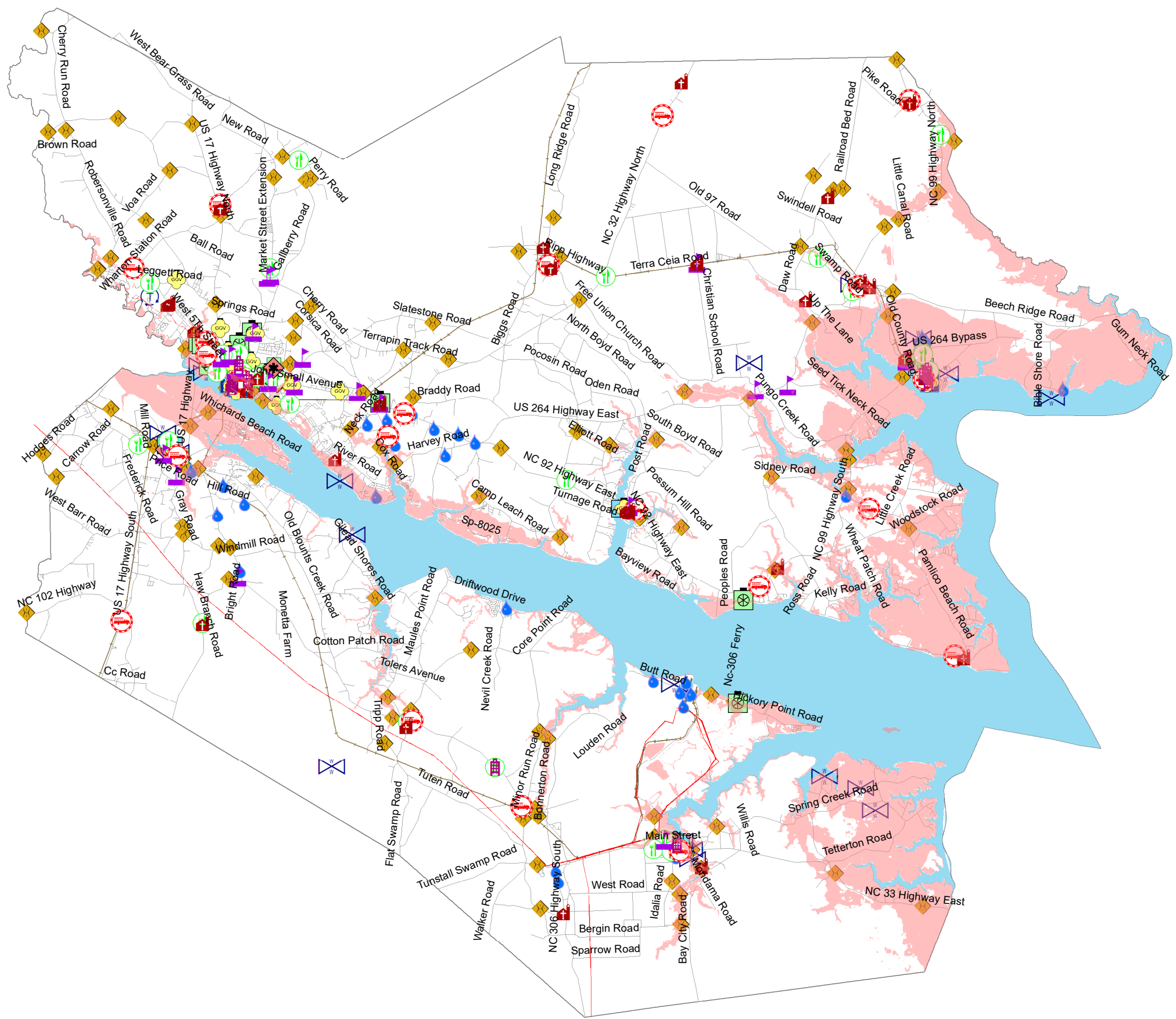


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Streams (81.2% in potential SLR area)
- Wetlands (34.8% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County

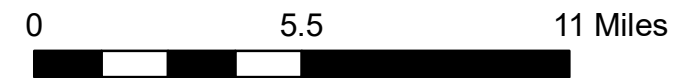
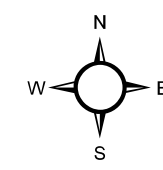


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 1 Event

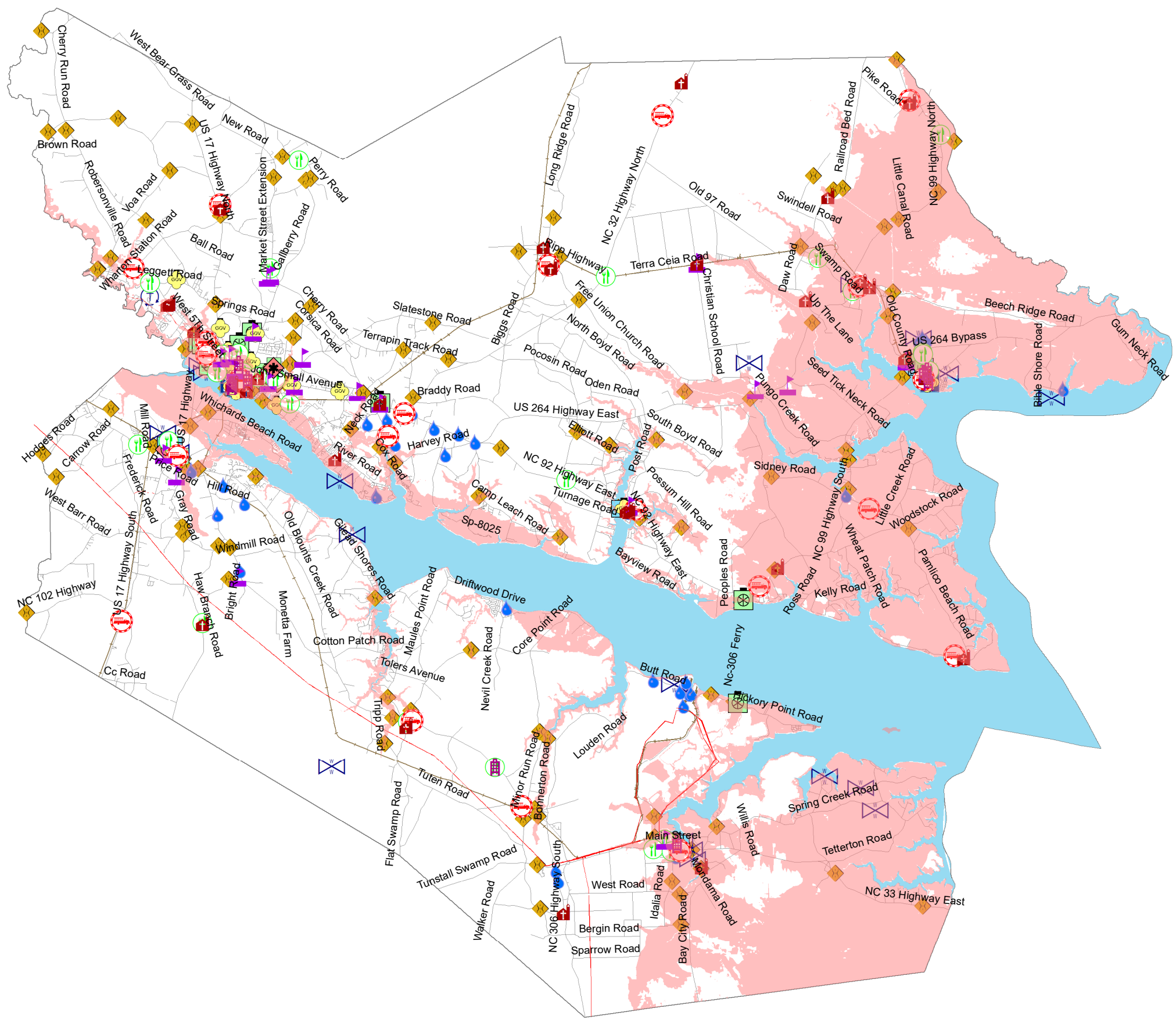


## Legend

- Cat. 1 Event Potential Storm Surge Area
- Community Buildings and Facilities (33.3% in potential SS area)
- Community Response Partners (17.9% in potential SS area)
- Duke Transmission Easements (11.2% in potential SS area)
- Education (5% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (12.5% in potential SS area)
- Food (13.8% in potential SS area)
- Government Services (14.3% in potential SS area)
- Law Enforcement/Security (16.7% in potential SS area)
- Libraries (50% in potential SS area)
- Medical (27.8% in potential SS area)
- Public Water Supply Wells (25.7% in potential SS area)
- Public Works Offices (16.7% in potential SS area)
- Solid Waste (None in potential SS area)
- Transportation Facilities (10% in potential SS area)
- Wastewater Discharge Permits (45% in potential SS area)
- Bridges (25.2% in potential SS area)
- Surface Water
- Rail
- Road Network (29.6% in potential SS area)
- Beaufort County

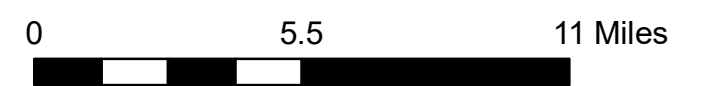
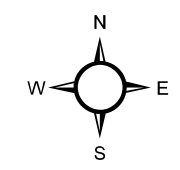


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 2 Event

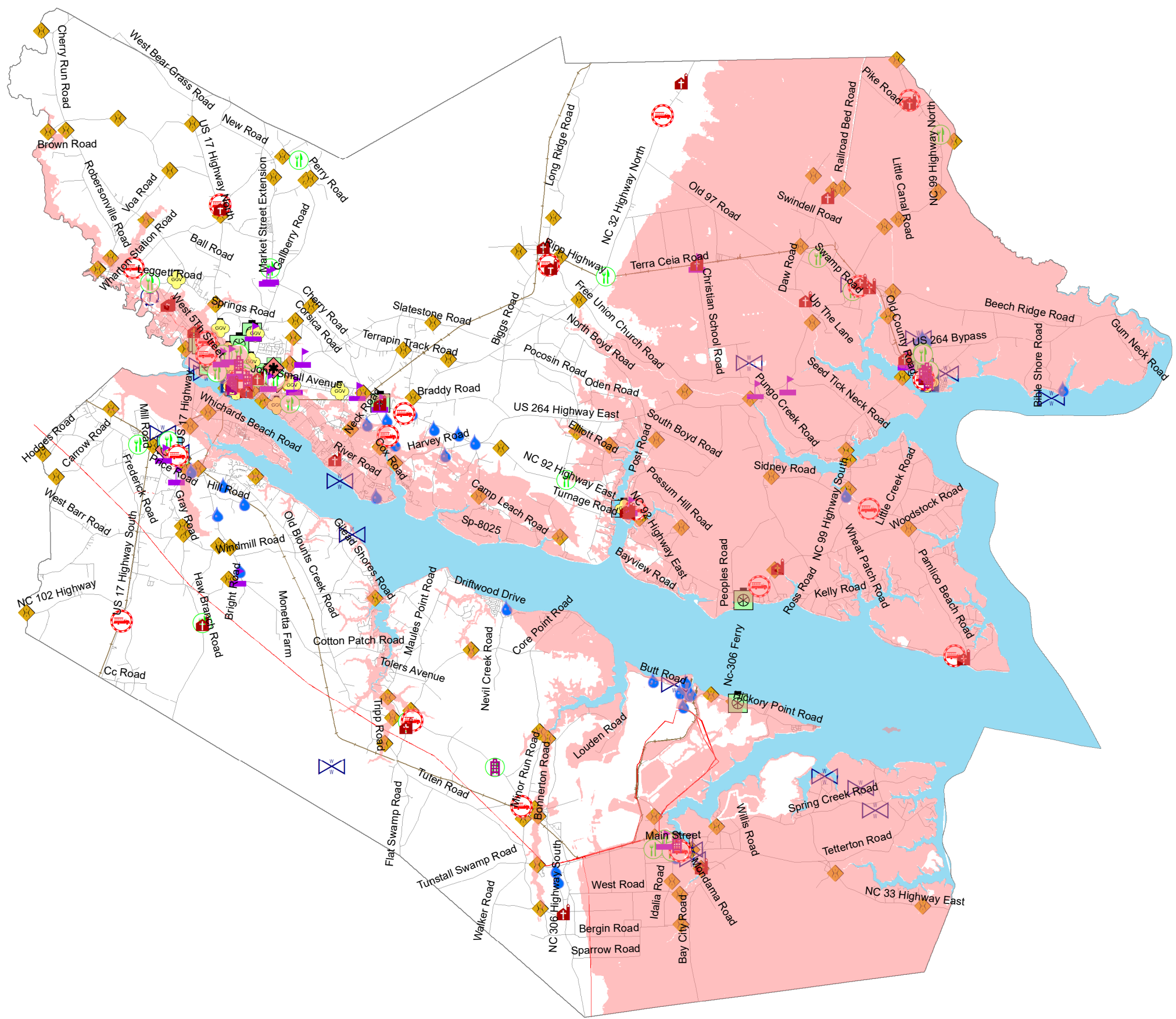


## Legend

- Cat. 2 Event Potential Storm Surge Area
- Community Buildings and Facilities (77.8% in potential SS area)
- Community Response Partners (46.4% in potential SS area)
- Duke Transmission Easements (24.1% in potential SS area)
- Education (5% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (41.7% in potential SS area)
- Food (41.4% in potential SS area)
- Government Services (53.6% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (75% in potential SS area)
- Medical (61.1% in potential SS area)
- Public Water Supply Wells (34.3% in potential SS area)
- Public Works Offices (66.7% in potential SS area)
- Solid Waste (None in potential SS area)
- Transportation Facilities (30% in potential SS area)
- Wastewater Discharge Permits (50% in potential SS area)
- Bridges (34.5% in potential SS area)
- Surface Water
- Rail
- Road Network (49.1% in potential SS area)
- Beaufort County

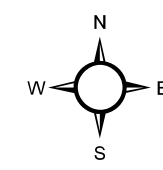


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 3 Event

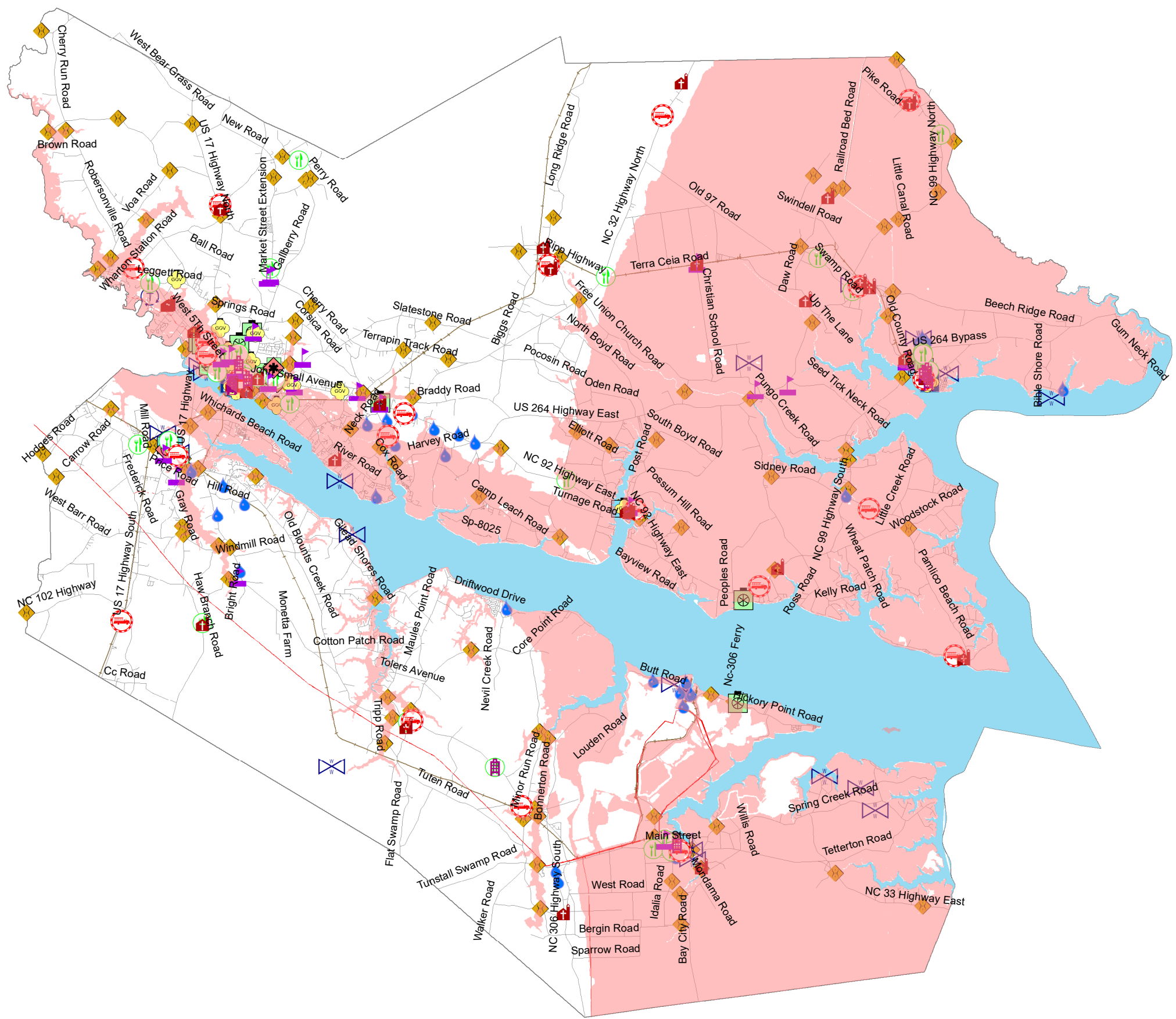


## Legend

- Cat. 3 Event Potential Storm Surge Area
- Community Buildings and Facilities (88.9% in potential SS area)
- Community Response Partners (71.4% in potential SS area)
- Duke Transmission Easements (56.5% in potential SS area)
- Education (45% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (50% in potential SS area)
- Food (65.5% in potential SS area)
- Government Services (71.4% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (100% in potential SS area)
- Medical (72.2% in potential SS area)
- Public Water Supply Wells (51.4% in potential SS area)
- Public Works Offices (83.3% in potential SS area)
- Solid Waste (100% in potential SS area)
- Transportation Facilities (50% in potential SS area)
- Wastewater Discharge Permits (60% in potential SS area)
- Bridges (43.7% in potential SS area)
- Surface Water
- Rail
- Road Network (62.4% in potential SS area)
- Beaufort County

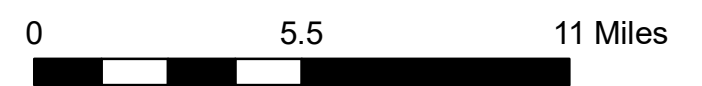
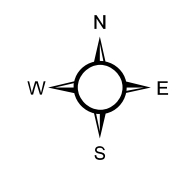


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 4 Event

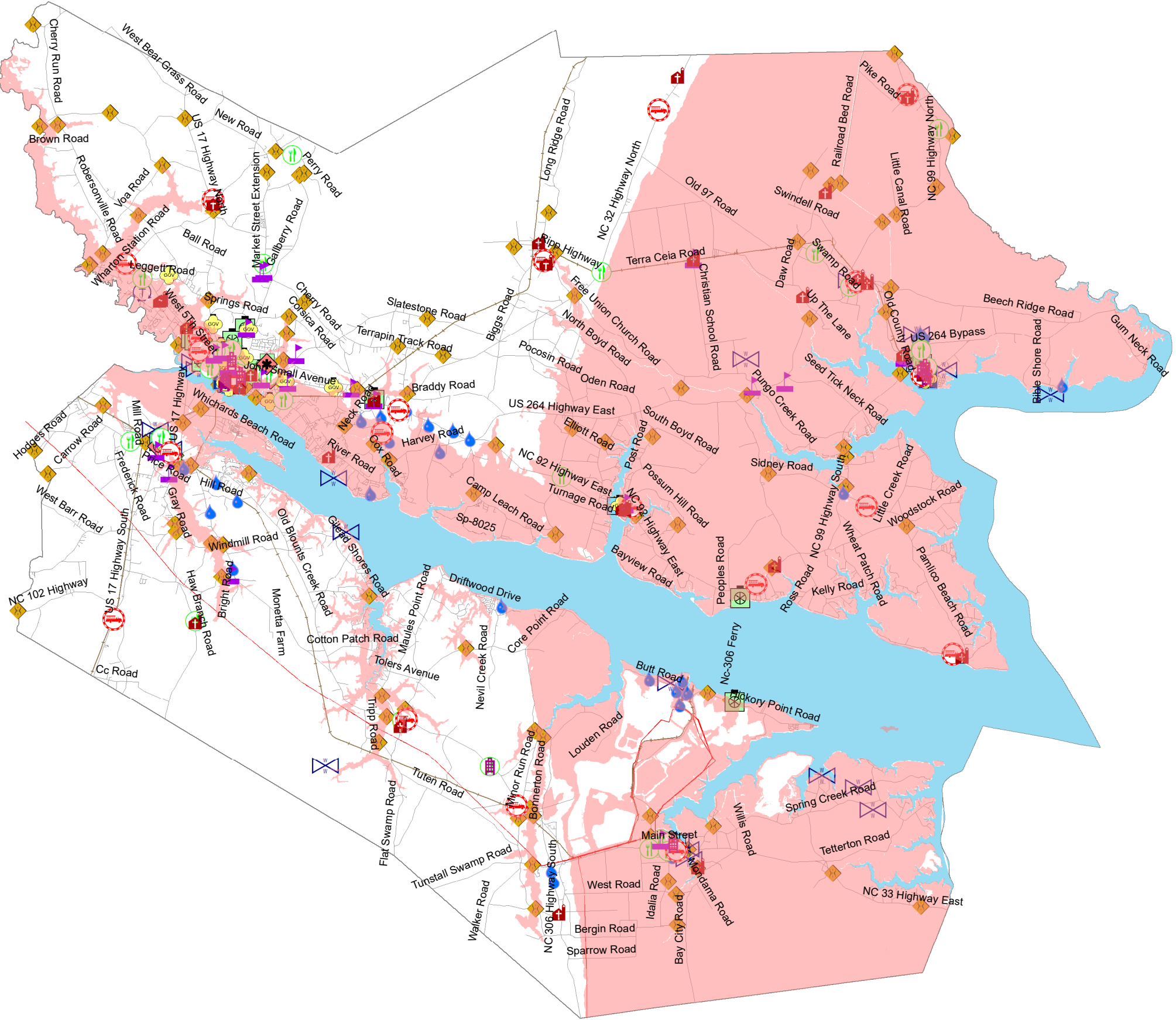


## Legend

- Cat. 4 Event Potential Storm Surge Area
- Community Buildings and Facilities (88.9% in potential SS area)
- Community Response Partners (71.4% in potential SS area)
- Duke Transmission Easements (63.3% in potential SS area)
- Education (45% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (54.2% in potential SS area)
- Food (72.4% in potential SS area)
- Government Services (71.4% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (100% in potential SS area)
- Medical (72.2% in potential SS area)
- Public Water Supply Wells (57.1% in potential SS area)
- Public Works Offices (83.3% in potential SS area)
- Solid Waste (100% in potential SS area)
- Transportation Facilities (60% in potential SS area)
- Wastewater Discharge Permits (60% in potential SS area)
- Bridges (49.6% in potential SS area)
- Surface Water
- Rail
- Road Network (66.8% in potential SS area)
- Beaufort County

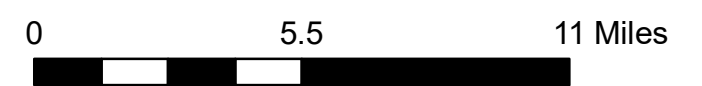
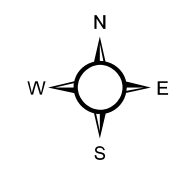


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 5 Event



## Legend

- Cat. 5 Storm Surge Potential
- Community Buildings and Facilities (88.9% in potential SS area)
- Community Response Partners (71.4% in potential SS area)
- Duke Transmission Easements (67% in potential SS area)
- Education (45% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (58.3% in potential SS area)
- Food (72.4% in potential SS area)
- Government Services (71.4% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (100% in potential SS area)
- Medical (72.2% in potential SS area)
- Public Water Supply Wells (60% in potential SS area)
- Public Works Offices (83.3% in potential SS area)
- Solid Waste (100% in potential SS area)
- Transportation Facilities (60% in potential SS area)
- Wastewater Discharge Permits (60% in potential SS area)
- Bridges (52.9% in potential SS area)
- Surface Water
- Rail
- Road Network (69.8% in potential SS area)
- Beaufort County



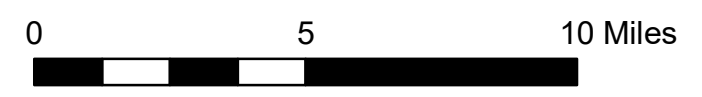
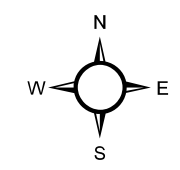
# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 1 Event



## Legend

### Cat. 1 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County



# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 2 Event

## Legend

### Cat. 2 Event Storm Surge Potential

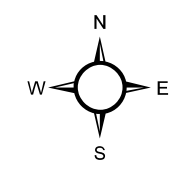
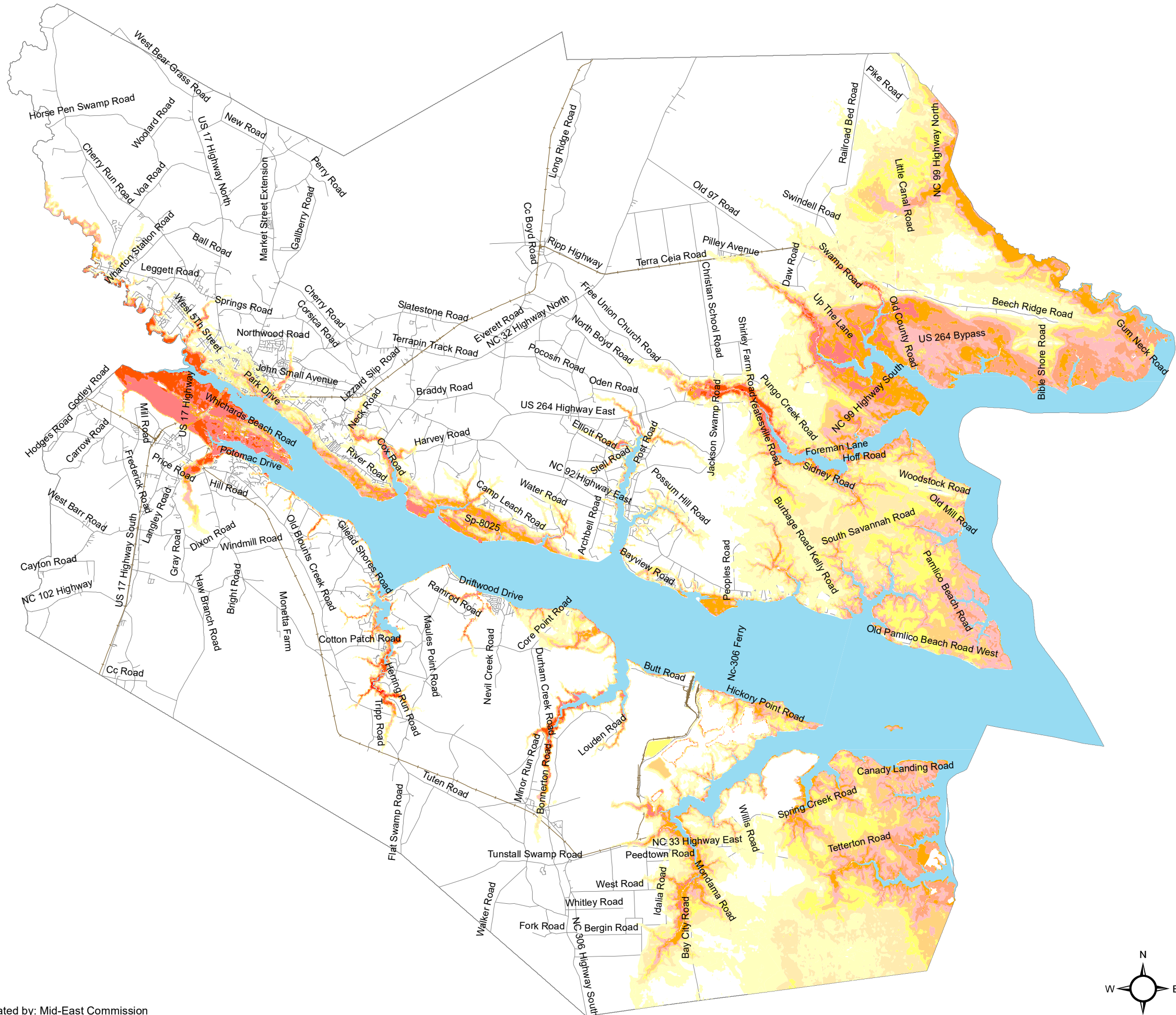
- 00 to 01 foot above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground

Surface Water

Rail

Road Network

Beaufort County

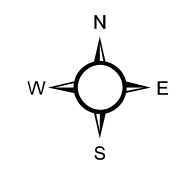
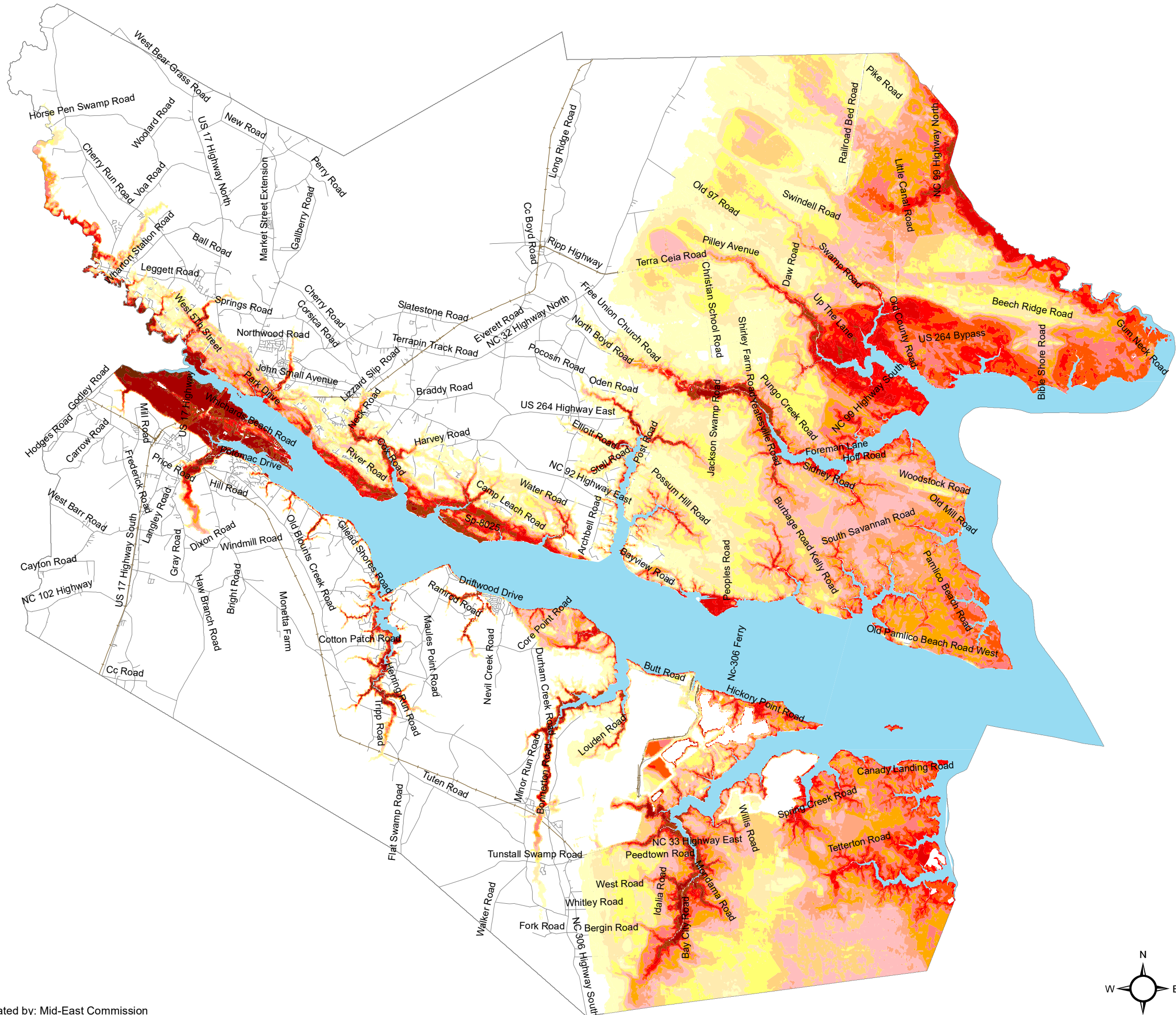


# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 3 Event

## Legend

### Cat. 3 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground
- 11 to 12 feet above ground
- 12 to 13 feet above ground
- 13 to 14 feet above ground
- 14 to 15 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County

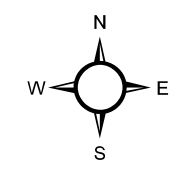
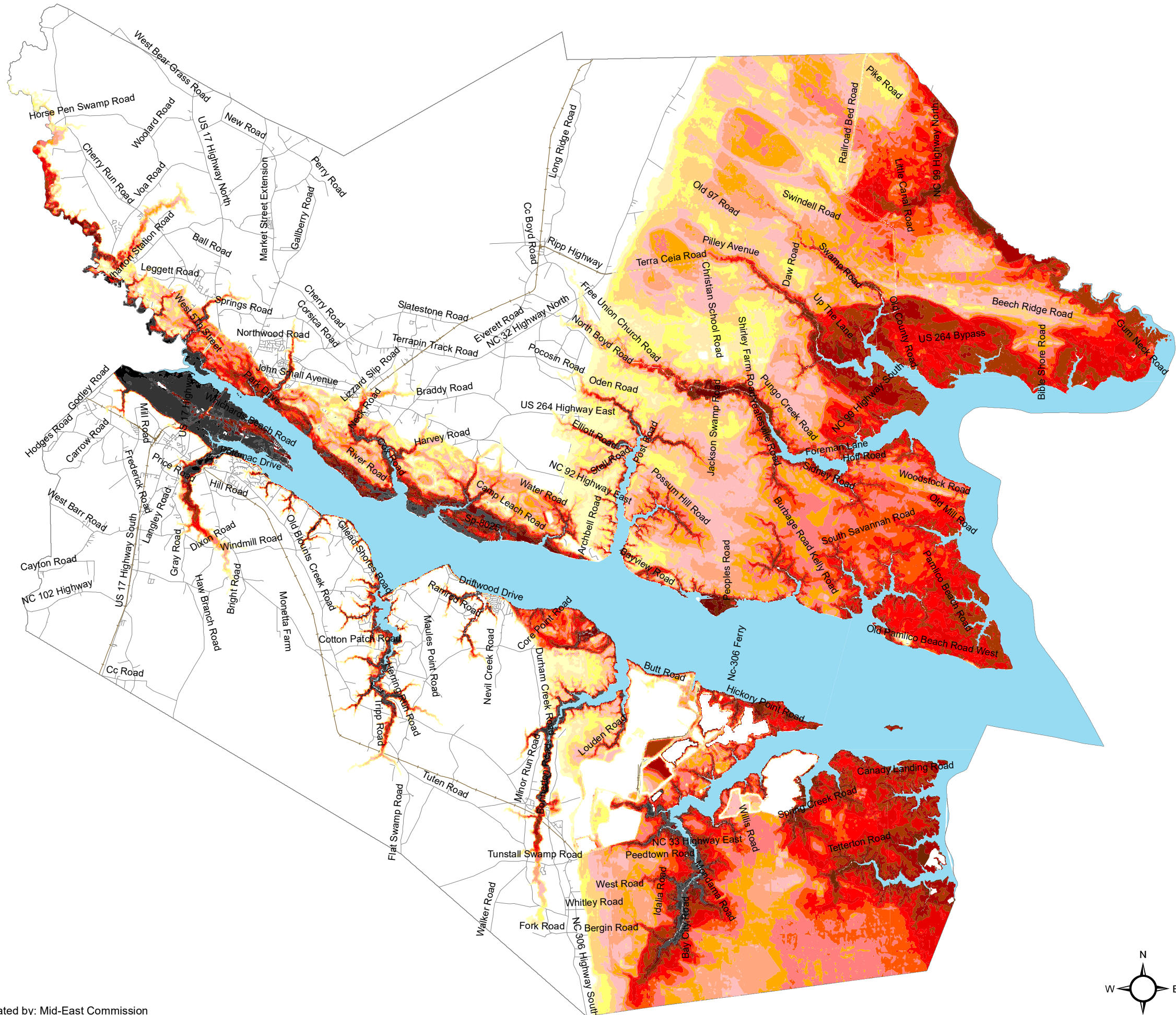


# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 4 Event

## Legend

### Cat. 4 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground
- 11 to 12 feet above ground
- 12 to 13 feet above ground
- 13 to 14 feet above ground
- 14 to 15 feet above ground
- 15 to 16 feet above ground
- 16 to 17 feet above ground
- 17 to 18 feet above ground
- 18 to 19 feet above ground
- 19 to 20 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County

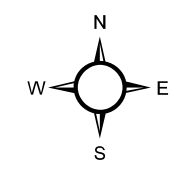
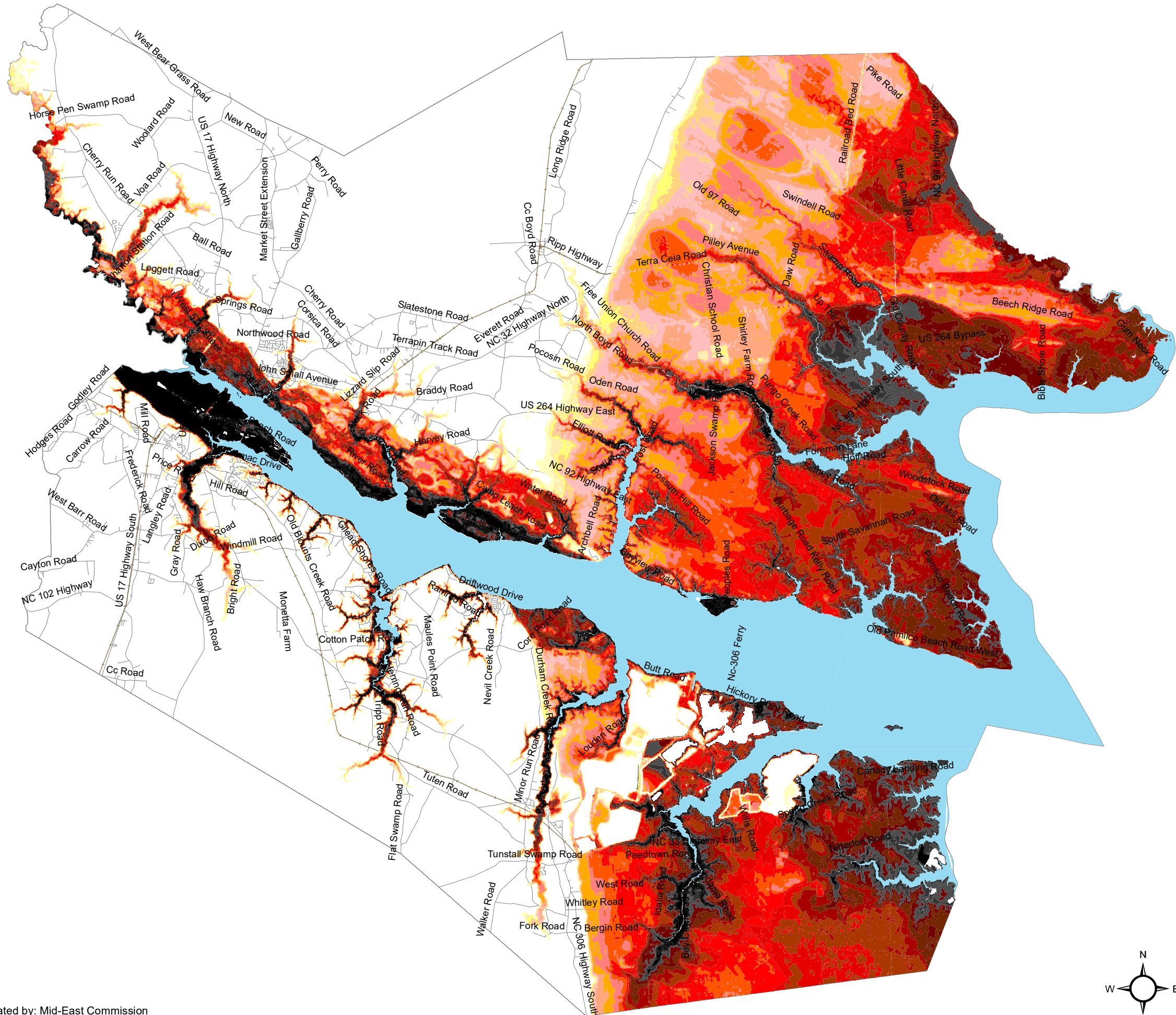


# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 5 Event

## Legend

### Cat. 5 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground
- 11 to 12 feet above ground
- 12 to 13 feet above ground
- 13 to 14 feet above ground
- 14 to 15 feet above ground
- 15 to 16 feet above ground
- 16 to 17 feet above ground
- 17 to 18 feet above ground
- 18 to 19 feet above ground
- 19 to 20 feet above ground
- Greater than 20 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County





# BEAUFORT COUNTY

## RISK ESTIMATE

Sector	Number of Critical Assets at Risk	Asset Value
<i>E.g., government facilities, utilities, natural infrastructure</i>	<i>#</i>	<i>\$X,000,000</i>
Emergency Management	1	\$105,312
Law Enforcement/Security	3	\$10,060,261
Fire and EMS Stations	24	\$9,521,686
911 Dispatch	1	\$390,283
Government Services	11	\$15,005,494
Food	2	\$606,693
Water/Wastewater	17	
Solid Waste	1	
Electric Power Grid	5	
Roads		
Bridges	119	
Transportation Facilities	8	
Fuel Availability	2	
Medical	2	\$21,574,161
Schools	18	
Libraries	0	-
Community Response Partners	28	
Community Buildings and Facilities	2	
Hazards	124	
Wetland	5510 (192,225 ac.)	\$12,964,049,983.50
Streams	292 (948 Stream miles)	\$3,137,419,662.40
Parks/Public Land	5	
Public Boat Ramps	4	
Natural Areas	23	
Managed Areas	167	

### Estimate Risk

Determine what levels of risk call for actions to reduce that risk and increase resilience.

Hazard Mitigation Plans contain risk assessments that used NCEM's iRISK data for building footprints, building values, and other data on critical facilities. These data can be extracted, expanded to include additional critical assets and natural infrastructure, and updated with current economic data. It will be useful to have a good understanding of the locations of vulnerable populations that may need targeted assistance including where there may be clusters that allow for neighborhood-scale strategies.



# BEAUFORT COUNTY

## CRITICAL ASSET & NATURAL INFRASTRUCTURE VULNERABILITY

Asset	Exposure Score 0-3	Sensitivity Score 0-3	Adaptive Capacity 0-3	Vulnerability Score 0-6
<i>Asset name</i>	<i>0 = no exposure 1 = low 2 = medium 3 = high</i>	<i>0 = no sensitivity 1 = low 2 = medium 3 = high</i>	<i>0 = no adaptive capacity 1 = low 2 = medium 3 = high</i>	<i>0-2 = low 3-4 = medium 5-6 = high</i>
<b>Emergency/Enforcement</b>				
Fire and EMS (Exposure: 1.88; Sensitivity: 54%)	2	3	1	Med
Beaufort County Courthouse and Jail	3	3	1	High
Beaufort County Sheriff's Office and 911 Communications Center	2	3	1	Med
<b>Government Services</b>				
Beaufort County Development Center (BCDC)	1	2	2	Low
Beaufort County Financial Services Center	3	2	2	Med
Beaufort County Inspections/Environmental Health	2	2	2	Low
Beaufort County Manager's Office	3	2	2	Med
Beaufort County Social Services	3	3	1	High
Mid-East Commission (Suite A) and NC Works Career Center (Suite B)	1	2	2	Low
NC DEQ Regional Office	1	2	2	Low
NC Division of Vocational Rehabilitation	1	2	1	Low
NC License Plate Agency	2	2	2	Low
Pantego Town Hall	3	2	2	Med
<b>Community</b>				
Bobby Andrews Recreation Center	3	2	1	Med
Grace Martin Harwell Senior Center	3	2	1	Med
<b>Churches</b>				
Church Buildings (Exposure: 2.36; Sensitivity: 88%)	3	3	2	Med

<b>Asset</b>	<b>Exposure Score 0-3</b>	<b>Sensitivity Score 0-3</b>	<b>Adaptive Capacity 0-3</b>	<b>Vulnerability Score 0-6</b>
<b><i>Food</i></b>				
Eagle's Wings Food Pantry	2	3	1	Med
Macedonia Church of Christ	3	3	1	High
Martha's Project	2	3	1	Med
Mobile Food Pantry EW Snowden	2	3	1	Med
Mobile Food Pantry First Church of Christ	2	3	1	Med
Mobile Food Pantry Pantego	3	3	1	High
Mt. Gilead Outreach Ministry	2	3	1	Med
Salvation Army (Beaufort)	2	3	1	Med
St. John's Missionary Baptist Church	2	3	1	Med
St. Vincent de Paul - Mother of Mercy	2	3	1	Med
Union Grove Church of Christ	2	3	1	Med
Washington Area Shelter and Soup Kitchen	3	3	1	High
<b><i>Education</i></b>				
Beaufort Hyde Partnership for Children	1	3	1	Med
JC Tayloe Elementary School	1	3	1	Med
Pungo Christian Academy	3	3	1	High
SW Snowden Elementary School	2	3	1	Med
<b><i>Medical (All in Municipalities)</i></b>				
XXXX				
<b><i>Water/Wastewater</i></b>				
Beaufort County Richland Water Treatment Plant	3	3	1	High
Beaufort County Water Dept. - Public Works Dept.	3	3	1	High
BJ's Convenience Store well (Well #1)	2	3	0	High
Dowry Creek Marina well (Well #1)	2	3	0	High
Dowry Creek Wastewater Treatment Plant	2	3	1	Med
New Hope Church of Christ Wastewater Treatment Plant	3	3	1	High
Carolina Fisheries Wastewater Discharge	2	2	1	Med
Castle Hayne Fisheries Wastewater Discharge	2	2	1	Med
Town of Chocowinity System Well (Well #2A)	3	3	0	High
Town of Chocowinity System Well (Well #3)	3	3	0	High

<b>Asset</b>	<b>Exposure Score 0-3</b>	<b>Sensitivity Score 0-3</b>	<b>Adaptive Capacity 0-3</b>	<b>Vulnerability Score 0-6</b>
Washington Mill Wastewater Discharge	3	2	1	Med
Nutrien well (PCS Central Maint Well)	1	3	0	Med
Washington Mill wastewater discharge	3	2	1	Med
Whitley's Mobile Home Park well (Well #2)	2	3	0	High
Whitley's Mobile Home Park well (Well #1)	2	3	0	High
<b>Library (All in Municipalities)</b>				
XXX				
<b>Public Land and Parks</b>				
Blounts Creek Boat Ramp and Fishing Pier	3	2	1	Med
Mason's Landing Boat Ramp	3	2	1	Med
Wright's Creek Boat Ramp	2	2	1	Med
Smith's Creek Boat Ramp	2	2	1	Med
Goose Creek State Park	1	2	1	Low
<b>Transportation</b>				
Roads (Exposure: 2.67; Sensitivity: 23%)	3	1	1	Med
Bridges (Exposure: 2.96; Sensitivity: 63%)	3	3	1	High
Rail Line	2	3	0	High
Bayview Ferry Terminal	2	3	1	Med
Beaufort Area Transit System (BATS)	2	3	1	Med
<b>Natural Resources</b>				
Wetlands (Exposure: 2.73; Sensitivity: 37%)	3	2	1	Med
Streams (Exposure: 2.97; Sensitivity: 63%)	3	3	1	High
Natural Areas (Exposure: 2.44; Sensitivity: 78%)	3	3	1	High
Managed Areas (Exposure: 2.87; Sensitivity)	3	1	1	Med
<b>Hazards</b>				
Underground Storage Tanks (Exposure: 2.33; Sensitivity: 59%)	3	3	1	High
Hazard Waste Sites (Exposure: 2.18; Sensitivity: 100%)	3	3	1	High

## Assess Vulnerability

This assessment explores the vulnerability of critical assets, natural infrastructure, and social systems. Use your team's judgement and any available data to estimate each asset's vulnerability to combined hazards.

### Critical Asset & Natural Infrastructure Vulnerability

Vulnerability of critical assets and natural infrastructure to a hazard is a function of the exposure, sensitivity, and adaptive capacity:

**Exposure** refers to the probability of physical contact between an asset and a hazard.

**Sensitivity** is the degree to which an asset is impacted by a hazard.

**Adaptive Capacity** is the ability of an asset to change its characteristics or behavior in response to a hazard.

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity} - \text{Adaptive Capacity}$$



# RISK AND VULNERABILITY INDEX THRESHOLDS

Community Action Team - Meeting #3

**Hazards:** Flooding, Storm Surge (From Cat 3 Hurricane), and Sea Level Rise

## Data Sources:

- FEMA Coast Storm Model
- Belhaven – 10Yr, 25Yr, and 50Yr Storm Flood Data
- 100Yr, 500Yr Flood Data
- Category 3 Hurricane Storm Surge Data (<3ft, 3-9ft, 9+Ft)
- Sea Level Rise Data (1ft, 2ft, 3ft)
- Hurricane Matthew Road and Bridge Flooding Information
- Pamlico Sound Regional Hazard Mitigation Plan

## Building Infrastructure

**Exposure** (Data: Floodplains (10/25/50/100/500yr /flood water surface elevation) / Storm Surge / Sea Level Rise (SRL) / Historic flood events)

- High: Coastal Flood Risk (FEMA Model) (10Y Floodplain- Belhaven)/9+ft Surge / 1ft SLR
- Medium: 100YR floodplain (25Y-Belhaven) / 3-9 ft Surge/2ft SLR/
- Low: 500 floodplains (50Yr floodplain for Belhaven) />3ft Surge /3ft SLR

## Sensitivity

- High: >66%+ Facilities affected /Needed by the community (critical infrastructure)
- Medium: 33%-66% / Other facilities can be used (Alternatives)
- Low: <33%/Facility not needed to operate

## Adaptive Capacity

- Subjective – need community input
- Social vulnerability index (need for public education,
- Ability to relocate building infrastructure (Ex. From 25yr to 50yr floodplain)
- The ability to raise structure
- Accessibility to residents once moved (SVI)
- Land availability
- Ability to retrofit for flooding (Rise generator/sensitive components)
- Another facility can be used in its place
- Facility is not needed to operate

## Natural Resources (Streams, Wetlands, Managed Areas, Natural Areas)

**Exposure** (Data: Floodplains (10/25/50/100/500yr /flood water surface elevation) / Storm Surge / Sea Level Rise (SRL) / Historic flood events)

- High: Coastal Flood Risk (FEMA Model) (10Y Floodplain- Belhaven)/9+ft Surge / 1ft SLR
- Medium: 100YR floodplain (25Y-Belhaven) / 3-9 ft Surge/2ft SLR/
- Low: 500 floodplains (50Yr floodplain for Belhaven) />3ft Surge /3ft SLR

**Sensitivity** (Inundation from SLR with no ability to migrate or evolve)

- High: 1 Ft / 25ft from structure / 50% effected
- Med: 2 Ft / 50 ft from structure / 25%-50%
- Low: 3+ ft / 100 ft from structure / >25%

### Adaptive Capacity

- Restorative capacity
- Ability to increase flood capacity
- Alternative use capacity (Ex. Park and floodplain)

## Transportation Infrastructure

**Exposure** (Data: Floodplains (25/50/100/500yr flood water surface elevation) / Storm Surge / SRL / Historic flood events)

- High: Coastal Flood Risk (FEMA Model) (10Y Floodplain- Belhaven)/9+ft Surge / 1ft SLR
- Medium: 100YR floodplain (25Y-Belhaven) / 3-9 ft Surge/2ft SLR/
- Low: 500 floodplains (50Yr floodplain for Belhaven) />3ft Surge /3ft SLR

### Sensitivity

- High: >50% of structures effected by natural hazards
- Medium: 25% - 50% effected by natural hazards
- Low: <25% effected by natural hazards

### Adaptive Capacity

- Subjective– need community input
- Social vulnerability index
- Ability to relocate transportation infrastructure (Ex. From 25yr to 50yr floodplain)
- The ability to raise structure (Bridge)
- Ability to retrofit the infrastructure to be more resilient to flooding

## Sewer Infrastructure Utility System Infrastructure (Sewer/Water/Electric/Communications)

**Exposure** (Data: Floodplains (25/50/100/500yr flood water surface elevation) / Storm Surge / SRL / Historic flood events)

- High: Coastal Flood Risk (FEMA Model) (10Y Floodplain- Belhaven) / 9+ft Surge / 1ft SLR
- Medium: 100YR floodplain (25Y floodplain for Belhaven) / 3-9 ft Surge/ 2ft SLR/
- Low: 500Y floodplains (50Yr floodplain for Belhaven) />3ft Surge / 3ft SLR

### **Sensitivity**

- High: >50% of structures effected by natural hazards
- Medium: 25% - 50% effected by natural hazards
- Low: <25% effected by natural hazards

### **Adaptive Capacity**

- Subjective– need community input
- Social vulnerability index
- Ability to relocate utility system infrastructure (Ex. From 25yr to 50yr floodplain)
- The ability to increase capacity
- Ability to retrofit the infrastructure to be more resilient to flooding



# Resilient Coastal Communities Program

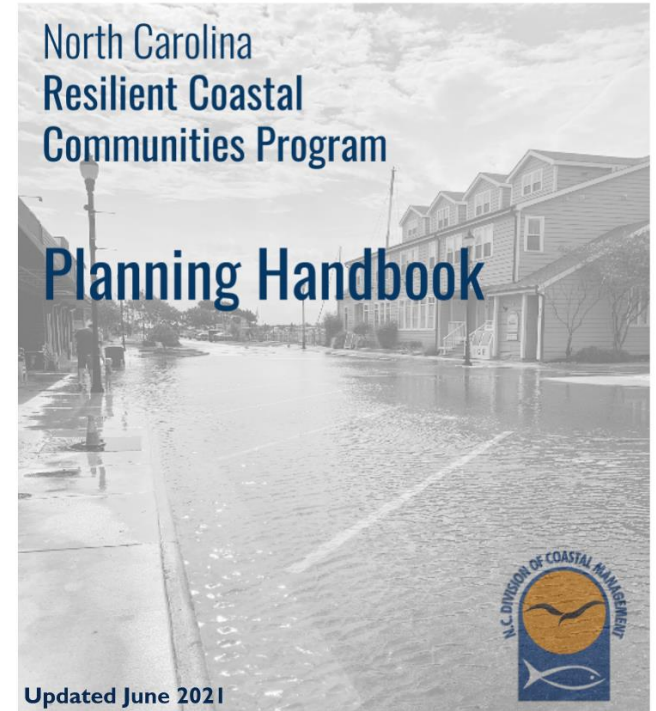
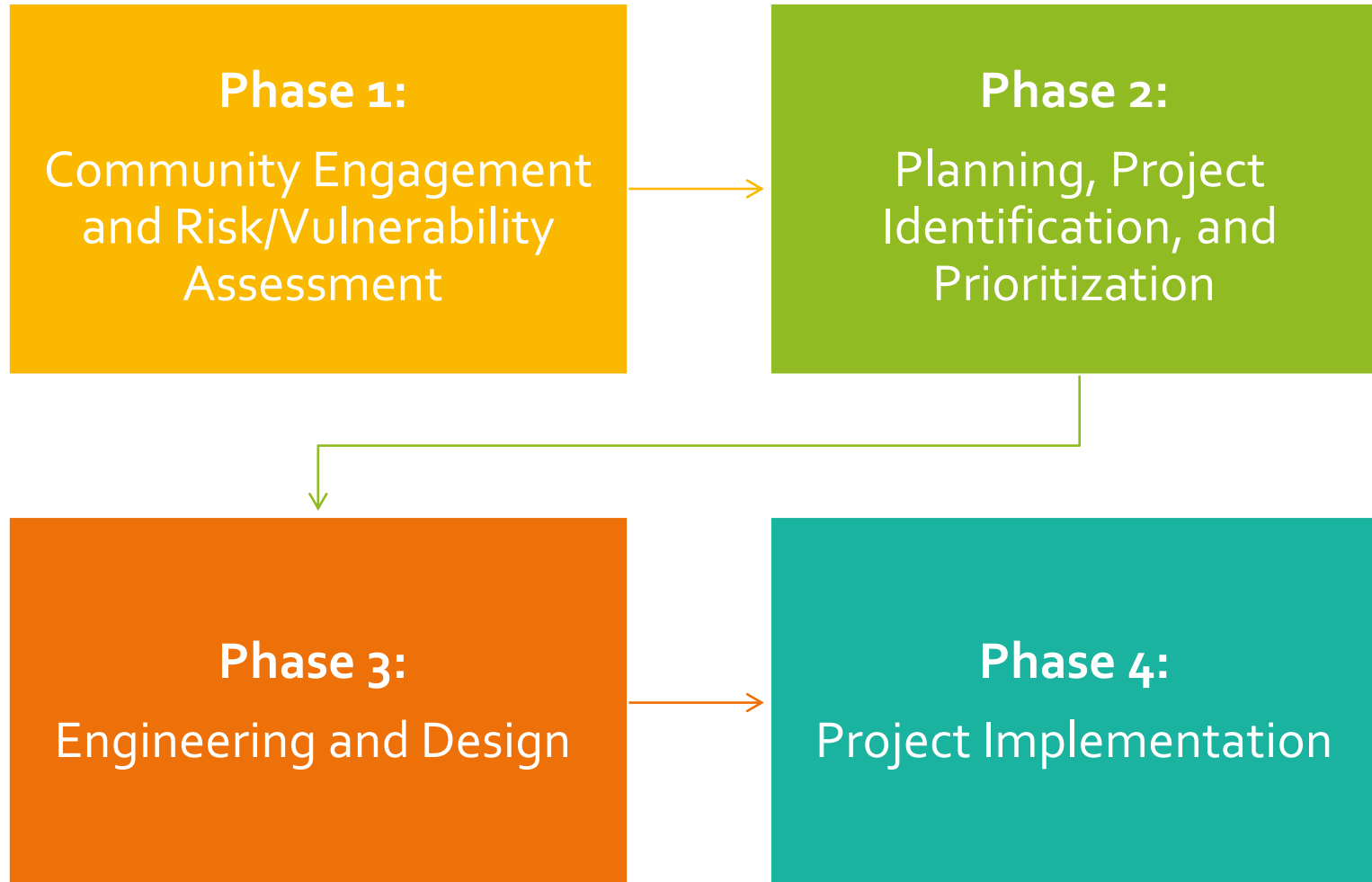
## Beaufort County Community Action Team Meeting #3

### Risk & Vulnerability Assessments

December 1, 2021



# RCCP Phases



# RCCP Phase 1 and 2 Steps

- **Phase 1: Community Engagement and Risk/Vulnerability Assessment**
  - ✓ *Step 1 – Develop a Community Action Team*
  - ✓ *Step 2 – Set Vision and Goals*
  - ✓ *Step 3 – Review Existing Plans and Efforts*
  - ✓ *Step 4 – Develop a Community Engagement Strategy*
  - ✓ *Step 5 – Map Critical Assets and Natural Infrastructure*
  - ★ **Step 6 – Conduct Risk and Vulnerability Assessment**
- **Phase 2: Planning, Project Identification, and Prioritization**
  - Step 1 – Identify a Suite of Potential Solutions
  - Step 2 – Consolidate and Prioritize Projects
  - Step 3 – Develop the Resilience Strategy Document



## **PHASE 1 – STEP 6**

# **RISK & VULNERABILITY ASSESSMENT**

## 6. Risk & Vulnerability Assessment

- A. Identify and Map the Hazards
- B. Assess Vulnerability
- C. Estimate Risk

# 6A. Identify and Map the Hazards

- Review Hazard Mitigation plans
- Document disaster declaration history
- Interview stakeholders about local hazards
- Identify hazards to include in the risk and vulnerability assessment
  - Flooding (rainfall, tidal, riverine)
  - Storm surge
  - Sea level rise (minimum 30-year projection)
- Map geographic extent of hazards

## Tools to identify and map hazards

- NOAA's Storm Events Database
- FEMA's Floodplain Layers
- NOAA's Sea Level Rise Layers
- National Hurricane Center Historic Flood Data
- FEMA Disaster Declarations Database
- NC Emergency Management Digital Elevation Models (DEMs)
- 2020 North Carolina Climate Science Report
- FEMA's Checklist for Vulnerability of Flood-Prone Sites and Buildings
- NC Flood Inundation Mapping and Alert Network (NC Floodplain Mapping Program)
- NC Flood Risk Information System (FRIS)
- Mapping tools: ArcMap (desktop GIS software), ArcGIS online

## 6B. Assess Vulnerability

- **Vulnerability** describes a system's susceptibility to harm or change. Vulnerability is the combined result of exposure, sensitivity, and adaptive or response capacity and, as such, a function of the character, magnitude, and rate of the climate change hazard to which a system is exposed, as well as of non-climatic (social and environmental) characteristics of the system, which determine its sensitivity and adaptive capacity.

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity} - \text{Adaptive Capacity}$$



## 6B. Assess Vulnerability

- **Exposure** refers to the probability of physical contact between an asset and a hazard.
- **Sensitivity** is the degree to which an asset is impacted by a hazard.
- **Adaptation** is the ability of an asset to change its characteristics or behavior in response to a hazard.



## 6B. Assess Vulnerability

- Estimate each asset's vulnerability to combined hazards
- Develop a **Vulnerability Index** with **vulnerability thresholds**
- **Exposure** – Determine overlap between asset locations and hazard impact areas.
- **Sensitivity** – Evaluate degree which an asset is impacted cumulatively by hazards.
- **Adaptive Capacity** – Assess an asset's ability to cumulatively adapt to all hazards.

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity} - \text{Adaptive Capacity}$$

### Assessment Threshold Groups

(Defines thresholds for each asset that falls within the category)

#### Groups

- Building Infrastructure
- Transportation Infrastructure
- Sewer Infrastructure & Utility System Infrastructure  
(Sewer/Water/Electric/Communications)
- Natural Resources (Streams, Wetlands, Managed Areas, Natural Areas)



### Building Infrastructure

- Exposure
  - High: Coastal Flood Risk (FEMA Model) (10yr Floodplain- Belhaven) / 9+ft Surge / 1ft SLR
  - Medium: 100yr floodplain (25yr-Belhaven) / 3-9 ft Surge / 2ft SLR
  - Low: 500yr floodplains (50yr floodplain for Belhaven) / >3ft Surge / 3ft SLR
- Sensitivity (Infrastructure group)
  - High: >66%+ Facilities affected / Needed by the community
  - Medium: 33%-66% / Other facilities can be used (Alternatives)
  - Low: <33% / Facility not needed to operate
- Adaptive Capacity
  - Subjective – need community input
  - Social vulnerability index
  - Ability to relocate building infrastructure (Ex. From 25yr to 50yr floodplain)
  - The ability to raise structure
  - Accessibility to residents once moved (SVI)
  - Land availability
  - Ability to retrofit for flooding (raise generator/sensitive components)
  - Another facility can be used in its place
  - Facility is not needed to operate



### Transportation Infrastructure

- Exposure
  - High: Coastal Flood Risk (FEMA Model) (10yr Floodplain- Belhaven) / 9+ft Surge / 1ft SLR
  - Medium: 100yr floodplain (25yr floodplain for Belhaven) / 3-9 ft Surge / 2ft SLR
  - Low: 500yr floodplains (50yr floodplain for Belhaven) / >3ft Surge / 3ft SLR
- Sensitivity
  - High: >50% of structures affected by natural hazards
  - Medium: 25% - 50% affected by natural hazards
  - Low: <25% affected by natural hazards
- Adaptive Capacity
  - Subjective – need community input
  - Replacement cost
  - Detour length
  - Disruption duration
  - FHWA roadway functional classification (roadways with higher functional classification may cause greater system disruptions if damaged)
  - Evacuation routes
  - Emergency services/freight route
  - Access to food and services (supermarkets, bottled water, prescriptions, batteries, critical goods)
  - Historical repair cost
  - Access to critical areas (roads that provide the only access to critical areas are more significant to the adaptive capacity of larger response systems)



### Sewer Infrastructure & Utility System Infrastructure (Sewer/Water/Electric/Communications)

- Exposure
  - High: Coastal Flood Risk (FEMA Model) (10yr Floodplain- Belhaven) / 9+ft Surge / 1ft SLR
  - Medium: 100yr floodplain (25yr floodplain for Belhaven) / 3-9 ft Surge / 2ft SLR
  - Low: 500yr floodplain (50yr floodplain for Belhaven) / >3ft Surge / 3ft SLR
- Sensitivity
  - High: >50% of structures affected by natural hazards
  - Medium: 25% - 50% affected by natural hazards
  - Low: <25% affected by natural hazards
- Adaptive capacity
  - Subjective– need community input
  - Social vulnerability index
  - Ability to relocate utility infrastructure (Ex. From 25yr to 50yr floodplain)
  - The ability to increase capacity
  - Ability to retrofit infrastructure to be more resilient to flooding



### Natural Resources (Streams, Wetlands, Managed Areas, Natural Areas)

- Exposure
  - High: Coastal Flood Risk (FEMA Model) (10yr Floodplain- Belhaven) / 9+ft Surge / 1ft SLR
  - Medium: 100yr floodplain (25yr floodplain-Belhaven) / 3-9ft Surge / 2ft SLR
  - Low: 500yr floodplains (50yr floodplain for Belhaven) / >3ft Surge / 3ft SLR
- Sensitivity (Inundation from SLR with no ability to migrate or evolve)
  - High: 1 ft / 25ft from structure / 50% affected
  - Med: 2 ft / 50ft from structure / 25%-50%
  - Low: 3+ ft / 100ft from structure / >25%
- Adaptive Capacity
  - Restorative capacity
  - Ability to increase flood capacity
  - Alternative use capacity (Ex. park and floodplain)



# 6B. Assess Vulnerability



## Beaufort County

### CRITICAL ASSET & NATURAL INFRASTRUCTURE VULNERABILITY

Asset	Exposure Score 0-3	Sensitivity Score 0-3	Adaptive Capacity 0-3	Vulnerability Score 0-6
<i>Asset name</i>	<i>0 = no exposure 1 = low 2 = medium 3 = high</i>	<i>0 = no sensitivity 1 = low 2 = medium 3 = high</i>	<i>0 = no adaptive capacity 1 = low 2 = medium 3 = high</i>	<i>0-2 = low 3-4 = medium 5-6 = high</i>

# 6C. Estimate Risk

- Determine what levels of risk call for actions
- Quantitatively estimate risk
- Use Hazard Mitigation Plan risk assessments for building footprints, values, and other data on critical facilities



## Beaufort County

### RISK ESTIMATE

Sector	Number of Critical Assets at Risk	Asset Value
<i>E.g., government facilities, utilities, natural infrastructure</i>	#	\$X,000,000



# 6C. Estimate Risk



## Beaufort County

### RISK ESTIMATE

Data sources used for asset values:

- Beaufort County tax values (buildings)
- Division of Mitigation Services (wetland value per acre, stream value per linear foot)

Sector	Number of Critical Assets at Risk	Asset Value
<i>E.g., government facilities, utilities, natural infrastructure</i>	#	\$X,000,000



# Next Steps

## PHASE 2

### PLANNING, PROJECT IDENTIFICATION & PRIORITIZATION

- **Step 1:** Identify a Suite of Potential Solutions
- **Step 2:** Consolidate and Prioritize Projects



November & December

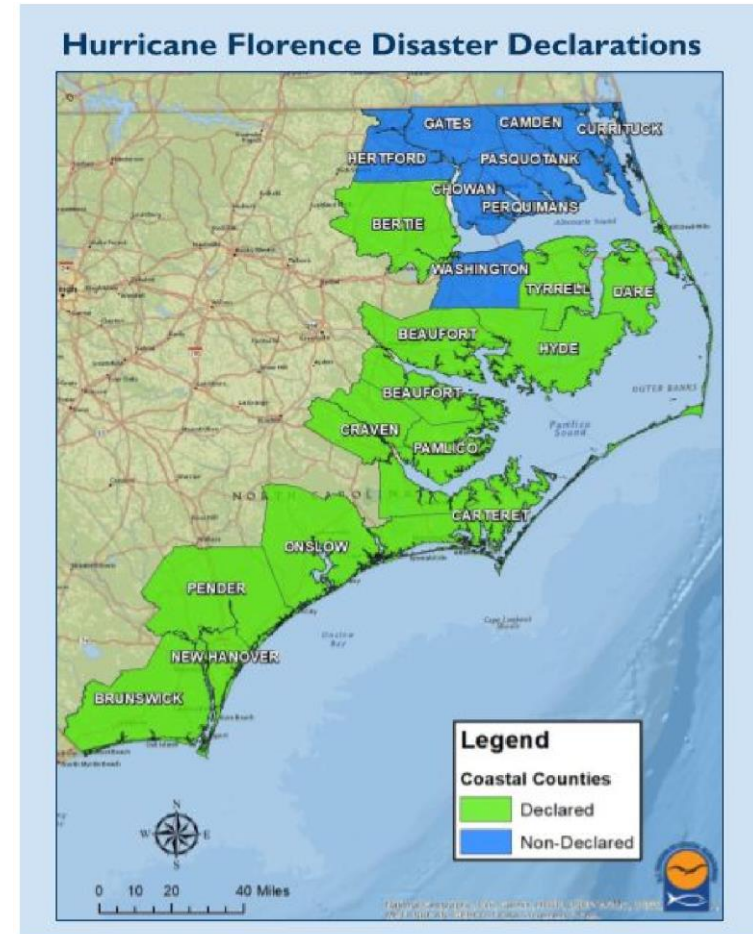


January & February



# 1. Identify a Suite of Potential Solutions

- Brainstorm strategies + consider funding
  - Hard infrastructure
  - Soft nature-based
  - Hybrid options
  - Policy solutions
  - RK&K RCCP Communities – Actions or projects must include at least one natural/nature-based or hybrid option (more desired)



# Resiliency Project Trends - Softening

- Living shorelines and floodplain reconnection
- Intentional inundation
- Removing infrastructure from floodplains



Read Avenue Living Shoreline, Dewey Beach, DE



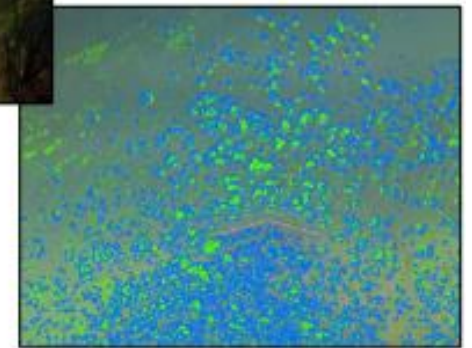
Intentional inundation at Atlanta's Fourth Ward Park



Four Mile Run Wetlands, Alexandria, VA

# Resiliency Project Trends – Seagrass and Culture

- Seagrass transplants and monitoring
- Wave attenuation walls to protect Seagrass
- Protecting Seagrass protects fish population and the fishing culture in eastern North Carolina



Bonner Bridge Wave-break, Oregon Inlet, NC

# Resiliency Project Trends – Response and Hardening

- Emergency repairs, disaster relief, and expedited permitting
- Elevating critical infrastructure and power supply backup
- Shoreline hardening/floodwalls
- Tidal controls (backflow preventers) and pump stations
- Pipe upsizing



Windmill Hill Bulkhead, Alexandria, VA

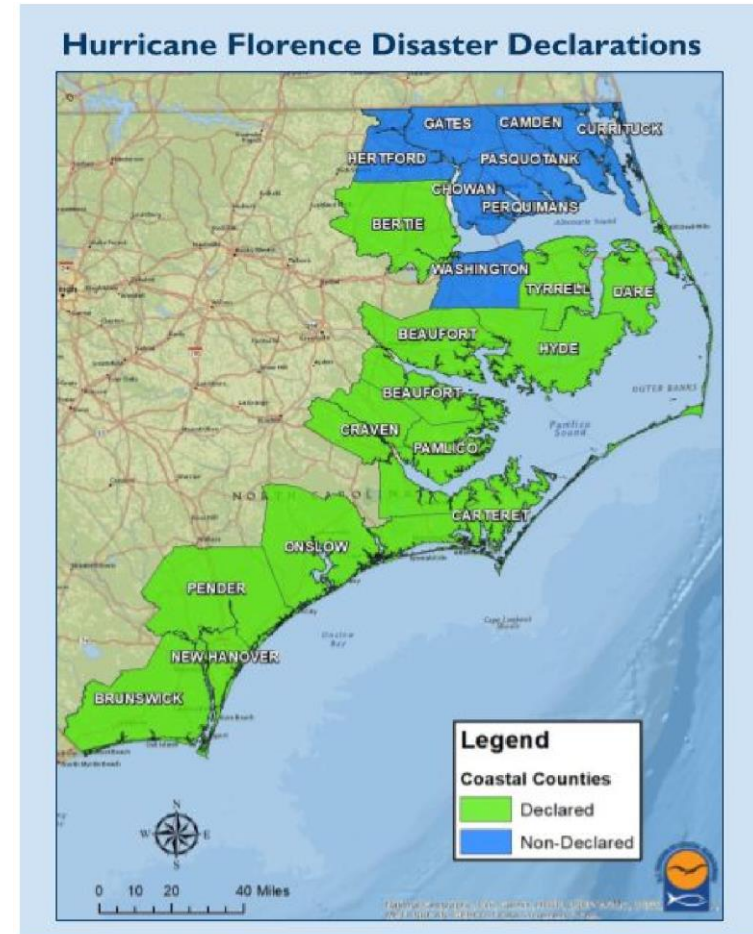


Emergency stream bank repair, DC


# Brainstorm Potential Solutions



- Consider vision, goals, and objectives + survey results + Risk & Vulnerability Assessment
- Begin brainstorming strategies
  - Hard infrastructure
  - Soft nature-based
  - Hybrid options
  - Policy solutions
  - RK&K RCCP Communities –  
Actions or projects must include at least one natural/nature-based or hybrid option (more desired)



## 2. Consolidate & Prioritize Projects

- Evaluate strategies and their feasibility
  - Including cost-benefit estimation
- Consolidate and prioritize strategies (draft)
- Host a public Open House  February
- Finalize strategies



## 2. Consolidate & Prioritize Projects

- Narrow down actions
- Identify at least five (5) priority projects for each community
- Organize project information using this template



Organize information for each project in the portfolio using the following template:

<b>Project Name</b>	<i>Come up with a brief title for the project</i>
<b>Project Description</b>	<i>Describe project, including information gathered during project development</i>
<b>Hazard(s) addressed by project</b>	<i>List hazards specific to this program which impact the project location</i>
<b>Type of Solution</b>	<i>Infrastructure, Plans and policies, Ordinances, Non-regulatory programs, Other (describe)</i>
<b>Project Estimated Cost</b>	<i>Estimate total cost of project</i>
<b>Potential Implementation Funding Sources</b>	<i>Identify potential sources for project/action implementation</i>
<b>Projected Estimated Timeline</b>	<i>Estimate length of time project will take to complete and any expected delays in the timeline</i>
<b>Priority Rating</b>	<i>High, Medium, Low</i>
<b>Project Map</b>	<i>Provide a map of the project site</i>




# 3. Develop a Resiliency Strategy Document

- Vision & Goals
- Community Action Team
- Stakeholder Engagement Strategy
- Review of Existing Local & Regional Efforts
- Risk and Vulnerability Assessment Report
- Project Portfolio
- Additional Files (e.g., mapping, Excel spreadsheets)



# Phase 3: Engineering & Design

- Top Nature-Based/Hybrid Project (1 project per community)
- Phase 3 Application  Anticipated: January-February Opening, Mid-March Deadline
- Approximately \$40k funding per community
  - Consider project scale with available funding





**Thank you for participating in CAT Meeting #3.**





# BEAUFORT COUNTY

## Community Action Team - Meeting #3

### MEETING SUMMARY

WEDNESDAY, DECEMBER 01, 2021, 10:00 AM - 12:00 PM, COUNTY COMMISSIONER' S

MEETING ROOM + VIRTUAL

#### Meeting Purpose:

- To discuss the public survey results, draft hazards mapping, vulnerability thresholds, draft risk and vulnerability assessment, and begin discussion on projects.
- Refer to attached meeting agenda.

#### Attendees:

- Refer to attached meeting sign-in sheet.

#### Materials:

- Refer to attached materials:
  - Public survey results summary document
  - Draft hazards maps
    - Floodplains overlaid with critical assets (FEMA)
    - Sea level rise 1 ft. scenario overlaid with critical assets (NOAA)
    - Potential storm surge with depths (NOAA)
    - Potential storm surge overlaid with critical assets (NOAA)
    - Sea level rise 1 ft. scenario overlaid with natural infrastructure (NOAA)
    - Hurricane Florence storm surge, 2018 (NHC)
  - Draft risk worksheet
  - Vulnerability thresholds document
  - Draft vulnerability worksheet

#### Meeting Discussion:

##### Public survey results

- Results of the public survey were reviewed. Beaufort County had 51 responses.

##### Hazards maps

- Draft hazard maps were reviewed.
- There were no comments on the draft maps.

##### Vulnerability Thresholds

- The vulnerability thresholds were explained.
- Formula: Exposure + Sensitivity – Adaptive Capacity = Vulnerability

- Exposure is more concrete, while there is some subjectivity in determining sensitivity and adaptive capacity which requires input from the community action team.

### Draft Vulnerability Worksheet

- The draft vulnerability worksheet was reviewed.
- There were no comments on the draft vulnerability worksheet.

### Draft Risk Assessment Worksheet

- The draft risk assessment worksheet was reviewed.
- There were no comments on the draft risk assessment worksheet.

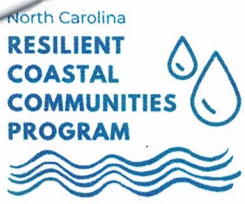
### Project Discussion

- Project types were reviewed including traditional/hard infrastructure, nature based solutions, hybrid solutions, and policy solutions.
- Beaufort County is required to have a minimum of one nature based or hybrid solution, and more than one is desired.
- Current and potential projects were discussed by the Community Action Team.
  - Aurora Industrial Park
  - Flooding at the end of Main Street in Aurora
  - Aurora wants to dredge the creek to allow larger boats in
  - The Washington-Warren Airport has a current grant related to a drainage issue on the runways.
  - The SE corner of Bridge St. and 5<sup>th</sup> St. in Washington, a car wash wants to go in but there are flooding issues at that intersection.
  - Bath is getting a new sewer system.
  - Belhaven, the new housing development where the old hospital was may have flooding potential.
  - The new dry stack marina in Washington across from the bridge.
  - There is a grant being applied for to upgrade Aurora's water and sewer system. The system is very susceptible to flooding. Aurora has to be evacuated more because of water/sewer issues that flooded homes.
  - River Street cable and internet provider is a high priority, because Beaufort County Emergency Management and 911 Communications run off their system.
  - There was a recent acquisition of 24 rental units in Washington. Need affordable housing that is not susceptible to flooding. This also effects employment in the county.
  - For nature based solutions there is watershed scale and neighborhood/site scale. There was a question on which scale we should look at. Ideally we will have projects at both scales.
  - Living shoreline projects are potentials.
  - Stormwater projects are potentials.
  - We can include policy solutions as well.

# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 3  
**Date** Dec. 01, 2021 **Time** 10:00 AM – 12:00 PM **Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Brian Alligood	Beaufort County	County Manager	brian.alligood@co.beaufort.nc.us	
	Christina Smith	Beaufort County	Public Works Director	christina.smith@co.beaufort.nc.us	
	Carlton Gideon	Mid-East Commission	Planner	cgideon@mideastcom.org	Carlton Gideon (online)
	Carnie Hedgpeth	Beaufort County	Beaufort County Emergency Management Director	carnie.hedgpeth@co.beaufort.nc.us	
	Ed Booth	Beaufort County	Commissioner	ed.booth@co.beaufort.nc.us	Ed Booth
	John Rebholz	Beaufort County	Commissioner	john.rebholz@co.beaufort.nc.us	
	Bishop James S. McIntyre Sr.	Cornerstone Family Worship Center	Pastor	pastorcfwc@gmail.com	
	Martyn Johnson	Beaufort County	Economic Development Director	Martyn.johnson@beaufortedc.com	Martyn Johnson online
	Heather Deck	Sound Rivers	Executive Director	heather@soundrivers.org	
	Tom Stroud	NC Estuarium/ Partnership for the Sounds	Deputy Director	tmstroud@embarqmail.com	Tom Stroud (online)
	Dave Loope	Beaufort County Community College	President	dave.loope@beaufortccc.edu	Dave Loope
	Jamie Heath	Mid-East Commission	Contractor	jheath@mideastcom.org	Jamie Heath



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 3  
**Date** Dec. 01, 2021 **Time** 10:00 AM – 12:00 PM **Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Lisa Williams	Mid-East Commission	Contractor	lwilliams@mideastcom.org	Lisa Williams online
	Paige Cureton	RK&K	Contractor	pcureton@rkk.com	
	Tris Ford	RK&K	Contractor	tford@rkk.com	
	Gordon Marsh	RK&K	Contractor	gmarsh@rkk.com	Gordon Marsh
	Tancred Miller	NC DEQ	State/Grant Agency	Tancred.miller@ncdenr.gov	
	Mackenzie Todd	NC DEQ	State/Grant Agency	Mackenzie.todd@ncdenr.gov	Mackenzie Todd
	Sarah Spiegler	NC Sea Grant	Coastal Resilience Specialist	sespiegl@ncsu.edu	
	<del>Sarah Spiegler</del>				Rachel Cove Adrick online
					Susan Squires online
					Jill Holkwell online



**Community Action Team**  
Meeting #4 Materials



# BEAUFORT COUNTY

Community Action Team - Meeting #4

## AGENDA

Wednesday, Dec. 15, 2021, 10:00 AM - 12:00 PM

Location: Beaufort County Commissioners Board Room (in Beaufort County Financial Services Center), 136 W 2nd St. Washington, NC 27889 + Virtual via Zoom

**10:00 – 10:05 AM**

**Welcome/Introductions**

**10:05 – 10:20 AM**

**Resiliency Strategy Framework**

- Discuss strategy areas
- Review strategy types/core approaches and benefits
- Discuss example strategies

**10:20 – 10:40 AM**

**Draft Resiliency Strategies**

- Review community assets with high vulnerability indices
- Review community assets identified by CAT/public survey
- Discuss draft master list of resiliency strategies by type
- **Reference:** Pamlico Sound HMP Actions

**10:40 – 11:10 AM**

**Interactive Exercise**

- Partner to review draft strategies
- Identify your team's top 10 strategies + new/revised strategies
- Report out to group

**11:10 AM - NOON**

**Master Strategy List**

- Discuss results of interactive exercise
- Revise draft master list of resiliency strategies by type
- Discuss next steps

**NOON**

**Adjournment**



Draft Strategy		Related Asset	Strategy Area							Strategy Approach				
#	Strategy Description	Related Community Asset	Policy / Regulatory	Staffing, Funding & Resources	Education & Public Information	Emergency Services	Infrastructure	Nature-Based	Hybrid	Avoid	Accommodate	Protect	Retreat	Build Adaptive Capacity
26.	Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement.		x										x	
27.	Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management.		x										x	
28.	Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests.		x											x
29.	Develop a framework for decision making regarding land protection and restoration strategies based on wetland and habitat vulnerability that would include restoration, protection, and retreat strategies.		x											x
30.	Develop a comprehensive outreach strategy to educate stakeholders about SLR and coastal vulnerability and provide continuing education to affected communities and citizens.		x											x
31.	Identify data gaps and collect necessary data to plan for infrastructure investments that are part of implementation plan for adaptation.				x									
#	Pamlico Hazard Mitigation Plan Strategies	Status Update – In Progress/Complete												
B1	Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions.													
B2	Maintain reciprocal mutual aid agreements with surrounding communities for fire protection and emergency response.													
B3	Annually evaluate adequacy of existing local early warning and emergency response communications equipment and prepare annual capital improvements plans to improve early warning and communication effectiveness before, during, and following disaster events.													
B4	Develop standard protocols for training/ certification of volunteer staff for shelter management, traffic control, first aid, etc., to improve volunteer response capability during and following disaster events, including coordination with American Red Cross personnel on an annual basis													
B5	Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel.													
B6	Provide citizens and visitors with maps of evacuation routes which will facilitate the evacuation of the county in case of a hazardous event. This effort will involve the production of hard copy maps for distribution.													
B7	Continue to monitor and establish programs to maintain continuity of government operations through annual review and update of the Continuity of Operations Plan (COOP).													
B8	Continue to support and participate in the directives of the County Emergency Operations Plan (EOP). The EOP includes evacuation procedures and response to hazards not addressed in this plan such as hazardous materials, petroleum products, hazardous waste, nuclear threat/attack, and civil disorder. The County will review and update the EOP annually to ensure that it coordinates with the most recent NCEM and NCOEMS directives.													

Draft Strategy		Related Asset	Strategy Area							Strategy Approach				
#	Strategy Description	Related Community Asset	Policy / Regulatory	Staffing, Funding & Resources	Education & Public Information	Emergency Services	Infrastructure	Nature-Based	Hybrid	Avoid	Accommodate	Protect	Retreat	Build Adaptive Capacity
B9	Continue to apply for grant funds, allocate local funding, and work with local electric service providers to procure and maintain back-up generators/transfer switches for all critical public facilities, with an emphasis on emergency services facilities, critical water/sewer facilities, and shelter facilities. Evaluate the equipment on a regular basis to assure it continues to meet the needs of the operations occurring at each facility. Backup generators are still needed at the following facilities: Southside High School, S.W. Snowden Elementary School, and John Cotten Tayloe Elementary School.													
B10	Hold an annual public hazard mitigation meeting, attended by the HMPC and participating jurisdictions, to educate the public and elected officials and receive comments about the location of high-risk facilities/development, the jurisdictions' overall vulnerability to natural and man-made hazards, and the jurisdictions' hazards mitigation efforts.													
B11	Maintain the Hazard Mitigation Planning Committee (HMPC) and hold annual HMPC meetings to continue relationship-building and communicate about mitigation measures taking place throughout the community.													
B12	Maintain continual contact/working relationship with electric service providers in the county to address the following: 1) Disaster preparedness techniques (e.g., tree trimming, vegetation planting requirements, pole replacement); 2) Identification of critical electrical facilities needing retrofit or upgrade and map with elevation reference marks; 3) Identification of problem areas and potential solutions; and 4) Communication with county officials during and immediately after a natural hazard event that results in loss of electrical power													
B13	Monitor trees and vegetation on publicly owned property to assure that no property or utility damage will occur as a result of diseased or dying trees or other vegetation. This strategy only applies to the municipal jurisdictions.													
B14	Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to pro-actively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.													
B15	Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans).													
B16	Annually review local floodplain ordinances to provide improved flood protection standards and require freeboard for retrofitting and new construction as required by NC State Building Code. The County will consider establishing a freeboard requirement.													
B17	Maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation.													
B18	Encourage County Commissioners and elected officials of non-CRS communities to participate in the Community Rating System													

Draft Strategy		Related Asset	Strategy Area							Strategy Approach				
#	Strategy Description	Related Community Asset	Policy / Regulatory	Staffing, Funding & Resources	Education & Public Information	Emergency Services	Infrastructure	Nature-Based	Hybrid	Avoid	Accommodate	Protect	Retreat	Build Adaptive Capacity
B19	Continue to work with local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within an SFHA. The county will provide these agencies with brochures documenting the concerns relating to development located within the flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, and heavy rains.													
B20	Make information regarding hazards and development regulations within floodplains available through the following: 1) Ensure that local libraries maintain information relating to flooding and flood protection, 2) Provide a link on the municipal website to FEMA resources addressing flooding and flood protection, evacuation procedures, disaster preparedness, and post-disaster recovery, and 3) Provide website links to relevant hazard mitigation measures.													
B21	Promote national "awareness" weeks (i.e., hurricane preparedness, severe weather preparedness, etc.) through local media. ("Awareness" weeks are listed on the National Weather Service website at <a href="http://www.nws.noaa.gov/os/severeweather/severewx.cal.shtml">http://www.nws.noaa.gov/os/severeweather/severewx.cal.shtml</a> )													
B22	Educate the general public to the importance of weather alert radios and systems that can operate on alternative power and can provide up-to-the-moment information regarding locations of severe storms and possible tornadoes													
B23	Maintain a Hazardous Material Action Plan that addresses the proper containment of spills, etc. This effort will be coordinated with the county LEPC.													
B24	Monitor natural and man-made drainage structures to ensure they are clear and functioning properly; prioritize needed drainage projects and review funding alternatives annually.													
B25	Continue to coordinate annually with the NC Forestry Division to address the threat of wildfire throughout the County. These efforts will involve posting of the daily fire risk present within the County on the County website daily. Additionally, the County will distribute and make information available regarding County methods for mitigating fire hazards.													
B26	Maintain Debris Removal and Monitoring Services Contracts for post-disaster response. These services should focus on preparing documentation necessary to ensure full reimbursement of cost associated with community cleanup and immediate infrastructure restoration.													
B27	Work to implement all strategies outlined within the Hurricane Matthew Resilient Redevelopment Plan.													
#	Community Ideas and Strategies													

Draft Strategy		Related Asset	Strategy Area							Strategy Approach				
#	Strategy Description	Related Community Asset	Policy / Regulatory	Staffing, Funding & Resources	Education & Public Information	Emergency Services	Infrastructure	Nature-Based	Hybrid	Avoid	Accommodate	Protect	Retreat	Build Adaptive Capacity

**Beaufort County High Risk Assets**

- Beaufort County Courthouse and Jail
- Beaufort County Social Services
- Macedonia Church of Christ
- Mobile Food Pantry Pantego
- Washington Area Shelter and Soup Kitchen
- Pungo Christian Academy
- Beaufort County Richland Water Treatment Plant
- Beaufort County Water Dept. - Public Works Dept.
- New Hope Church of Christ Wastewater Treatment Plant
- BJ's Convenience Store Well (Well #1)
- Dowry Creek Marina Well (Well #1)
- Town of Chocowinity System Well (Well #2A)
- Town of Chocowinity System Well (Well #3)
- Whitley's Mobile Home Park Well (Well #2)
- Whitley's Mobile Home Park Well (Well #1)
- Bridges
- Rail Line
- Steams
- Natural Areas
- Underground Storage Tanks
- Hazard Waste Sites

## 6. ADAPTATION STRATEGIES

Generally, adaptation means adjusting to new conditions and taking steps to mitigate, manage, and avoid the worst possible consequences of the effects of SLR and coastal hazards. Adaptation strategies can be actions to prepare for SLR and coastal hazards in a specific location, such as raising structures out of flood-prone areas or building dikes to keep water out of low-lying areas. Adaptation strategies can also include planning efforts to avoid placement of new infrastructure in vulnerable areas. Additionally, building the capacity to adapt can also serve as a strategy. This can include increasing the availability of data, technical expertise, funding, regulations, coordination, public support, etc. that will allow for selection and implementation of adaptation strategies.

Proactive SLR/coastal hazard planning and incorporation of SLR scenarios into plans for new development, redevelopment, and capital projects not only allows the County to build resiliency in the short-term, but also minimizes the need for more costly upgrades in the future. It can also increase the expected lifespan of infrastructure and support sustainability of natural resources and agriculture.

Strategies presented herein are intended to provide guidance and recommendations to QACO staff for implementation at the County level. Some strategies are more prescriptive than others with the intention that any recommendations will ultimately be developed by the County for implementation. Adaptation planning and implementation plans should be adjusted and improved as more information becomes available.

Adaptation strategies are often grouped into the following categories:

1. **Avoid** – Avoidance strategies seek to limit new development or infrastructure in vulnerable areas.
2. **Accommodate** – Accommodate strategies acknowledge the long-term effects of SLR and coastal hazards, while implementing short-term measures to maintain the existing use of a resource. These strategies decrease the risks of SLR without using potentially more costly protection strategies.
3. **Protect** – Protection adaptation strategies focus on protecting land from inundation or storm-induced flooding through construction of larger, longer-lasting projects such as building levees or raising elevations of roadways and other utilities.
4. **Retreat** – Retreat adaptation strategies allow for natural shore migration through land conservation and planned relocation of structures and other infrastructure.
5. **Build Adaptive Capacity** – The strategy of building adaptive capacity is not a solution in itself but is critically important to provide the data and knowledge to inform the aforementioned adaptation strategies. Communities with more capacity to adapt to SLR and coastal flooding are able to react quickly and make informed decisions.
6. **No Action** – The no-action strategy is the default strategy for communities that do not proactively plan for SLR and coastal flooding. This un-planned retreat results in loss of habitat and infrastructure that are imminent or have already occurred, leaving few viable options for adaptation. This adaptation strategy is not discussed further in this document and is not recommended herein for any identified vulnerable resources.

The following are adaptation strategies that can be used Countywide:

## Avoid

- Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable.
- Allow coastal wetlands to migrate landward to provide habitat and natural buffer to coastal storms.
- Set up processes for transfer of development rights, conservation easements, and/or setback requirements.

## Accommodate

- Provide regulatory incentives that encourage SLR and coastal flooding adaptation and allow for innovative projects.
- Encourage elevation of habitable structures above the base flood elevation plus SLR and/or encourage flood-proofing of vulnerable structures.
- Incorporate development standards and regulations that are more stringent than current regulations and that allow for SLR, such as additional freeboard requirements for new construction and/or redevelopment.
- Foster pilot projects that demonstrate the effectiveness of adaptation actions of agricultural lands affected by SLR and coastal flooding through conversion to tidal marsh systems.
- Create redundancy for at risk infrastructure and emergency services

## Protect

- Designate critical shoreline zones for adaptation action and evaluate projects such as living shorelines, thin layer dredge disposal on tidal marshes, and beach nourishment that help to preserve a static shoreline in critical areas.
- Require all infrastructure project planning to incorporate SLR.
- Consider the use of levees, dikes, floodwalls, flood gates, tide gates, and other structural means to protect vulnerable areas.
- Identify and preserve areas for potential wetland migration.
- Flood-proof infrastructure

## Retreat

- Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement.
- Evaluate the relocation or buy out potential of structures and infrastructure in vulnerable areas.
- Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management.

## Build Adaptive Capacity

- Engage broad public participation in adaptation decisions.
- Improve coordination of permit decisions for adaptation projects among federal, state and local officials.

- Create new partnerships to increase resources for research and development of adaptation options, such as with adjacent Counties, non-government organizations (NGOs), local universities, and state/federal agencies.
- Conduct a comprehensive inventory of funding mechanisms, regulations and policies to remove barriers that prohibit opportunities for SLR and coastal hazard adaptation.
- Consider cost-sharing projects with state and federal agencies, such as SHA, that are mutually beneficial in increasing resiliency for resources with common interests.
- Develop a framework for decision making regarding land protection and restoration strategies based on wetland and habitat vulnerability that would include restoration, protection, and retreat strategies.
- Evaluate the benefits and risks of permitting privately-owned coastal impoundments and evaluate procedures for inspection and maintenance of such impoundments.
- Develop a comprehensive outreach strategy to educate stakeholders about SLR and coastal vulnerability and provide continuing education to affected communities and citizens.
- Install tide gauges and salinity observation stations to monitor changes over time.
- Encourage FEMA to incorporate SLR into their flood models and mapping.
- Develop additional datasets to assess vulnerability of SLR and coastal flooding.
- Identify data gaps and collect necessary data to plan for infrastructure investments that are part of implementation plan for adaptation.
- Improve understanding of impacts to adjacent properties from adaptation actions.
- Provide technical assistance to NGOs, local governments, business owners, and residents.
- Perform an assessment and analysis of funding options for adaptation measures.
- Develop a plan for prioritization of adaptation actions.
- Plan early for SLR and increased coastal flooding.
- Develop a training budget for County employees to receive continued training and understand the best available science and technology for decision making.
- Employ FEMA Community Rating System (CRS) activities

## 7. RECOMMENDED ADAPTATION STRATEGIES

The impacts discussed in the Vulnerability Assessment from SLR and coastal hazards will not be experienced all at once in the years 2050 or 2100. Adaptation and increasing resiliency needs to be an ongoing effort to combat impacts that are being seen and felt incrementally. Many of the data gaps identified and recommended additional evaluation highlight the need for planning, building adaptive capacity, and incorporating adaptation strategies. This Vulnerability Assessment has compiled a large amount of data but additional site-specific or resource-specific data may be needed before adaptation measures can be implemented in a particular location or for a particular resource.

Avoid, accommodate, retreat, protect, and build adaptive capacity strategies can be undertaken simultaneously to meet the goals of reducing vulnerability to SLR and coastal flooding and increasing resiliency of County resources. It is important to assess and monitor adaptation strategies over time and update longer-term plans to incorporate lessons learned, new data, changing public perceptions, and reflect changing conditions.

Short-term action strategies address the immediate needs of the County to build resiliency and protect against SLR and coastal flooding. These are typically strategies to either provide temporary protection of resources or planning activities for more permanent protection. Short-term action strategies should include evaluation of regulatory changes for development, flood proofing of existing resources, incorporation of SLR in planning for future capital projects, and continued efforts to build adaptive capacity.

Medium-term action strategies begin to implement short-term planning studies and increase the level of protection in the County. Long-term strategies aim to create more permanent solutions and resiliency to achieve lasting protection throughout the County. Monitoring and assessment of previously implemented strategies should be continued for medium- and long-term strategies and adjustments made as new data becomes available. Lessons learned should continually be evaluated and incorporated into planning and implementation of revised strategies. Building adaptive capacity should continue long-term.

Table 46, Table 47, and Table 48 provide recommended short-term, medium-term, and long-term adaptation strategies for public safety and infrastructure resources respectively and Table 49, Table 50, and Table 51 provide recommended short-term, medium-term, and long-term adaptation strategies for natural resources and land use respectively.

**TABLE 46: PUBLIC SAFETY AND INFRASTRUCTURE SHORT -TERM ADAPTATION STRATEGIES**

<b>AVOID</b>	<b>ACCOMODATE</b>	<b>PROTECT</b>	<b>RETREAT</b>	<b>BUILD ADAPTIVE CAPACITY</b>
<ul style="list-style-type: none"> <li>• Increase building set-back distances</li> <li>• Identify opportunities for voluntary conservation easements</li> <li>• Create elevated County review procedures for projects in vulnerable areas</li> <li>• Evaluate process for transfer of development rights</li> <li>• Coordinate with private utility companies to incorporate SLR</li> <li>• Encourage FEMA to update Flood Insurance Rate Maps (FIRMs) to include SLR and re-map riverine flooding with SLR effects</li> <li>• Encourage FEMA to update FIRMs to include impacts to storm surge modeling based on SLR</li> </ul>	<ul style="list-style-type: none"> <li>• Improve emergency evacuation plans based on SLR projections</li> <li>• Evaluate boat transportation emergency routes to areas isolated by inundation</li> <li>• Flood-proof at-risk structures</li> <li>• Evaluate regulatory incentives that encourage SLR and coastal flooding adaptation</li> <li>• Evaluate mobile capabilities and mutual aid backup of emergency services</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate feasibility of levees and other structural measures to protect vulnerable areas</li> <li>• Identify targeted areas to be protected</li> <li>• Evaluate and determine regulatory elevations for vulnerable areas</li> <li>• Coordinate SLR adaptation with SHA</li> <li>• Evaluate elevation of critical component elevations of wastewater and water treatment/ transmission facilities</li> <li>• Coordinate development and Capital Improvement plans to address as many affected resources as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Identify areas of high vulnerability</li> <li>• Evaluate relocation potential of structures and infrastructure in vulnerable areas</li> <li>• Evaluate feasibility of land acquisition of vulnerable parcels</li> <li>• Purchase frequently flooded areas and remove structures</li> </ul>	<ul style="list-style-type: none"> <li>• Improve coordination with Federal, State, and Local officials</li> <li>• Create new partnerships to increase resources for research and development of adaptation options</li> <li>• Conduct comprehensive inventory of funding mechanisms, regulations, and policies to remove barriers to SLR adaptation</li> <li>• Provide technical assistance to local governments, business owners, and residents</li> <li>• Develop a prioritization plan of adaptation actions</li> <li>• Evaluate socio-economic impact of SLR</li> <li>• Participate in FEMA’s Community Rating System and employ CRS activities</li> </ul>

**TABLE 47: PUBLIC SAFETY AND INFRASTRUCTURE MEDIUM -TERM ADAPTATION STRATEGIES**

AVOID	ACCOMODATE	PROTECT	RETREAT	BUILD ADAPTIVE CAPACITY
<ul style="list-style-type: none"> <li>• Implement conservation easements</li> <li>• Monitor set-back requirements</li> <li>• Limit or prohibit new infrastructure in vulnerable areas</li> <li>• Implement transfer of development rights</li> <li>• Require private utilities to build new infrastructure outside of vulnerable areas</li> <li>• Incorporate new studies from FEMA and updated FIRMs</li> </ul>	<ul style="list-style-type: none"> <li>• Develop plans for mobilization of emergency management services</li> <li>• Require additional freeboard of new homes above the base flood elevation</li> <li>• Incorporate regulatory incentives for innovative projects that adapt to SLR and coastal flooding</li> <li>• Improve boat access for emergency evacuation services</li> </ul>	<ul style="list-style-type: none"> <li>• Require roads to be elevated to provide access to new development and targeted protection areas</li> <li>• Require new development to protect against regulatory elevations in vulnerable areas</li> <li>• Evaluate impacts to adjacent properties from adaptation actions</li> <li>• Coordinate elevation of evacuation routes/ bridges with SHA</li> <li>• Retrofit wastewater and water treatment/ transmission facilities as needed</li> <li>• Elevate wastewater manholes above anticipated SLR and flood elevations to prevent inundation</li> </ul>	<ul style="list-style-type: none"> <li>• Create a special funding mechanism for purchase of frequently flooded structures</li> <li>• Purchase frequently flooded areas and remove structures</li> <li>• Implement rolling easements</li> </ul>	<ul style="list-style-type: none"> <li>• Engage public participation in adaptation decisions</li> <li>• Implement cost-sharing projects with State and Federal agencies</li> <li>• Update Multi-Jurisdictional Hazard Mitigation Plan, Floodplain Management Plan, Zoning Ordinance, Comprehensive Plan, and Capital Improvement Plan to address SLR</li> <li>• Continue FEMA’s CRS program and employ CRS activities</li> <li>• Identify grant opportunities to incorporate SLR adaptation projects</li> </ul>

**TABLE 48: PUBLIC SAFETY AND INFRASTRUCTURE LONG -TERM ADAPTATION STRATEGIES**

AVOID	ACCOMODATE	PROTECT	RETREAT	BUILD ADAPTIVE CAPACITY
<ul style="list-style-type: none"> <li>• Continue monitoring set-back compliance</li> <li>• Monitor conservation easements</li> <li>• Continue limiting or prohibiting new resources in vulnerable areas</li> <li>• Monitor transfer of development rights procedures and adjust as needed</li> </ul>	<ul style="list-style-type: none"> <li>• Construct new infrastructure projects above the vulnerable elevation</li> <li>• Monitor SLR and coastal flooding effects on infrastructure and adjust regulatory requirements</li> <li>• Continue monitoring regulatory incentives for projects incorporating SLR</li> </ul>	<ul style="list-style-type: none"> <li>• Elevate roadways in targeted protection areas</li> <li>• Retrofit wastewater and water treatment facilities as needed for protection against inundation</li> <li>• Adjust adaptation actions to protect adjacent properties</li> <li>• Coordinate elevation of evacuation routes/ bridges with SHA</li> </ul>	<ul style="list-style-type: none"> <li>• Purchase frequently flooded areas and remove structures</li> <li>• Monitor rolling easement compliance</li> <li>• Remove structures that prevent shoreline movement</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate adaptive capacity and adapt as necessary</li> <li>• Employ FEMA CRS activities</li> </ul>

**TABLE 49: NATURAL RESOURCES AND LAND USE SHORT -TERM ADAPTATION STRATEGIES**

<b>AVOID</b>	<b>ACCOMODATE</b>	<b>PROTECT</b>	<b>RETREAT</b>	<b>BUILD ADAPTIVE CAPACITY</b>
<ul style="list-style-type: none"> <li>• Identify opportunities for voluntary conservation easements</li> <li>• Evaluate changes to zoning</li> </ul>	<ul style="list-style-type: none"> <li>• Install salinity observation stations to monitor changes to freshwater resources over time</li> <li>• Evaluate potential crop changes for agricultural areas such as aquaculture</li> </ul>	<ul style="list-style-type: none"> <li>• Identify beaches with high erosion rates</li> <li>• Evaluate living shoreline protection</li> <li>• Identify potential wetland migration areas</li> </ul>	<ul style="list-style-type: none"> <li>• Identify areas of high vulnerability</li> <li>• Identify land conservation areas and protect with easements</li> </ul>	<ul style="list-style-type: none"> <li>• Improve coordination with Federal, State, and Local officials and identify conflicting regulatory requirements</li> <li>• Create new partnerships to increase resources for research and development of adaptation options</li> <li>• Develop framework for decision making regarding land protection and restoration strategies</li> <li>• Evaluate socio-economic impact of SLR</li> </ul>

**TABLE 50: NATURAL RESOURCES AND LAND USE MEDIUM -TERM ADAPTATION STRATEGIES**

<b>AVOID</b>	<b>ACCOMODATE</b>	<b>PROTECT</b>	<b>RETREAT</b>	<b>BUILD ADAPTIVE CAPACITY</b>
<ul style="list-style-type: none"> <li>• Implement conservation easements</li> <li>• Allow coastal wetlands to migrate landward</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor conversion of freshwater wetlands and agricultural land to salt water wetland</li> </ul>	<ul style="list-style-type: none"> <li>• Replenish beaches</li> <li>• Preserve wetland migration areas</li> <li>• Coordinate sand supply from State or Federal dredging projects for reuse</li> </ul>	<ul style="list-style-type: none"> <li>• Create new land conservation areas</li> </ul>	<ul style="list-style-type: none"> <li>• Implement cost-sharing projects with State and Federal agencies</li> <li>• Encourage DNR to continually evaluate and update Critical Area</li> <li>• Identify grant opportunities to incorporate SLR adaptation projects</li> </ul>

**TABLE 51: NATURAL RESOURCES AND LAND USE LONG -TERM ADAPTATION STRATEGIES**

<b>AVOID</b>	<b>ACCOMODATE</b>	<b>PROTECT</b>	<b>RETREAT</b>	<b>BUILD ADAPTIVE CAPACITY</b>
<ul style="list-style-type: none"> <li>• Monitor coastal wetlands and enhance as needed</li> <li>• Monitor conservation easements</li> </ul>	<ul style="list-style-type: none"> <li>• Enhance conversion of freshwater wetlands and agricultural lands to saltwater wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor wetland migration and identify/ preserve additional wetland migration areas</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor land conservation areas and reassess as needed</li> </ul>	<ul style="list-style-type: none"> <li>• Reassess County’s adaptive capacity and adjust as needed</li> </ul>

## 8. IMPLEMENTATION PLAN

Implementation of the recommended adaptation strategies can best be achieved at the County level through more stringent regulatory requirements and revision of planning documents to incorporate the impacts of SLR and coastal flooding scenarios. The recommended adaptation strategies in Section 6 are intended to be somewhat broad in nature so that they were not unnecessarily prescriptive. However, since specific actions are not proposed herein the County will need to decide which strategies may work best in the County based on funding, political support, socio-economics, regulatory environment, and County agency organization and objectives. For example, the recommendation to “identify targeted protection areas” is an important recommendation since protection of all County resources is not economically feasible, but will require the County to determine how to best allocate funding to protect those areas most critical to the livelihood of the County residents.

The following identifies implementation opportunities through incorporation of SLR and coastal flooding scenarios into county planning and regulatory documents.

### Data Collection to Fill Data Gaps

This report has identified the following data gaps that will help the County plan and update strategies and implementation of projects to build resiliency and protection against SLR and coastal storms:

- First floor building elevations
- Bridge locations and deck elevations
- Road centerline elevations
- Storm drain invert elevations (including outfalls)
- Critical component elevations of wastewater and water treatment facilities
- Locations of private wells
- Locations of septic fields and systems
- Upland forests
- Beaches and dunes
- Saltwater vs. freshwater wetlands
- Piers and boat ramps

These data will be important when prioritizing adaptation strategies, assessing potential projects, allocating funds, and designing and implementing future projects.

### Multi-Jurisdictional Hazard Mitigation Plan

The QACO Multi-Jurisdictional Hazard Mitigation Plan (2012-2017) currently does not address the effects of SLR. Understanding the effects of SLR on hazard mitigation will be important in order for the County to coordinate hazard response; update mitigation goals, objectives, and related actions; and implement hazard mitigation policies, programs, and projects. Incorporating SLR scenarios into mitigation planning will help to protect public safety and property, incorporate cost-savings activities and projects, permit access to federal funding for SLR related projects, and promote effective recovery post-disaster.

SLR should be incorporated into the next revision to properly define the Hazard Identification and Risk Assessment (HIRA), identify mitigation goals, and update execution and maintenance plans for flooding

and hurricanes as well as address the effects of SLR on emergency services and emergency evacuation routes. Adaptive management implementation projects to reduce vulnerability to SPR that are included in the report should be listed in the plan to project the potential for FEMA support/funding for these projects.

## Floodplain Management Ordinance

The QACO floodplain management ordinance incorporates regulations to protect the public health, safety, and general welfare of the community. The statement of purpose includes “meeting” the community participation requirements of the National Flood Insurance Program (NFIP) as set forth in the Code of Federal Regulations (CFR). The floodplain regulations apply to all special flood hazard areas (SFHA) within the jurisdiction of QACO. While the SFHA as shown on the FEMA maps generally encompass the SLR scenarios presented herein, the SFHAs themselves do not incorporate SLR. As sea levels continue to rise, the SFHAs will become incrementally outdated.

The floodplain management ordinance can be modified to incorporate SLR specifically, or through requirements that exceed FEMA’s minimum standards that will ultimately protect against SLR. For example, QACO has identified the flood protection elevation as the base flood elevation plus two (2) feet of freeboard, which is more stringent than FEMA’s minimum requirement of one (1) foot of freeboard. With SLR projections of two (2) to four (4) feet between 2050 and 2100, the flood protection elevation may need to be reevaluated from time to time as actual SLR is monitored.

Additional requirements and/or more-stringent standards should be evaluated with regards to floodplain setbacks, substantial improvements of structures in SFHAs (including repair of substantial damage), and/or building location requirements as it relates to tidal elevations and/or anticipated SLR elevations. These and other more-stringent regulations will help the County accumulate points towards the Community Rating System (CRS) with FEMA. Protecting against future SLR will also build resiliency in today’s storm events.

## Zoning and Subdivision Regulations

QACO Zoning and Subdivision Regulations should be evaluated for comprehensive changes to zoning districts to account for SLR and coastal hazards. Long-range land use plans are the logical place to start adaptation planning and zoning codes can be the strongest potential SLR adaptation regulatory tools. In areas vulnerable to SLR the creation of special districts with restrictive zoning may be needed to begin the orderly disinvestment of those zones over time.

Evaluation of permitted uses by district is recommended, particularly the Countryside District that generally lies within the Critical Area. This may result in permitted uses being revised to conditional uses, or conditional uses being revised to non-permitted uses, to allow the County authority to make informed decisions whether or not to permit uses that will add infrastructure to vulnerable areas.

Increasing setback distances from tidal wetlands will also be an effective tool to build resiliency in mixed-use, commercial, light industrial, and residential uses. Setback distances should be assessed for all districts to evaluate SLR and vulnerable coastal buffers.

Zoning within the areas vulnerable to SLR and coastal flooding, including within FEMA’s effective floodplain could have a requirement for minimum lot sizes or land use to reduce the number of vulnerable structures. This will also contribute to scoring criteria under the CRS.

## Comprehensive Plan

A Comprehensive Plan is an advisory document and should be reviewed and revised as change occurs to cover new challenges. The Queen Anne's County Comprehensive Plan (2010) contains the blueprint for the future development and preservation of the County and the plan is the policy foundation upon which the County is built. Comprehensive plans are not law, however the statutes that require their preparation mandate that all zoning or land use laws must be updated in accordance with the plan to prevent the enactment of arbitrary regulation and ensure the public welfare is being served through legislation implementing the goals of the community.

The Comprehensive Plan expresses long-range goals and objectives of the County and can recommend land uses. This is typically a precursor to changes in Zoning. Without accommodations for SLR and related coastal hazards, many of the coastal areas will not be able to sustain build-out scenarios without putting people and property at risk.

Changes to the Comprehensive Plan may include revisions to ultimate land uses to account for areas vulnerable to SLR and coastal hazards. SLR and coastal hazards have the potential to affect many of the elements of the plan including, but not limited to; land use, sensitive areas, water resources, priority preservation areas, historic and cultural preservation, County/Town planning framework, economic development and tourism, and community facilities and transportation.

## Capital Improvement Plan

County departments typically recommend an annual capital budget while the County Commissioners approve the budget while considering the priorities established by a long-term plan, typically 5, 10, or 20 years. Planning for SLR should be incorporated into all applicable capital improvement design projects leading to design, as well as long-term plans and budgets. Many of these projects are large-scale projects with long design life expectancies. Incorporating SLR will not only build resiliency into future projects, but will provide a cost savings compared to retrofitting a project prior to the end of its useful life expectancy.

This assessment report identifies roads, bridges, wastewater facilities, water facilities, and other potential capital projects that could be affected by SLR and changing coastal hazards. As these impacted resources are scheduled for upgrades, retrofits, and/or replacement, consideration of SLR should be evaluated.

Capital improvement plans also typically identify options for financing the plan. QACO should continue to assess means to finance projects through grants, cost-sharing, and other alternative funding options. Climate change and disaster-related resiliency grants are becoming more available as climate change and SLR are more understood. The U.S. Department of Urban Development (HUD), FEMA, NOAA, NRCS, and other agencies are providing funding for resilient housing, infrastructure, agricultural, and natural resource projects, especially to communities impacted by major disasters.

Cost-sharing can provide mutual benefits from a wide array of partners. Coordination and agreements with SHA may allow roadway projects to incorporate SLR that otherwise may not have addressed vulnerable areas. Sediments dredged from navigation channels in the Chesapeake Bay are many times deposited in upland confined disposal sites. Partnerships can be developed to use dredged spoils to replenish beaches to protect against erosion and/or to elevate tidal marshes to accommodate SLR without inundation of the resource. This can also save money by reducing transportation costs of dredged material. The County may want to evaluate the benefits of a Regional Sediment Management Plan and

Beneficial Use of Dredged Materials in cooperation with the USACE and State of Maryland to plan for, identify, and coordinate potential opportunities.

## Prioritization of Adaptive Management Strategies

Due to the magnitude of the recommendations, the diversity in vulnerabilities, the diversity of resources that are vulnerable, and the realization of funding limitations and capacity – a prioritization strategy should be developed for implementation opportunities. There are a number of means to prioritize adaptive management strategies. Strategies can vary by resource, threat, level of risk, cost of implementation, community, funding, multi-purpose/functions, number of benefactors, or other approaches. The process of setting priorities should be part of the evaluation of how recommendations are incorporated into the various county regulations and plans. Initial prioritized strategies should include staff resources to update plans with recommendations and complete the non-capital opportunities first such as updated mapping, outreach, communication, and avoidance strategies to reduce new vulnerabilities.

## Funding

As noted in the Capital Plan Section, there are traditional funding mechanisms available for implementation projects. These funds are limited and there is extensive competition for the funds. Strategies to pursue these funds and position for high potential for reward should be part of an implementation plan. The need to generate additional funding resources is evident and a strategy to develop those alternative programs is vital to an implementation plan. Many communities are looking into creative fee structures, taxes, public/private partnerships, incentive programs, and the like for needed funding.

## Public Engagement

























Many of the recommended adaptation strategies and implementation plan recommendations include actions pertaining to private land and/or use of public funds through private citizen taxes, each with their own opinions of SLR and each with their own interests in mind. Additionally, much of the County's population resides in upland areas that are relatively unimpeded by SLR and coastal hazards. It is important that adaptation strategies are as equitable as possible across the County. It is also important to gain public buy-in to adaptation strategies. This can be accomplished through dissemination of information, hearing and addressing concerns, and implementing unbiased solutions. Town meetings, charrettes, questionnaires, surveys, flyers, and/or other methods of communication can be used to solicit feedback, identify concerns, and implement solutions. Any engagement efforts need to consider use of language and images that the lay public can understand and relate to personally to be effective. Engaging resources to assist in this communication may be beneficial as part of an implementation plan.

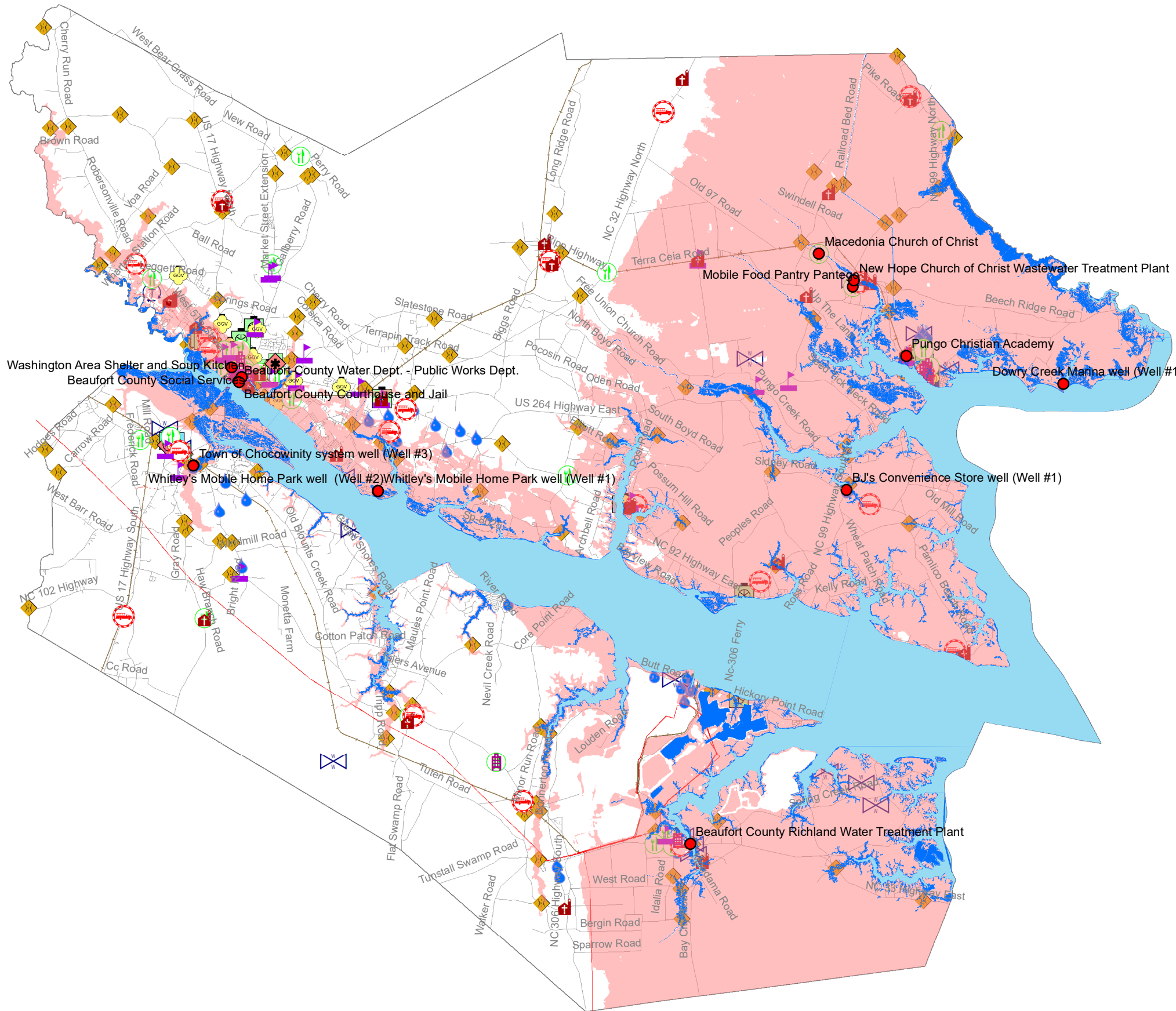
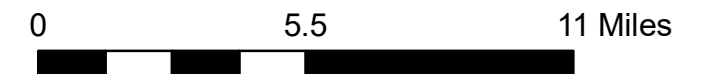
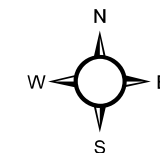
## Timeline

The timeline to implement adaptation strategies to build resiliency is largely dependent on available funding and capacity of QACO staff. Short-term recommendations identified herein should be implemented to the extent practicable now and as planning, permitting, design, and construction progresses within the County. As County planning documents are updated, SLR and coastal hazard adaptation strategies should be incorporated. Medium-term and long-term recommendations should be incorporated as feasible and identified in the prioritization of adaptive management strategies plan.

# NC Resilient Coastal Communities Program: Beaufort County Critical Assets with 1 ft. Sea Level Rise Scenario Area & Potential Storm Surge for Cat. 3 Event Area

## Legend

-  Surface Water
-  1 ft. Sea Level Rise Scenario Area
-  Cat. 3 Event Potential Storm Surge Area
-  High Vulnerability Critical Assets
-  Community Buildings and Facilities (88.9% in potential SS area)
-  Community Response Partners (71.4% in potential SS area)
-  Duke Transmission Easements (56.5% in potential SS area)
-  Education (45% in potential SS area)
-  Emergency Management (None in potential SS area)
-  Fire and EMS Stations (50% in potential SS area)
-  Food (65.5% in potential SS area)
-  Government Services (71.4% in potential SS area)
-  Law Enforcement/Security (50% in potential SS area)
-  Libraries (100% in potential SS area)
-  Medical (72.2% in potential SS area)
-  Public Water Supply Wells (51.4% in potential SS area)
-  Public Works Offices (83.3% in potential SS area)
-  Solid Waste (100% in potential SS area)
-  Transportation Facilities (50% in potential SS area)
-  Wastewater Discharge Permits (60% in potential SS area)
-  Bridges (43.7% in potential SS area)
-  Rail
-  Road Network (62.4% in potential SS area)
-  Beaufort County





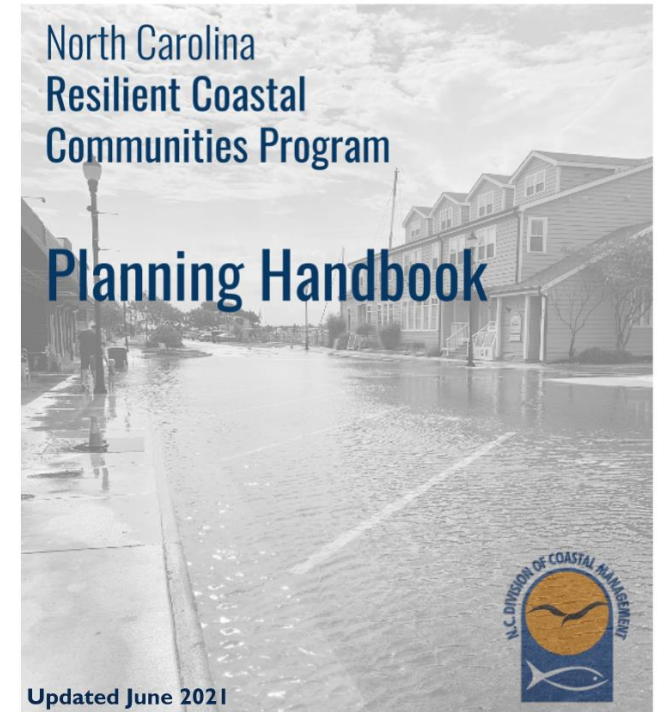
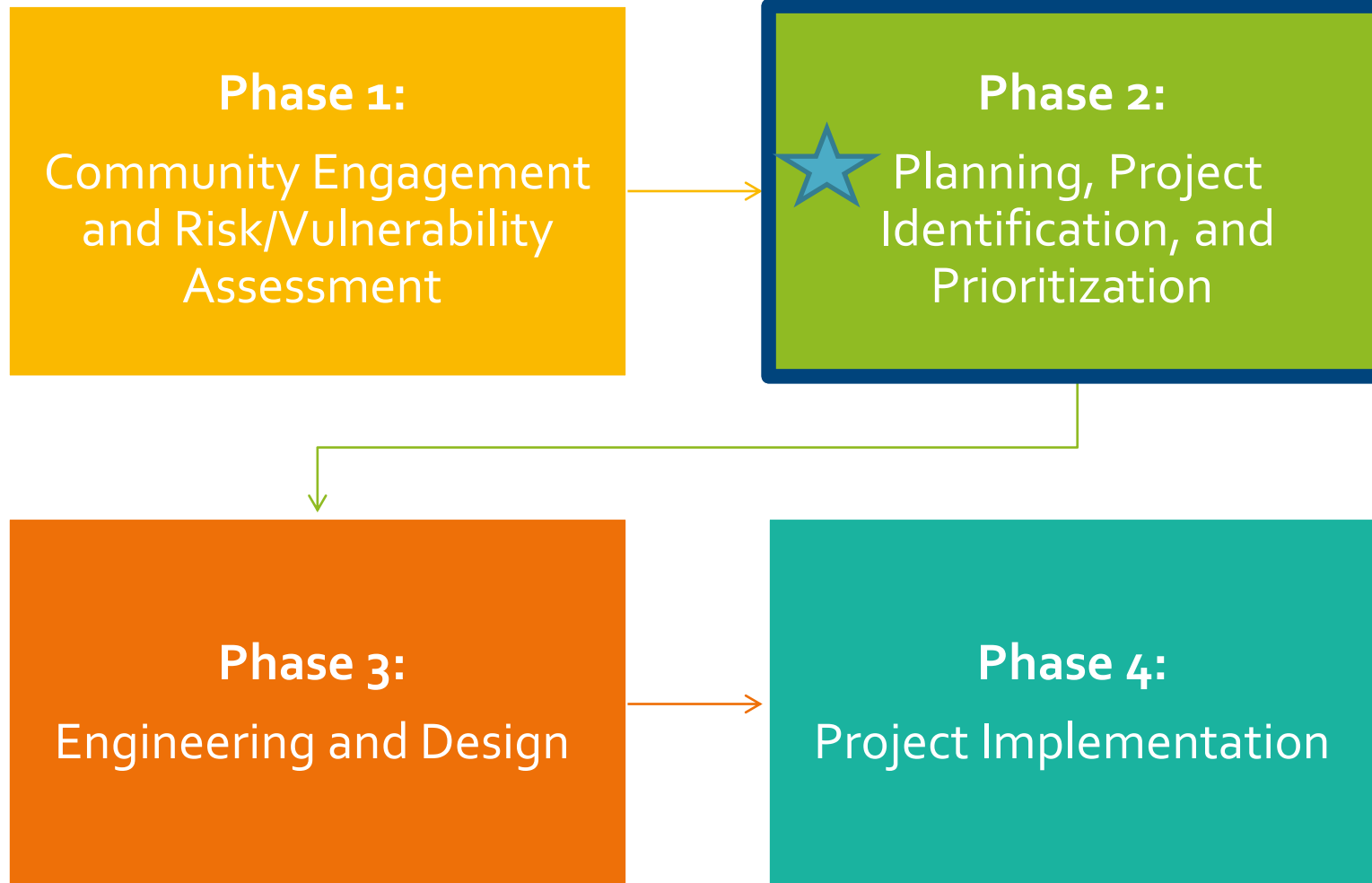
# Resilient Coastal Communities Program

## Community Action Team Meeting #4 Identify a Suite of Potential Solutions

December 15-16, 2021



# RCCP Phases



# RCCP Phase 1 and 2 Steps

## ■ Phase 1: Community Engagement and Risk/Vulnerability Assessment

- ✓ *Step 1 – Develop a Community Action Team*
- ✓ *Step 2 – Set Vision and Goals*
- ✓ *Step 3 – Review Existing Plans and Efforts*
- ✓ *Step 4 – Develop a Community Engagement Strategy*
- ✓ *Step 5 – Map Critical Assets and Natural Infrastructure*
- ✓ *Step 6 – Conduct Risk and Vulnerability Assessment*

## ■ Phase 2: Planning, Project Identification, and Prioritization

- ★ **Step 1 – Identify a Suite of Potential Solutions**
  - Step 2 – Consolidate and Prioritize Projects
  - Step 3 – Develop the Resilience Strategy Document



# CAT Meeting #4 Agenda

- **Welcome/Introductions**
- **Resiliency Strategy Framework**
  - *Strategy areas, approaches, and examples*
- **Draft Resiliency Strategies**
  - *Community assets, draft master list of strategies, Pamlico HMP Actions*
- **Interactive Exercise**
  - *Review strategies, identify top 10 strategies, report out*
- **Master Strategy List**
  - *Discuss results, revise draft master list of strategies, discuss next steps*
- **Adjournment**



## **PHASE 2**

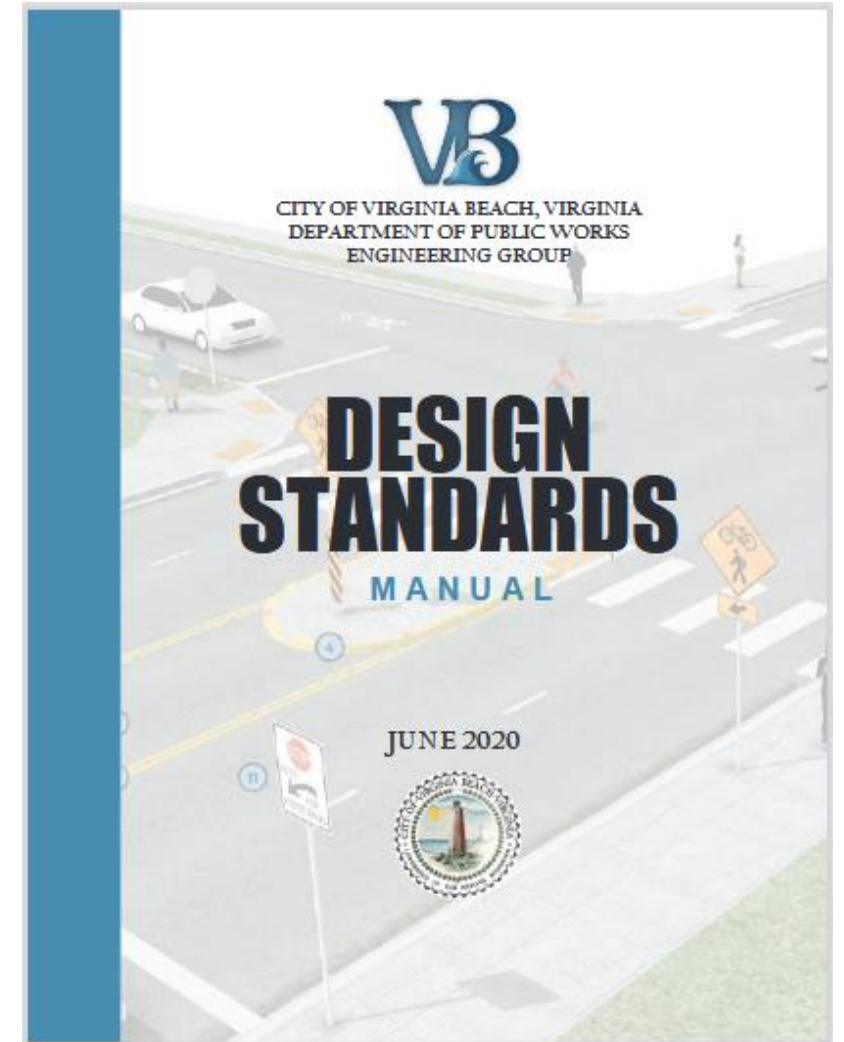
# **PLANNING, PROJECT IDENTIFICATION & PRIORITIZATION**

# Strategy Area – Policy / Regulatory

- Zoning\* and Subdivision Regulations – evaluate zoning regulations for comprehensive changes to zoning districts to account for SLR and coastal hazards (*\*municipalities*)
  - Create special districts with restrictive zoning
  - Evaluate permitted uses by district
  - Increase setback distances from tidally inundated areas
  - Include impervious surface limitations
  - Consider minimum lot size requirement in floodplains
  - Examine existing regs to ensure they are not limiting innovative techniques
- Floodplain Management Ordinance – consider additional requirements and/or more-stringent standards for floodplain setbacks, substantial improvement in special flood hazard areas, building location requirements

# Strategy Area – Policy / Regulatory

- Changes to Design Standards and Building Codes
  - Maryland Climate Ready Action Boundary (CRAB)
  - VA Beach evaluating increased design rainfall intensity
  - FDOT – SLR must be considered in design
- Buy back programs for floodplain restoration
  - City of Charlotte Floodplain Buyout Program
  - NJ Blue Acres Floodplain Acquisitions
- Implement a stormwater utility
  - Washington, NC
  - Greenville, NC



# Strategy Area – Staffing, Funding & Resources

- Increase maintenance staff
- Identify secured funding
- Setup partnerships with local, state, and federal agencies and non-government organizations



# Strategy Area – Education & Public Information


- Public outreach and education
- Public art projects reflecting historical floods
- Story project that solicits local knowledge to create stories around historical flooding events
- Low Impact Development (LID) centerpiece project in downtown
- Install education placards along boardwalk or established walkways

Enter Information Set Ground Level **3 Flood Zone Results**

6072 RIVER CRESCENT 23505  
Resident Type: Just Looking

According to FEMA, your property is in the X-Shaded (moderate-risk) Flood Zone.

Based on the elevation of your property above Mean Sea Level, this image shows anticipated flood heights expected to occur for your home based on a storm with a 1-in-500 annual chance.



Flood Area 1.25 ft

# Strategy Area – Education & Public Information

- Publish Quarterly Bulletin with Water Bill
- Partner with community events (fairs and festivals, farmers market)
- Engage local media to highlight resiliency projects or ideas
- Develop a permanent Community Action Team to build on resiliency gains within the communities



# Strategy Area – Infrastructure

- Elevate critical infrastructure and power supply backup
- Shoreline hardening/floodwalls
- Tidal controls (backflow preventers) and pump stations
- Pipe upsizing



Windmill Hill Bulkhead, Alexandria, VA



Emergency stream bank repair, DC

# Resiliency Project Trends – Response and Hardening

- Emergency repairs, disaster relief, and expedited permitting
- Elevating critical infrastructure and power supply backup
- Shoreline hardening/floodwalls
- Tidal controls (backflow preventers) and pump stations
- Pipe upsizing



Windmill Hill Bulkhead, Alexandria, VA



Emergency stream bank repair, DC

# Strategy Area – Nature-Based Solutions

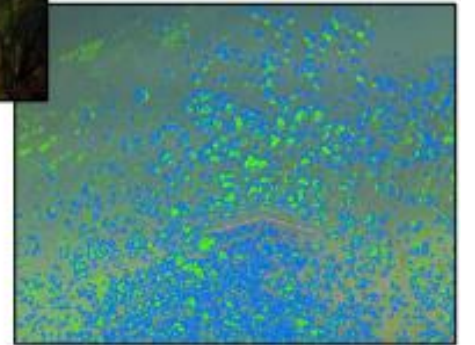
- Protect and enhance natural protective functions
- NNBS are a suite of strategies that consider or enhance natural landscape's ability
- Natural infrastructure is green infrastructure
- Protect shorelines using living shorelines and oyster beds
- Habitat uplift through plantings or removing invasive species



Four Mile Run Wetlands, Alexandria, VA

# Resiliency Project Trends – Seagrass

- Seagrass transplants and monitoring
- Wave attenuation walls to protect Seagrass
- Protecting Seagrass protects fish population and the fishing culture in eastern North Carolina



Bonner Bridge Wave-break, Oregon Inlet, NC

# Strategy Area – Hybrid

- Hybrid solutions incorporate grey infrastructure with natural infrastructure
- Repurpose upland property to attenuate peak flow using stormwater devices
- Convert existing ditches to bio-swales
- Dual use recreational and flood attenuation areas

# Resiliency Project Trends - Softening

- Living shorelines and floodplain reconnection
- Intentional inundation
- Removing infrastructure from floodplains



Read Avenue Living Shoreline, Dewey Beach, DE



Intentional inundation at Atlanta's Fourth Ward Park

# Strategy Approach

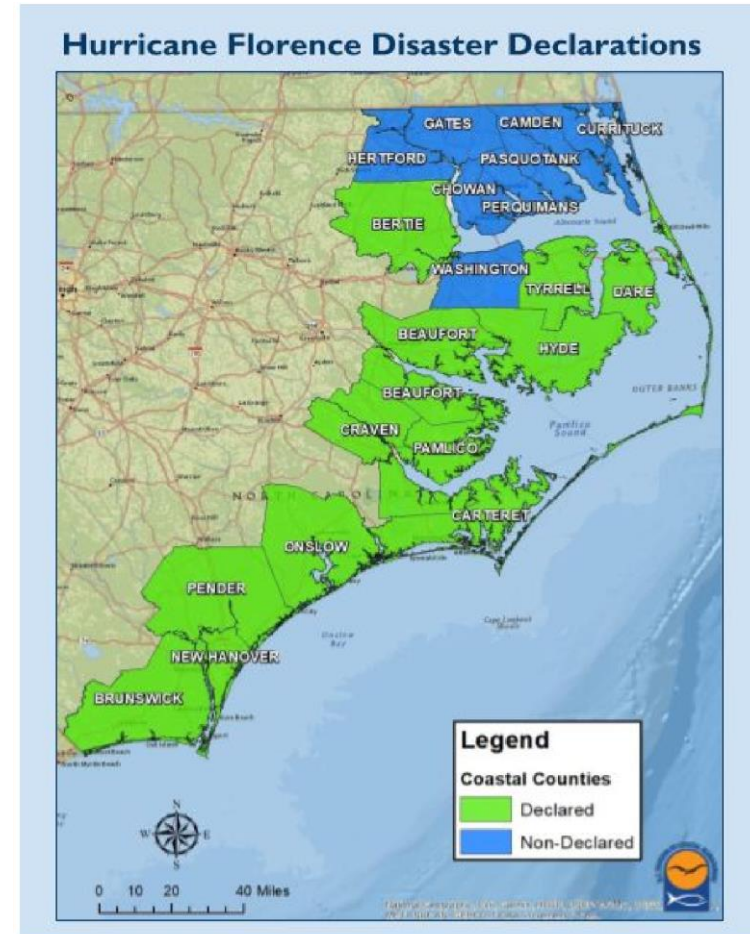
Approach	Description
<b>Avoid</b>	Avoidance strategies seek to limit new development or infrastructure in vulnerable areas.
<b>Accommodate</b>	Accommodate strategies acknowledge the long-term effects of SLR and coastal hazards, while implementing short-term measures to maintain the existing use of a resource. These strategies decrease the risks of SLR without using potentially more costly protection strategies.
<b>Protect</b>	Protection adaptation strategies focus on protecting land from inundation or storm-induced flooding through construction of larger, longer-lasting projects such as building levees or raising elevations of roadways and other utilities.
<b>Retreat</b>	Retreat adaptation strategies allow for natural shore migration through land conservation and planned relocation of structures and other infrastructure.
<b>Build Adaptive Capacity</b>	The strategy of building adaptive capacity is not a solution in itself but is critically important to provide the data and knowledge to inform the aforementioned adaptation strategies. Communities with more capacity to adapt to SLR and coastal flooding are able to react quickly and make informed decisions.
<b>No Action</b>	The no-action strategy is the default strategy for communities that do not proactively plan for SLR and coastal flooding. This un-planned retreat results in loss of habitat and infrastructure that are imminent or have already occurred, leaving few viable options for adaptation.

*Source: Queen Anne's County Sea Level Rise and Coastal Vulnerability Assessment and Implementation Plan, 64*

# 1. Brainstorm a Suite of Potential Solutions



- Consider vision, goals, and objectives + survey results + Risk & Vulnerability Assessment
- Review draft strategy worksheets
  - Hard infrastructure
  - Soft nature-based
  - Hybrid options
  - Policy solutions
  - RK&K RCCP Communities – Actions or projects must include at least one natural/nature-based or hybrid option (more desired)







# Next Steps

## PHASE 2

### PLANNING, PROJECT IDENTIFICATION & PRIORITIZATION





- **Step 1:** Identify a Suite of Potential Solutions
- **Step 2:** Consolidate and Prioritize Projects



January & February



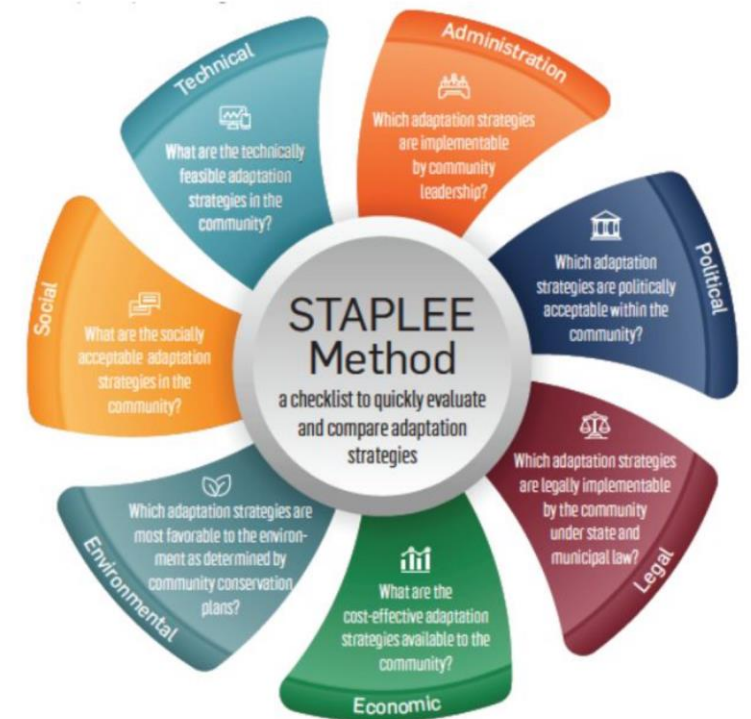
## 2. Consolidate & Prioritize Projects

- Evaluate strategies and their feasibility  January
  - Including cost-benefit estimation
- Consolidate and prioritize strategies (draft)
- Host a public Open House  February
- Finalize strategies

Benefit	
High	Action would have a significant impact on risk reduction
Medium	Action would have an impact on risk reduction
Low	Long-term benefits are difficult to quantify in the short term

Cost	
High	Existing funding is not adequate
Medium	Requires budget reappropriation or amendment
Low	Funding available under the existing budget



## 2. Consolidate & Prioritize Projects

- Narrow down actions
- Identify at least five (5) priority projects for each community
- Organize project information using this template



Organize information for each project in the portfolio using the following template:

<b>Project Name</b>	<i>Come up with a brief title for the project</i>
<b>Project Description</b>	<i>Describe project, including information gathered during project development</i>
<b>Hazard(s) addressed by project</b>	<i>List hazards specific to this program which impact the project location</i>
<b>Type of Solution</b>	<i>Infrastructure, Plans and policies, Ordinances, Non-regulatory programs, Other (describe)</i>
<b>Project Estimated Cost</b>	<i>Estimate total cost of project</i>
<b>Potential Implementation Funding Sources</b>	<i>Identify potential sources for project/action implementation</i>
<b>Projected Estimated Timeline</b>	<i>Estimate length of time project will take to complete and any expected delays in the timeline</i>
<b>Priority Rating</b>	<i>High, Medium, Low</i>
<b>Project Map</b>	<i>Provide a map of the project site</i>




# 3. Develop a Resiliency Strategy Document

- Vision & Goals
- Community Action Team
- Stakeholder Engagement Strategy
- Review of Existing Local & Regional Efforts
- Risk and Vulnerability Assessment Report
- Project Portfolio
- Additional Files (e.g., mapping, Excel spreadsheets)



# APPLICATION: Phase 3: Engineering & Design

- Top Nature-Based/Hybrid Project (1 project per community)
- Phase 3 Application  Anticipated: January-February Opening, Mid-March Deadline
- Approximately \$40k funding per community
  - Consider project scale with available funding





**Thank you for participating in CAT Meeting #4.**





# BEAUFORT COUNTY

## Community Action Team - Meeting #4

### MEETING SUMMARY

**WEDNESDAY, DECEMBER 15, 2021, 10:00 AM - 12:00 PM, COUNTY COMMISSIONER' S MEETING ROOM + VIRTUAL**

#### Meeting Purpose:

- To discuss the resiliency strategy framework and draft resiliency strategies, including holding an interactive exercise.
- Refer to attached meeting agenda.

#### Attendees:

- Refer to attached meeting sign-in sheet.

#### Materials:

- Refer to attached materials:
  - Draft hazards maps
    - High risk and other critical assets overlaid with Cat. 3 event potential storm surge and 1 ft. sea level rise.
  - Draft resiliency strategies spreadsheet
  - Queen Anne County Resiliency Plan example strategies

#### Meeting Discussion:

##### Resiliency Strategy Framework

- The resiliency strategy framework was reviewed. Strategy areas included policy/regulatory, staffing, funding & resources, education & public information, emergency services, infrastructure, and hybrid. Strategy approaches included avoid, accommodate, protect, retreat, and build adaptive capacity. Example strategies and projects were reviewed as well.

##### Draft Resiliency Strategies

- The draft resiliency strategies spreadsheet for Beaufort County was reviewed. The team held a discussion while reviewing the draft strategies.
- There are already drainage districts in the county that should be considered in drainage ditch maintenance strategies. These districts are taxed for maintenance.
- We should look at possible changes to the subdivision and mobile home park ordinances.
- The stormwater ordinance currently mirrors the state. The electric and building codes mirror the state also.
- Highway 33 should be considered as an evacuation route in addition to US 264.
- #12 regarding the shoreline along Butt Rd. should be moved to Aurora's program spreadsheet.
- The Nature Conservancy should be looked at for living shoreline examples.
- The county already has a Floodplain Ordinance.

- The county had previously discussed adding a freeboard requirement to the Floodplain Ordinance, but it did not pass the board.
- A strategy can be added to encourage, but not mandate, items such as freeboard. An education component could be worked into the permitting process.
- The focus from the county has been more on elevation rather than avoidance or acquisition.
- The county discussed participation in the Community Rating System. However, they decided not to because of the cost, and the fact that the expenditure would only benefit those with flood insurance rather than all residents.
- Each team member was provided a copy of the draft resiliency strategies spreadsheet, which served as their worksheet for the interactive exercise.
- Each person was asked to select their top 10 strategies, and if applicable, to select any strategies which should be changed or removed from the list. Team members shared their top 10 strategies with the group.

### **Pamlico Sound Hazard Mitigation Plan Strategies**

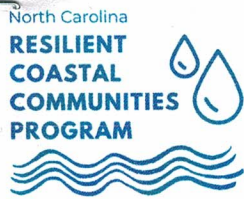
- The Beaufort County strategies from the 2020 update of the Pamlico Sound Regional Hazard Mitigation Plan were reviewed. The team selected strategy B1 (coordinating all development/planning decisions with CAMA Land Use Plan) to move up into the draft resiliency strategies for the Resilient Coastal Communities Program.
- The team had a brief discussion on the current status of strategies from the Pamlico Sound Hazard Mitigation Plan. Carnie will follow up with a few details on the implementation status of related strategies.
- We noted that Southside High School is the fourth shelter and used only if the other three are full. Southside does not have a generator yet. Transportation to shelters is provided.
- We noted that the Mid-East Commission maintains current listings of severe repetitive loss properties and conducts outreach activities to homeowners on behalf of Beaufort County.
- The Emergency Operations Plan is reviewed internally on an annual basis.
- The Emergency Evacuation Plan may need updating with partnership policy to acquire more assets and have a plan in place for who does what where. Maps of evacuation routes would be great to include with hard copies for distribution as well.

### **High Risk Critical Assets / Hazards Map**

- The list of identified high risk critical assets were reviewed. The Pamlico Beach Fire Dept. and Northside High School should be added as high risk. The Macedonia Church of Christ should be labeled as a food pantry.
- The draft hazards map with high risk critical assets labeled was reviewed. The Queen Anne County Resiliency Plan example was provided as a resource.
- The team was given time to brainstorm additional projects and add them to their worksheet.
- Flooding on Hwy 17 Bus. South should be added. The Hwy 17 Bus. (Bridge St.) / US-264 (5<sup>th</sup> St.) intersection is a particular issue. Hwy 17 Bypass is shut down for heavy wind and rain, so Hwy 17 Bus. becomes a vital evacuation route.
- The bridge which floods on Cherry Run Rd. should be added (identified in Hurricane Matthew Resilient Redevelopment Plan).

### Master Strategy List

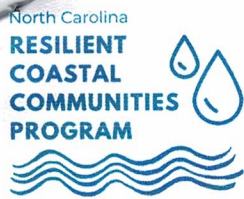
- Feedback from the community action team's discussion, as well as feedback from collected worksheets, will be incorporated into Beaufort County's draft Master Strategy List.



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 4  
**Date** Dec. 15, 2021 **Time** 10:00 AM – 12:00 PM **Location** Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Brian Alligood	Beaufort County	County Manager	brian.alligood@co.beaufort.nc.us	<i>Brian Alligood</i>
	Christina Smith	Beaufort County	Public Works Director	christina.smith@co.beaufort.nc.us	
	Carlton Gideon	Mid-East Commission	Planner	cgideon@mideastcom.org	<i>JCG</i>
	Carnie Hedgepeth	Beaufort County	Beaufort County Emergency Management Director	carnie.hedgepeth@co.beaufort.nc.us	<i>CH</i>
	Ed Booth	Beaufort County	Commissioner	ed.booth@co.beaufort.nc.us	
	John Rebholz	Beaufort County	Commissioner	john.rebholz@co.beaufort.nc.us	<i>John Rebholz</i>
	Bishop James S. McIntyre Sr.	Cornerstone Family Worship Center	Pastor	pastorcfwc@gmail.com	
	Martyn Johnson	Beaufort County	Economic Development Director	Martyn.johnson@beaufortedc.com	<i>Martyn (online)</i>
	Heather Deck	Sound Rivers	Executive Director	heather@soundrivers.org	
	Jill Howell	Sound Rivers	Pamlico-Tar Riverkeeper	jill@soundrivers.org	<i>Jill (online)</i>
	Tom Stroud	NC Estuarium/ Partnership for the Sounds	Deputy Director	tmstroud@embarqmail.com	
	Dave Loope	Beaufort County Community College	President	dave.loope@beaufortccc.edu	



# MEETING SIGN-IN SHEET

**Title** Beaufort County Community Action Team – Meeting 4

**Date** Dec. 15, 2021

**Time** 10:00 AM – 12:00 PM

**Location**

Beaufort County Commissioners Board Room

✓	Name	Organization	Title/Role	Email	Signature
	Jamie Heath	Mid-East Commission	Contractor	jheath@mideastcom.org	<i>Jamie Heath</i>
	Lisa Williams	Mid-East Commission	Contractor	lwilliams@mideastcom.org	
	Paige Cureton	RK&K	Contractor	pcureton@rkk.com	
	Trent Cormier	RK&K	Contractor	tcormier@rkk.com	<i>Trent Cormier</i>
	Gordon Marsh	RK&K	Contractor	gmarsh@rkk.com	<i>Gordon Marsh</i>
	Tancred Miller	NC DEQ	State/Grant Agency	Tancred.miller@ncdenr.gov	
	Mackenzie Todd	NC DEQ	State/Grant Agency	Mackenzie.todd@ncdenr.gov	<i>Mackenzie (online)</i>
	Rachel Love-Adrick	NC DEQ	State/Grant Agency	Rachel.love-adrick@ncdenr.gov	
	Sarah Spiegler	NC Sea Grant	Coastal Resilience Specialist	sespiegl@ncsu.edu	<i>Sarah (online)</i>
	<i>Sam Singleton Mid East</i>				<i>X Sam Singleton</i>
	<i>Sue Squires BC ED</i>				<i>Sue (online)</i>



**Community Action Team**  
Meeting #5 Materials



# BEAUFORT COUNTY

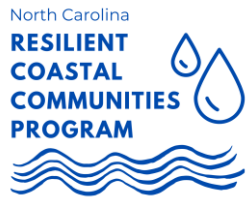
Community Action Team - Meeting #5

## AGENDA

Wednesday, Jan. 12, 2022, 10:00 AM - 12:00 PM

Location: Beaufort County Commissioners Board Room (in Beaufort County Financial Services Center), 136 W 2nd St. Washington, NC 27889+ Virtual via Zoom

- |                         |  |
|-------------------------|--|
| <b>10:00 – 10:05 AM</b> | <b>Welcome/Introductions</b>   |
| <b>10:05 – 10:15 AM</b> | <b>Introduction to STAPLEE</b> <ul style="list-style-type: none"><li>▪ Discuss STAPLEE tool</li></ul>  |
| <b>10:15 – 11:00 AM</b> | <b>Draft STAPLEE Analysis &amp; Priority Projects</b> <ul style="list-style-type: none"><li>▪ Review draft STAPLEE analysis</li><li>▪ Identify draft priority projects</li></ul> |
| <b>11:00 – 11:20 AM</b> | <b>Project Portfolio</b> <ul style="list-style-type: none"><li>▪ Review Project Portfolio Template</li><li>▪ Benefit Cost Worksheet</li></ul>                                    |
| <b>11:20 AM - NOON</b>  | <b>Stakeholder Involvement</b> <ul style="list-style-type: none"><li>▪ Plan for Public Open House (February 2022)</li></ul>  |
| <b>NOON</b>             | <b>Adjournment</b>   |



# Beaufort County

## Benefit/Cost Ratings

Strategy	Benefit	Cost
1. Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done). <b>Comments:</b>	MEDIUM	HIGH
2. Develop easements to maintain drainage ditches and tributaries (for areas not located in current drainage districts, where this is already done). <b>Comments:</b>	MEDIUM	MEDIUM
3. Develop an open space/recreation plan for flood mitigation projects. <b>Comments:</b>	HIGH	MEDIUM
4. Install backflow valves on stormwater drains. <b>Comments:</b>	HIGH	MEDIUM
6. Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances. <b>Comments:</b>	MEDIUM	HIGH
7. Implement a bioswale policy. Consider implementing within current subdivision and mobile home park ordinances. <b>Comments:</b>	MEDIUM	MEDIUM
8. Improve building codes (higher electrical outlets, stilts). <b>Comments:</b>	N/A	N/A
9. Restore wetlands at the confluence of the Pamlico and Pungo Rivers. <b>Comments:</b>	HIGH	HIGH
10. Restore mudflat wetlands throughout Beaufort County. <b>Comments:</b>	HIGH	HIGH
11. Restore T.G Ponds (at Pamlico River and South Creek) to wetlands. <b>Comments:</b>	HIGH	HIGH
13. Remove culverts from bridges to increase water capacity. <b>Comments:</b>	HIGH	HIGH
14. Restore Pungo River headwaters to increase storm surge capacity. <b>Comments:</b>	MEDIUM	MEDIUM

Strategy	Benefit	Cost
15. Move critical assets out of the floodplain. <b>Comments:</b>	MEDIUM	MEDIUM
16. Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented. <b>Comments:</b>	MEDIUM	LOW
17. Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan). <b>Comments:</b>	MEDIUM	HIGH
18. Research flooding concerns for NC Hwy 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed. <b>Comments:</b>	LOW	MEDIUM
19. Increase frequency of powerline and ROW vegetation maintenance and establish a regular schedule for maintenance. <b>Comments:</b>	MEDIUM	MEDIUM
20. Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable. <b>Comments:</b>	MEDIUM	LOW
21. Allow coastal wetlands to migrate landward to provide habitat and natural buffer to coastal storms. <b>Comments:</b>	HIGH	HIGH
22. Set up processes for transfer of development rights, conservation easements, and/or setback requirements. <b>Comments:</b>	HIGH	MEDIUM
24. Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings. <b>Comments:</b>	MEDIUM	MEDIUM
25. Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more	MEDIUM	MEDIUM

Strategy	Benefit	Cost
disaster resistant to strong winds, lightning, heavy rains, and flooding. <b>Comments:</b>		
26. Create redundancy for at risk infrastructure and emergency services. <b>Comments:</b>	MEDIUM	MEDIUM
27. Evaluate the relocation or buy out potential of critical infrastructure in vulnerable areas. <b>Comments:</b>	HIGH	MEDIUM
28. Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas. <b>Comments:</b>	MEDIUM	LOW
29. Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement. <b>Comments:</b>	HIGH	MEDIUM
30. Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management. <b>Comments:</b>	HIGH	LOW
31. Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests. <b>Comments:</b>	HIGH	LOW
32. Develop a framework for decision making regarding land protection and restoration strategies based on wetland and habitat vulnerability that would include restoration, protection, and retreat strategies. <b>Comments:</b>	MEDIUM	MEDIUM
33. Develop a comprehensive outreach strategy to educate stakeholders about SLR and coastal vulnerability and provide continuing education to affected communities and citizens. <b>Comments:</b>	MEDIUM	MEDIUM
34. Identify data gaps and collect necessary data to plan for infrastructure investments that are part of implementation plan for adaptation. <b>Comments:</b>	MEDIUM	MEDIUM
35. Raise the bridge on Cherry Run Road above the base flood elevation (see Hurricane Matthew Resilient Redevelopment Plan). <b>Comments:</b>	MEDIUM	HIGH
36. Implement projects to address flooding on US Hwy 17 Business South. The Hwy 17 Business (Bridge St.) and US 264 (5th St.) intersection is a particular issue, but the whole corridor should be looked at (Hwy 17	MEDIUM	HIGH

Strategy	Benefit	Cost
Bypass is shut down for heavy wind and rain, so Hwy 17 Business becomes a vital evacuation route.) <b>Comments:</b>		
37. Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution. <b>Comments:</b>	MEDIUM	LOW
38. Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions. <b>Comments:</b>	MEDIUM	LOW
39. Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans). <b>Comments:</b>	MEDIUM	LOW
40. Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel. <b>Comments:</b>	HIGH	LOW
41. Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to pro-actively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative. <b>Comments:</b>	HIGH	LOW
42. Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation. <b>Comments:</b>	HIGH	MEDIUM

## Benefit-Cost Overview

The cost or the economic case for different strategies or actions must be considered when developing resilience strategies. An informal cost-benefit analysis should be used to review proposed adaptation actions. Ratings of high, medium, or low are assigned to the anticipated costs and the benefits associated with each action based on general criteria that are established by the community.

Make sure to explore and identify potential funding mechanisms for project or action item implementation.

<b>Benefit/cost ratings</b>	
	<b>Benefit</b>
<b>HIGH</b>	Action would have significant impact on risk reduction
<b>MEDIUM</b>	Action would have an impact on risk reduction
<b>LOW</b>	Long-term benefits are difficult to quantify in the short term
	<b>Cost</b>
<b>HIGH</b>	Existing funding is not adequate
<b>MEDIUM</b>	Requires budget reappropriation or amendment
<b>LOW</b>	Funding available under the existing budget

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
1. Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done). <b>Comments:</b>	1	1	1	1	1	1			1	1	1		1		1	1		1	1	0	0	1	1	16
2. Develop easements to maintain drainage ditches and tributaries (for areas not located in current drainage districts, where this is already done). <b>Comments:</b>	1	1	1	1	1	1			1				1		1	1		0	1	0	0	1	1	13
3. Develop an open space/recreation plan for flood mitigation projects. <b>Comments:</b>	1	1	1	1	0	1					1		1		1	1		0	1	0	0	1	0	11
4. Install backflow valves on stormwater drains. <b>Comments:</b>	1	1	1	1	0	1					1		1		1	1		1	1	0	0	1	0	12
6. Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances. <b>Comments:</b>	0	1	1	1	0	1							1		1	1	1	1	1	1	1			12
7. Implement a bioswale policy. Consider implementing within current subdivision and mobile home park ordinances. <b>Comments:</b>	0	1	1	1	0	1							1		1	1		1	1	1	1			11
8. Improve building codes (higher electrical outlets, stilts). <b>Comments:</b>	0	1	1	1	0	1							1		1	1		1	0	0	0	0	0	8
9. Restore wetlands at the confluence of the Pamlico and Pungo Rivers. <b>Comments:</b>	1	1	1	1	1	1							0		1	0		0	1	0	0		1	9
10. Restore mudflat wetlands throughout Beaufort County. <b>Comments:</b>	1	1	1	1	1	1							0		1	0		0	1	0	0		1	9
11. Restore T.G Ponds (at Pamlico River and South Creek) to wetlands. <b>Comments:</b>	1	1	1	1	1	1							0		1	0		0	1	0	0		1	9

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
13. Remove culverts from bridges to increase water capacity. Comments:	1	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1			1	1	1		0		1	0		0	1	0	0		1	9
14. Restore Pungo River headwaters to increase storm surge capacity. Comments:	1	1	1	0	1	1							0		1	0		0	1	0	1		1	9
15. Move critical assets out of the floodplain. Comments:	1	1	1	1	0	0			1	1	1		1		1	0		0	1	0	0	1	1	12
16. Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented. Comments:	1	1	1	1	0	1				1			1		1	1		1	1	1	1	1	1	15
17. Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan). Comments:	1	1	1	1	0	0			1	1	1		0		1	0		0	1	1	1	1	1	13
18. Research flooding concerns for NC Highway 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed. Comments:	1	1	1	1	0	1			1	1	1		0		1	1		1	0	0	0	0	0	11
19. Increase frequency of powerline and ROW vegetation maintenance and establish a regular schedule for maintenance. Comments:	1	1	1	1	0	0			1	1	1		0		1	1		1	1	0	0	1	1	13
20. Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable. Comments:	1	1	1	1	0	1				1			1		1	1		1	1	1	0		1	13
21. Allow coastal wetlands to migrate landward to provide habitat and natural buffer to coastal storms. Comments:	1	1	1	1	1	1				1			0		1	1		1	1	1	1		1	14
22. Set up processes for transfer of development rights, conservation easements, and/or setback requirements. Comments:	1	1	1	1	0	1				1			1		1	1		1	0	0	0	0	0	10

RCCP STAPLEE Criteria Worksheet  
Beaufort County



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<b>Considerations for Alternative Actions</b>																									
24. Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings. <b>Comments:</b>	1	1	1	1	1	0				1		1		1	1		1	0	0	0	1	1		12	
25. Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, heavy rains, and flooding. <b>Comments:</b>	1	1	1	1	1	0				1	1	1		1	1		0	0	0	0	0	0		10	
26. Create redundancy for at risk infrastructure and emergency services. <b>Comments:</b>	1	1	1	1	1	0			1	1	1		1	1	1		1	0	0	0	0	0		12	
27. Evaluate the relocation or buy out potential of critical infrastructure in vulnerable areas. <b>Comments:</b>	1	1	1	1	0	0			1	1	1		1	1	1		1	0	0	0	0	0		11	
28. Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas. <b>Comments:</b>	1	1	1	1	0	1				1		1		1	1		1	0	0	0	0	0		10	
29. Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement. <b>Comments:</b>	1	1	1	1	1	0				1		0		1	1		0	1	1	1		1		12	
30. Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management. <b>Comments:</b>	1	1	1	1	0	1				1		1		1	1			0	0	0	0	0		9	
31. Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests. <b>Comments:</b>	1	1	1	1	0	1				1		1		1	1		1	0	0	0	0	0		10	
32. Develop a framework for decision making regarding land protection and restoration strategies based on wetland and habitat vulnerability that would include restoration, protection, and retreat strategies. <b>Comments:</b>	1	1	1	1	0	1				1		1		1	1			0	1	1		1		12	
33. Develop a comprehensive outreach strategy to educate stakeholders about SLR and coastal vulnerability and provide continuing education to affected communities and citizens. <b>Comments:</b>	1	1	1	1	0	0				1		1		1	1			0	0	0	1	1		10	

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Beaufort County



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<b>Considerations for Alternative Actions</b>																								
34. Identify data gaps and collect necessary data to plan for infrastructure investments that are part of implementation plan for adaptation. <b>Comments:</b>	1	1	1	1	0	1				1		1		1	1		1	0	1	1	1	1	1	14
35. Raise the bridge on Cherry Run Road above the base flood elevation (see Hurricane Matthew Resilient Redevelopment Plan). <b>Comments:</b>	1	1	1	1	0	1			1	1	1		0	1	0		0	1	0	0	1	1	1	12
36. Implement projects to address flooding on US Hwy 17 Business South. The Hwy 17 Business (Bridge St.) and US 264 (5th St.) intersection is a particular issue, but the whole corridor should be looked at (Hwy 17 Bypass is shut down for heavy wind and rain, so Hwy 17 Business becomes a vital evacuation route.) <b>Comments:</b>	1	1	1	1	0	1			1	1	1		0	1	0		0	1	0	0	1	1	1	12
37. Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution. <b>Comments:</b>	1	1	1	1	0	1			1	1	1		1	1	1			0	0	0	0	0	0	11
38. Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions. <b>Comments:</b>	1	1	1	1	0	1				1			1	0	1		1	0	1	1	1	1	1	13
39. Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans). <b>Comments:</b>	1	1	1	0	1	1				1			1	1	1			1	0	0	1	0	0	11
40. Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel. <b>Comments:</b>	1	1	1	0	1	1				1			1	1	1		1	0	0	0	0	0	0	10
41. Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative. <b>Comments:</b>	1	1	1	1	0	1			1	1	1		1	1	1		1	1	1	1	1	1	1	17
42. Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation. <b>Comments:</b>	1	1	1	1	0	1			1	1	1		1	1	1		1	1	1	1	1	1	1	17
<b>Pamlico Sound Hazard Mitigation Plan</b>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																			

RCCP STAPLEE Criteria Worksheet  
Beaufort County



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<b>Considerations for Alternative Actions</b>																									
B1. Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B2. Maintain reciprocal mutual aid agreements with surrounding communities for fire protection and emergency response.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B3. Annually evaluate adequacy of existing local early warning and emergency response communications equipment and prepare annual capital improvements plans to improve early warning and communication effectiveness before, during, and following disaster events.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B4. Develop standard protocols for training/ certification of volunteer staff for shelter management, traffic control, first aid, etc., to improve volunteer response capability during and following disaster events, including coordination with American Red Cross personnel on an annual basis.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B5. Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B6. Provide citizens and visitors with maps of evacuation routes which will facilitate the evacuation of the county in case of a hazardous event. This effort will involve the production of hard copy maps for distribution.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B7. Continue to monitor and establish programs to maintain continuity of government operations through annual review and update of the Continuity of Operations Plan (COOP).			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B8. Continue to support and participate in the directives of the County Emergency Operations Plan (EOP). The EOP includes evacuation procedures and response to hazards not addressed in this plan such as hazardous materials, petroleum products, hazardous waste, nuclear threat/attack, and civil disorder. The County will review and update the EOP annually to ensure that it coordinates with the most recent NCEM and NCOEMS directives.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B9. Continue to apply for grant funds, allocate local funding, and work with local electric service providers to procure and maintain backup generators/transfer switches for all critical public facilities, with an emphasis on emergency services facilities, critical water/sewer facilities, and shelter facilities. Evaluate the equipment on a regular basis to assure it continues to meet the needs of the operations occurring at each facility. Backup generators are still needed at the following facilities: Southside High School, S.W. Snowden Elementary School, and John Cotten Tayloe Elementary School.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B10. Hold an annual public hazard mitigation meeting, attended by the HMPC and participating jurisdictions, to educate the public and elected officials and receive comments about the location of high risk facilities/development, the jurisdictions' overall vulnerability to natural and manmade hazards, and the jurisdictions' hazards mitigation efforts.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0

RCCP STAPLEE Criteria Worksheet  
Beaufort County



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<b>Considerations for Alternative Actions</b>																									
B11. Maintain the Hazard Mitigation Planning Committee (HMPC) and hold annual HMPC meetings to continue relationship building and communicate about mitigation measures taking place throughout the community.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B12. Maintain continual contact/working relationship with electric service providers in the county to address the following: 1) Disaster preparedness techniques (e.g., tree trimming, vegetation planting requirements, pole replacement); 2) Identification of critical electrical facilities needing retrofit or upgrade and map with elevation reference marks; 3) Identification of problem areas and potential solutions; and 4) Communication with county officials during and immediately after a natural hazard event that results in loss of electrical power			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B13. Monitor trees and vegetation on publicly owned property to assure that no property or utility damage will occur as a result of diseased or dying trees or other vegetation. This strategy only applies to the municipal jurisdictions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B14. Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B15. Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans).			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B16. Annually review local floodplain ordinances to provide improved flood protection standards and require freeboard for retrofitting and new construction as required by NC State Building Code. The County will consider establishing a freeboard requirement.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B17. Maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B18. Encourage County Commissioners and elected officials of non-CRS communities to participate in the Community Rating System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B19. Continue to work with local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within an SFHA. The county will provide these agencies with brochures documenting the concerns relating to development located within the flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, and heavy rains.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B20. Make information regarding hazards and development regulations within floodplains available through the following: 1) Ensure that local libraries maintain information relating to flooding and flood protection, 2) Provide a link on the municipal website to FEMA resources addressing flooding and flood protection, evacuation procedures, disaster preparedness, and post-disaster recovery, and 3) Provide website links to relevant hazard mitigation measures.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0

RCCP STAPLEE Criteria Worksheet  
Beaufort County



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<b>Considerations for Alternative Actions</b>																											
B21. Promote national "awareness" weeks (i.e., hurricane preparedness, severe weather preparedness, etc.) through local media. ("Awareness" weeks are listed on the National Weather Service website at <a href="http://www.nws.noaa.gov/os/severeweather/severewx cal.shtml">http://www.nws.noaa.gov/os/severeweather/severewx cal.shtml</a> )			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0
B22. Educate the general public to the importance of weather alert radios and systems that can operate on alternative power and can provide up-to-the-moment information regarding locations of severe storms and possible tornadoes.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0
B23. Maintain a Hazardous Material Action Plan that addresses the proper containment of spills, etc. This effort will be coordinated with the county LEPC.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0
B24. Monitor natural and man-made drainage structures to ensure they are clear and functioning properly; prioritize needed drainage projects and review funding alternatives annually.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0
B25. Continue to coordinate annually with the NC Forestry Division to address the threat of wildfire throughout the County. These efforts will involve posting of the daily fire risk present within the County on the County website daily. Additionally, the County will distribute and make information available regarding County methods for mitigating fire hazards.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0
B26. Maintain Debris Removal and Monitoring Services Contracts for post-disaster response. These services should focus on preparing documentation necessary to ensure full reimbursement of cost associated with community cleanup and immediate infrastructure restoration.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0
B27. Work to implement all strategies outlined within the Hurricane Matthew Resilient Redevelopment Plan.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						0

1. *Fill in the goal and its corresponding objective. Use a separate worksheet for each objective. The considerations under each criterion are suggested ones to use; you can revise these to reflect your own considerations (see Table 2-1).*

2. *Fill in the alternative actions that address the specific objectives the planning team identified in Worksheet #1.*

3. **Scoring:** *For each consideration, indicate a plus (+) for favorable, and a negative (-) for less favorable.*

*When you complete the scoring, negatives will indicate gaps or shortcomings in the particular action, which can be noted in the Comments section. For considerations that do not apply, fill in N/A for not applicable. Only leave a blank if you do not know an answer. In this case, make a note in the Comments section of the “expert” or source to consult to help you evaluate the criterion.*



# Resilient Coastal Communities Program

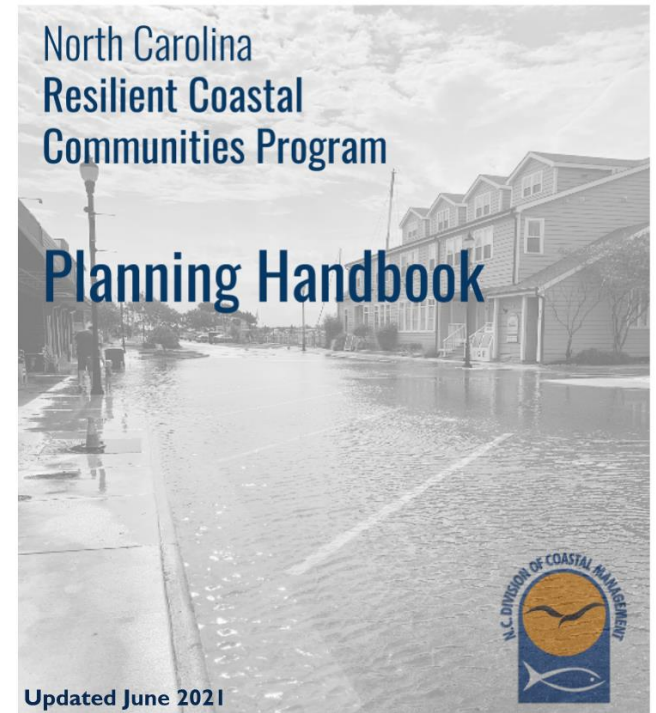
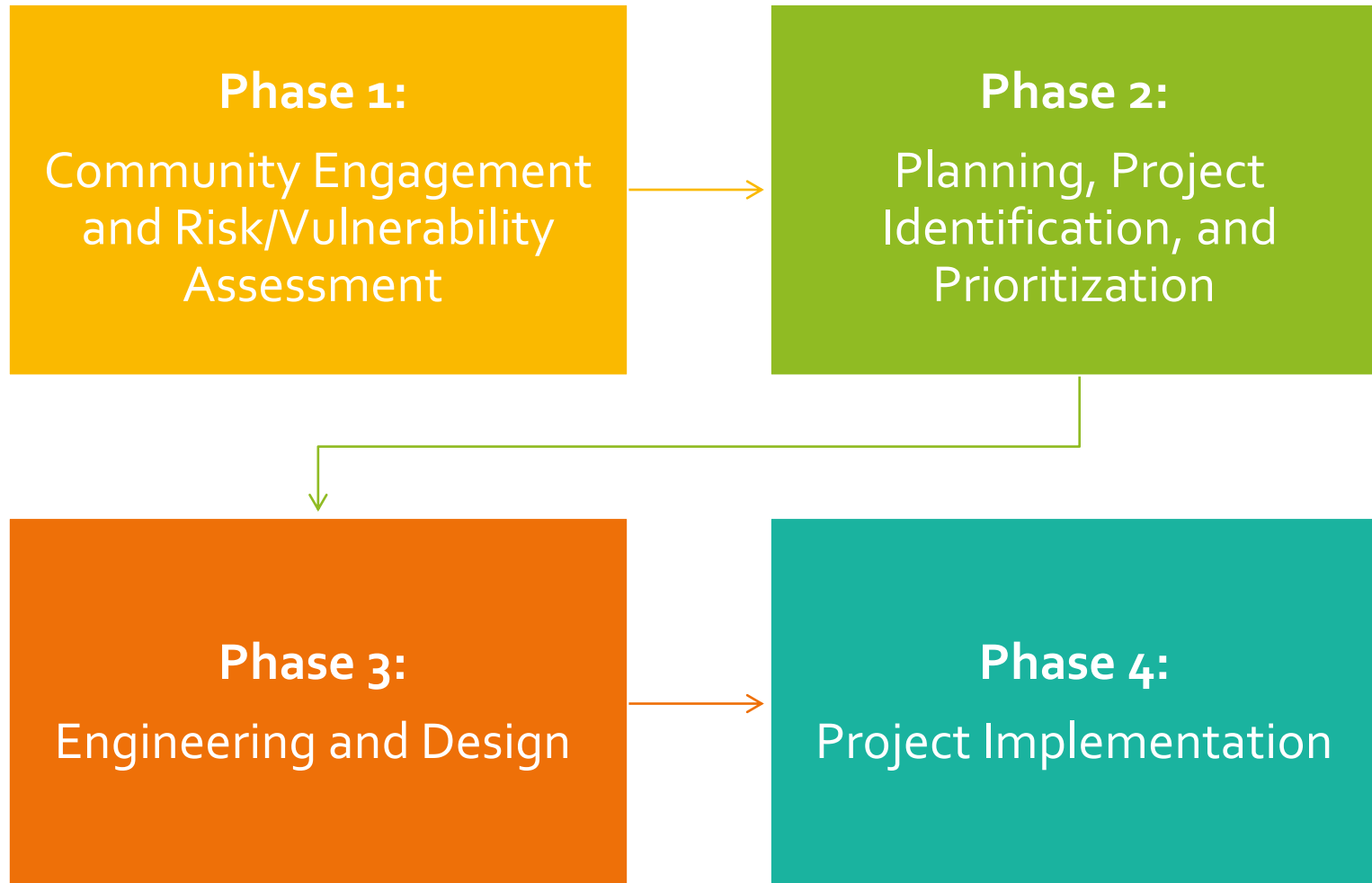
## Community Action Team Meeting #5

## Consolidate and Prioritize Projects

January 12-13, 2022



# RCCP Phases Overview



# RCCP Phase 1 and 2 Steps



## ■ Phase 1: Community Engagement and Risk/Vulnerability Assessment

- ✓ *Step 1 – Develop a Community Action Team*
- ✓ *Step 2 – Set Vision and Goals*
- ✓ *Step 3 – Review Existing Plans and Efforts*
- ✓ *Step 4 – Develop a Community Engagement Strategy*
- ✓ *Step 5 – Map Critical Assets and Natural Infrastructure*
- ✓ *Step 6 – Conduct Risk and Vulnerability Assessment*

## ■ Phase 2: Planning, Project Identification, and Prioritization

- ✓ *Step 1 – Identify a Suite of Potential Solutions*
- ★ **Step 2 – Consolidate and Prioritize Projects**
  - Step 3 – Develop the Resilience Strategy Document



# Potential Solutions Overview

- Range of solutions
- Structural (infrastructure)
- Nonstructural (policy)
- Nature-based
- Hybrid
- NFWF-funded counties
- Hurricane Florence-declared counties



# Natural/Nature-Based and Hybrid Solutions Overview

- NNBS – enhance natural landscape
- Green infrastructure
- Ecosystems and natural systems
- Hybrid solutions – gray infrastructure with natural or green infrastructure
- Floodplain/stormwater management
- National Flood Insurance Program Community Rating System
- Pre- and Post-Disaster Recovery and Redevelopment



# Phase 2, Step 2. Evaluate Projects

- Evaluate strategies
- STAPLEE method
- Evaluate feasibility
- Cost-benefit
- Potential funding



Benefit	
High	Action would have a significant impact on risk reduction
Medium	Action would have an impact on risk reduction
Low	Long-term benefits are difficult to quantify in the short term

Cost	
High	Existing funding is not adequate
Medium	Requires budget reappropriation or amendment
Low	Funding available under the existing budget

# Funding Sources/Strategy Areas

Funding Source	Due Date	Minimum Ask	Match	Strategies
NC DEQ Land & Water Fund (LWF) formally Clean Water Mgmt. Trust Fund (CWMTF)	First Monday in February	Varies	None, 60/40, 75/25	Policy / Regulatory Staffing, Funding & Resources Education & Public Info Infrastructure Nature-Based Hybrid
NC DEQ Water Resources Dev. Grant (WRDG) NRCS EQIP	Spring- June 30 Fall- Dec. 31	\$200,000	50/50	Infrastructure Nature-Based Hybrid
NC DOJ Env. Enhancement Grant (EEG) (Smithfield Agreement), Neuse River Watershed only	LOI- Mid-May App- June	\$500,000 Max.	50/50	Infrastructure Nature-Based Hybrid
FHWA/NCDOT Locally Administered Project Program (LAPP) – Bike/Ped, Roadway, Transit	October 31	Varies	80/20	Policy / Regulatory Staffing, Funding & Resources Education & Public Info Infrastructure

# Funding Sources/Strategy Areas

Funding Source	Due Date	Minimum Ask	Match	Strategies
NC State Parks – Parks and Rec. Trust Fund (PARTF)	Early May	\$500,000	50/50	Infrastructure Nature-Based Hybrid
HUD’s Community Dev. Block Grants – Mitigation (CDBG-MIT)	Rolling Basis	\$1,000,000		Infrastructure
American Rescue Plan Act (ARPA) of 2021	N/A	Federal Disbursement	N/A	Policy / Regulatory Staffing, Funding & Resources Education & Public Info Emergency Services Infrastructure Nature-Based Hybrid

# Funding Sources/Strategy Areas

Funding Source	Due Date	Minimum Ask	Match	Strategies
FEMA Hazard Mitigation Grant Program (HMGP)	After Presidentially Declared Disaster	20% of Declaration	75/25	Policy / Regulatory Staffing, Funding & Resources Education & Public Info Infrastructure Nature-Based Hybrid
FEMA Flood Mitigation Assistance (FMA)	LOI- October 1 App- January 28	\$900,000, Scoping/\$30M flood mitigation project	75/25, 90/10 for small communities	Policy / Regulatory Staffing, Funding & Resources Education & Public Info Infrastructure Nature-Based Hybrid
FEMA Building Resilience Infrastructure in Communities (BRIC) Program – C&CB, Mitigation	LOI- October 1 Sub App- Due January 28	\$600,000 State \$5,000,000 National	75/25, 70/30*	Policy / Regulatory Staffing, Funding & Resources Education & Public Info Emergency Services Infrastructure Nature-Based Hybrid

# Phase 2, Step 2. Consolidate & Prioritize Projects

- Advance prior efforts
- Technical soundness
- Potential co-benefits
- Positive benefit-cost ratio
- Social equity
- Long-term impact
- Funding sources
- Capacity to implement
- Project templates

<b>Project Name</b>	<i>Come up with a brief title for the project</i>
<b>Project Description</b>	<i>Describe project, including information gathered during project development</i>
<b>Hazard(s) addressed by project</b>	<i>List hazards specific to this program which impact the project location</i>
<b>Type of Solution</b>	<i>Infrastructure, Plans and policies, Ordinances, Non-regulatory programs, Other (describe)</i>
<b>Project Estimated Cost</b>	<i>Estimate total cost of project</i>
<b>Potential Implementation Funding Sources</b>	<i>Identify potential sources for project/action implementation</i>
<b>Projected Estimated Timeline</b>	<i>Estimate length of time project will take to complete and any expected delays in the timeline</i>
<b>Priority Rating</b>	<i>High, Medium, Low</i>
<b>Project Map</b>	<i>Provide a map of the project site</i>

# Phase 2, Step 2. Consolidate & Prioritize Projects

- Narrow down actions
- Identify at least five (5) priority projects for each community
- Organize project information using this template




Organize information for each project in the portfolio using the following template:

<b>Project Name</b>	<i>Come up with a brief title for the project</i>
<b>Project Description</b>	<i>Describe project, including information gathered during project development</i>
<b>Hazard(s) addressed by project</b>	<i>List hazards specific to this program which impact the project location</i>
<b>Type of Solution</b>	<i>Infrastructure, Plans and policies, Ordinances, Non-regulatory programs, Other (describe)</i>
<b>Project Estimated Cost</b>	<i>Estimate total cost of project</i>
<b>Potential Implementation Funding Sources</b>	<i>Identify potential sources for project/action implementation</i>
<b>Projected Estimated Timeline</b>	<i>Estimate length of time project will take to complete and any expected delays in the timeline</i>
<b>Priority Rating</b>	<i>High, Medium, Low</i>
<b>Project Map</b>	<i>Provide a map of the project site</i>



# Phase 2, Step 2. Consolidate & Prioritize Projects

- Evaluate strategies and their feasibility
  - Including cost-benefit estimation
- Consolidate and prioritize strategies (draft)
- Host a public Open House  February
- Finalize strategies




# Phase 2, Step 3. Develop a Resiliency Strategy Document

- Vision & Goals
- Community Action Team
- Stakeholder Engagement Strategy
- Review of Existing Local & Regional Efforts
- Risk and Vulnerability Assessment Report
- Project Portfolio
- Additional Files (e.g., mapping, Excel spreadsheets)



# Next Steps: Phase 3: Engineering & Design

- Top Nature-Based/Hybrid Project (1 project per community)
- Phase 3 Application  Anticipated: January-February Opening, Mid-March Deadline
- Approximately \$40k funding per community
  - Consider project scale with available funding





**Thank you for participating in CAT Meeting #5!**





# BEAUFORT COUNTY

## Community Action Team - Meeting #5

### MEETING SUMMARY

**WEDNESDAY, JANUARY 12, 2022, 10:00 AM - 12:00 PM, COUNTY COMMISSIONERS MEETING ROOM + VIRTUAL**

#### Meeting Purpose:

- To introduce the STAPLEE tool, review the draft STAPLEE analysis and identify draft priority projects, review the project portfolio template, and review the benefit cost analysis.
- Refer to attached meeting agenda.

#### Attendees:

- Refer to attached meeting sign-in sheet.

#### Materials:

- Refer to attached materials:
  - Cost benefit worksheet
  - STAPLEE worksheet

#### Meeting Discussion:

##### Cost Benefit Worksheet

- The Community Action Team worked together to complete the Cost Benefit Worksheet for all 42 strategies in the portfolio. For both “cost” and “benefit” the team had a choice between responses of low, medium, and high.

##### Introduction to STAPLEE Tool

- The STAPLEE tool was developed by FEMA. The analysis considers social, technical, administrative, political, legal, economic, and environmental factors. Strategies are scored by assigning a value of 0 (neutral effect) or 1 (positive effect).

##### STAPLEE Worksheet

- Contractors had many of the columns in the STAPLEE sheet filled in already and asked the CAT to review what had been done so far.
- The Community Action Team assisted with filling out the social, administrative, and political columns for each strategy.

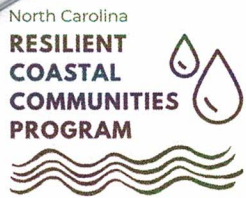
##### Project Portfolio

- The highest scoring projects from these analyses will be considered for the priority project portfolio. Input received at public open houses will help the Community Action Team to narrow down the list.

# MEETING SIGN-IN SHEET

<b>Title</b>	Beaufort County Community Action Team – Meeting 5		
<b>Date</b>	Jan. 12, 2022	<b>Time</b>	10:00 AM – 12:00 PM
<b>Location</b>	Beaufort County Commissioners Board Room		

✓	Name	Organization	Title/Role	Email	Signature
	Brian Alligood	Beaufort County	County Manager	brian.alligood@co.beaufort.nc.us	<i>Brian Alligood</i>
	Christina Smith	Beaufort County	Public Works Director	christina.smith@co.beaufort.nc.us	<i>Christina Smith</i>
	Carlton Gideon	Mid-East Commission	Planner	cgideon@mideastcom.org	<i>Carlton Gideon</i>
	Carnie Hedgepeth	Beaufort County	Beaufort County Emergency Management Director	carnie.hedgepeth@co.beaufort.nc.us	
	Ed Booth	Beaufort County	Commissioner	ed.booth@co.beaufort.nc.us	
	John Rebholz	Beaufort County	Commissioner	john.rebholz@co.beaufort.nc.us	<i>John Rebholz online</i>
	Bishop James S. McIntyre Sr.	Cornerstone Family Worship Center	Pastor	pastorcfwc@gmail.com	
	Martyn Johnson	Beaufort County	Economic Development Director	Martyn.johnson@beaufortedc.com	<i>Online</i>
	Heather Deck	Sound Rivers	Executive Director	heather@soundrivers.org	
	Jill Howell	Sound Rivers	Pamlico-Tar Riverkeeper	jill@soundrivers.org	<i>Online</i>
	Tom Stroud	NC Estuarium/ Partnership for the Sounds	Deputy Director	tmstroud@embarqmail.com	<i>Online</i>
	Dave Loope	Beaufort County Community College	President	dave.loope@beaufortccc.edu	<i>Online</i>



# MEETING SIGN-IN SHEET

<b>Title</b>	Beaufort County Community Action Team – Meeting 5		
<b>Date</b>	Jan. 12, 2022	<b>Time</b>	10:00 AM – 12:00 PM
<b>Location</b>	Beaufort County Commissioners Board Room		

✓	Name	Organization	Title/Role	Email	Signature
	Jamie Heath	Mid-East Commission	Contractor	jheath@mideastcom.org	<i>Jamie Heath</i>
	Lisa Williams	Mid-East Commission	Contractor	lwilliams@mideastcom.org	Online
	Sam Singleton	Mid-East Commission	Contractor	ssingleton@mideastcom.org	
	Paige Cureton	RK&K	Contractor	pcureton@rkk.com	
	Trent Cormier	RK&K	Contractor	tcormier@rkk.com	<i>Trent Cormier</i>
	Gordon Marsh	RK&K	Contractor	gmarsh@rkk.com	<i>Gordon Marsh</i>
	Tancred Miller	NC DEQ	State/Grant Agency	Tancred.miller@ncdenr.gov	
	Mackenzie Todd	NC DEQ	State/Grant Agency	Mackenzie.todd@ncdenr.gov	Online
	Rachel Love-Adrick	NC DEQ	State/Grant Agency	Rachel.love-adrick@ncdenr.gov	Online
	Sarah Spiegler	NC Sea Grant	Coastal Resilience Specialist	sespiegl@ncsu.edu	



**Community Action Team**  
Meeting #6 Materials



# BEAUFORT COUNTY

Community Action Team - Meeting #6

## AGENDA

Wednesday, Feb. 23, 2022, 10:00 AM - 12:00 PM

Location: Beaufort County Commissioners Board Room (in Beaufort County Financial Services Center), 136 W 2nd St. Washington, NC 27889+ Virtual via Zoom

<b>10:00 – 10:05 AM</b>	<b>Welcome</b>
<b>10:05 – 10:15 AM</b>	<b>Review Public Open House Results</b>
<b>10:15 – 10:30 AM</b>	<b>Review STAPLEE analysis for highest scoring projects</b>
<b>10:30 – NOON</b>	<b>Project Portfolio</b> <ul style="list-style-type: none"><li>▪ Select minimum of 5 projects for priority project portfolio</li><li>▪ Select one nature-based or hybrid project to move into Phases 3 &amp; 4</li></ul>
<b>NOON</b>	<b>Adjourn</b>

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
<b>ACTION: Drainage Ditches and Tributaries Maintenance Plan</b> Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done).	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0	0	1	1	17	
<b>ACTION: Open Space / Recreation Plan for Flood Mitigation</b> Develop an open space/recreation plan for flood mitigation projects.	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	1	0	0	1	1	17	
Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances.	0	1	1	1	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	16	
<b>ACTION: Pamlico and Pungo River Wetland Restoration</b> Restore wetlands at the confluence of the Pamlico and Pungo Rivers.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	0	1	0	0	1	1	17	
Restore mudflat wetlands throughout Beaufort County.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	16	
Restore T.G Ponds (at Pamlico River and South Creek) to wetlands.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	16	
Move critical assets out of the floodplain.	1	1	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	0	1	0	0	1	1	16
<b>ACTION: Living Shorelines Funding Program</b> Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented.	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	20	
Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan).	1	1	1	1	0	0	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0	1	1	12
Research flooding concerns for NC Highway 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed.	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	16

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL	
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<b>Considerations for Alternative Actions</b>																									
Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable.	1	1	1	1	0	1	0	0	0	1	0	1	1	0	1	1	1	1	1	0	0	1	1	15	
Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings.	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	1	16	
<b>ACTION: Special Flood Hazard Areas Educational Materials</b> Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, heavy rains, and flooding.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	17	
<b>ACTION: Essential / Emergency Services Operations Redundancies</b> Create redundancy for at risk infrastructure and emergency services.	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	17	
Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas.	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16	
<b>ACTION: Natural Shoreline Migration</b> Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement.	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	17	
Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management.	1	1	1	1	0	1	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	14	
Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests.	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16	

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	15
<b>ACTION: CAMA Land Use Plan Coordination</b> Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	18
<b>ACTION: Greenway and Public Park Improvements</b> Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans).	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	17
Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel.	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	15
<b>ACTION: Open Space Program</b> Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20
<b>ACTION: Repetitive Loss Property Acquisition</b> Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20

# DRAFT ACTIONS

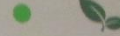
## BEAUFORT COUNTY

*Place a dot on your preferred action.*



### **Greenway and Public Park Improvements**

Integrate greenway and public park improvements into comprehensive planning and capital improvement efforts. This initiative will help the county improve its existing greenway and public park system, while attracting new adventurers and naturalists to the county.



*Place a dot on your preferred action.*



### **Living Shorelines Funding Program**

Coordinate with the Coastal Federation and other non-profit organizations to determine funding availability for living shorelines. Living shorelines are a relatively new approach that incorporate natural elements to create a more effective buffer to absorb wave energy and protect against shoreline erosion.

*Place a dot on your preferred action.*



### **CAMA Land Use Plan Coordination**

Continue to coordinate all development/planning decisions with review of appropriate CAMA Land Use Plans, including stated redevelopment policies and actions.

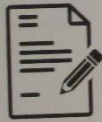
## DRAFT ACTIONS

BEAUFORT COUNTY



### **Special Flood Hazard Areas Educational Materials**

Develop Special Flood Hazard Areas brochures and other educational materials for residents. Distribute materials to local real estate agencies and manufactured home vendors. The materials should create awareness of risks related to development in flood prone areas and provide tools for homeowners to make their homes more disaster resistant to strong winds, lightning, heavy rains, and flooding.



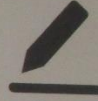
### **Drainage Ditches and Tributaries Maintenance Plan**

Develop a maintenance plan to clean out drainage ditches and tributaries to decrease flooding by improving flow. This plan would focus on areas located outside of existing drainage districts.

# DRAFT ACTIONS

BEAUFORT COUNTY

**Do you have ideas for how to improve resiliency to flooding in our community? Please add your ideas here.**

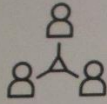


LED example  
\$40 at BCC.  
Available at  
the Sand Rivers  
DE in my home  
educational website  
for desktop + tablet

# DRAFT ACTIONS

## BEAUFORT COUNTY

*Place a dot on your preferred action.*



### Essential / Emergency Services Operations Redundancies

Create redundancy for government employees located within high risk infrastructures and emergency services buildings to decrease the potential for lack of services directly after severe weather events. This would include establishing backup office space and equipment at other facilities in order to return to operational status as quickly as possible.

*Place a dot on your preferred action.*



### Open Space Program

Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Areas as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.



### Repetitive Loss Property Acquisition and/or Elevation

Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA-sponsored residential acquisition and elevation programs. Continue to apply for hazard mitigation grant and hazard mitigation assistance funding for residential acquisition and elevation.

# DRAFT ACTIONS

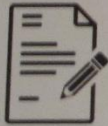
## BEAUFORT COUNTY



### **Pamlico and Pungo River Wetland Restoration**

*Place a dot on your preferred action.*

Restore wetlands at the confluence of the Pamlico and Pungo Rivers (Great Gut Bay) to increase storm surge capacity and reduce flooding. This will include: increasing native plant diversity, retaining water in the wet area, and adding habitat features.



### **Open Space / Recreation Plan for Flood Mitigation**

*Place a dot on your preferred action.*

Develop an open space/recreation plan for flood mitigation projects. This document will help the county plan for future conservation and recreational resources by implementing necessary zoning ordinances. The plan will identify a range of diverse flood mitigation strategies that could be implemented throughout the county.



### **Natural Shoreline Migration**

*Place a dot on your preferred action.*

Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement. This will reduce repetitive loss structures and increase stormwater capacity.





# BEAUFORT COUNTY

## Community Action Team - Meeting #6

### MEETING SUMMARY

WEDNESDAY, FEBRUARY 23, 2022, 10:00 AM - 12:00 PM, VIRTUAL ONLY VIA ZOOM

#### Meeting Purpose:

- To review the public open house results, review the STAPLEE analysis for the highest scoring projects, select a minimum of five projects for the priority project portfolio and one nature-based or hybrid project to move forward into phase 3.
- Refer to meeting agenda.

#### Attendees:

- Refer to attached meeting sign-in sheet.

#### Materials:

- Refer to attached materials:
  - Public open house results
  - STAPLEE worksheet of highest scoring projects

#### Meeting Discussion:

##### Public Open House Results

- The Community Action Team reviewed the results from the in person public open house held on Thurs. Feb. 17, 2022 and the virtual public open house held on Mon. Feb. 21, 2022.
- There was low participation at the open house, but with the participants in attendance these two on the ground projects were discussed:
  - Low Impact Development demonstration site at Beaufort County Community College combined with developer and homeowner educational materials (Jamie will contact Dr. Dave Loope at the college to make sure they are on board.)
  - Back-up project to move forward: Living Shoreline demonstration site at county owned Wright's Creek park site combined with Living Shoreline Planning/Funding Program.

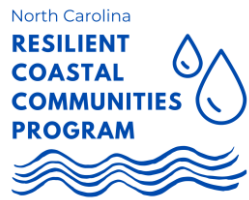
##### STAPLEE Worksheet of Highest Scoring Projects

- The Community Action Team briefly reviewed the STAPLEE worksheet of highest scoring projects.

##### Priority Project Portfolio

- The Community Action Team selected the following projects for the priority project portfolio.
  - Nature based or hybrid project to move forward:
  - Low Impact Development demonstration site at Beaufort County Community College combined with developer and homeowner educational materials.
  - Community College must be contacted for permission.

- Back-up project to move forward: Living Shoreline demonstration site at county owned Wright's Creek park site combined with Living Shoreline Planning/Funding Program.
- Other projects:
  - Develop and implement drainage ditches and tributaries maintenance plan (including recommendations for most environmentally sound practices).
  - Essential/emergency services operations redundancies (Jamie will contact Carnie Hedgepeth and Christina Smith with the county for more details on county needs.)
  - Repetitive loss property elevation program combined with existing flood hazard education materials project (use existing state resources for the education/outreach piece as much as possible).
  - Open Space Program combined with greenway and public park improvements.



# MEETING SIGN-IN SHEET

<b>Title</b>	Beaufort County Community Action Team – Meeting 6				
<b>Date</b>	Feb. 23, 2022	<b>Time</b>	10:00 AM – 12:00 PM	<b>Location</b>	Via Zoom online

✓	Name	Organization	Title/Role	Email	Signature
	Brian Alligood	Beaufort County	County Manager	brian.alligood@co.beaufort.nc.us	<u>Online</u>
	Christina Smith	Beaufort County	Public Works Director	christina.smith@co.beaufort.nc.us	<u>Online</u>
	Carlton Gideon	Mid-East Commission	Planner	cgideon@mideastcom.org	<u>Online</u>
	Carnie Hedgepeth	Beaufort County	Beaufort County Emergency Management Director	carnie.hedgepeth@co.beaufort.nc.us	<u>Online</u>
	Ed Booth	Beaufort County	Commissioner	ed.booth@co.beaufort.nc.us	
	John Rebholz	Beaufort County	Commissioner	john.rebholz@co.beaufort.nc.us	<u>Online</u>
	Bishop James S. McIntyre Sr.	Cornerstone Family Worship Center	Pastor	pastorcfwc@gmail.com	
	Martyn Johnson	Beaufort County	Economic Development Director	Martyn.johnson@beaufortcdc.com	<u>Online</u>
	Heather Deck	Sound Rivers	Executive Director	heather@soundrivers.org	
	Jill Howell	Sound Rivers	Pamlico-Tar Riverkeeper	jill@soundrivers.org	
	Tom Stroud	NC Estuarium/ Partnership for the Sounds	Deputy Director	tmstroud@embarqmail.com	
	Dave Loope	Beaufort County Community College	President	dave.loope@beaufortccc.edu	



# MEETING SIGN-IN SHEET

<b>Title</b>	Beaufort County Community Action Team – Meeting 6				
<b>Date</b>	Feb. 23, 2022	<b>Time</b>	10:00 AM – 12:00 PM	<b>Location</b>	Via Zoom online

✓	Name	Organization	Title/Role	Email	Signature
	Jamie Heath	Mid-East Commission	Contractor	jheath@mideastcom.org	<u>Online</u>
	Lisa Williams	Mid-East Commission	Contractor	lwilliams@mideastcom.org	
	Sam Singleton	Mid-East Commission	Contractor	ssingleton@mideastcom.org	
	Paige Cureton	RK&K	Contractor	pcureton@rkk.com	
	Trent Cormier	RK&K	Contractor	tcormier@rkk.com	
	Gordon Marsh	RK&K	Contractor	gmarsh@rkk.com	<u>Online</u>
	Tancred Miller	NC DEQ	State/Grant Agency	Tancred.miller@ncdenr.gov	
	Mackenzie Todd	NC DEQ	State/Grant Agency	Mackenzie.todd@ncdenr.gov	<u>Online</u>
	Rachel Love-Adrick	NC DEQ	State/Grant Agency	Rachel.love-adrick@ncdenr.gov	
	Sarah Spiegler	NC Sea Grant	Coastal Resilience Specialist	sespiegl@ncsu.edu	



## **APPENDIX B**

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### Stakeholder Engagement Materials

# BEAUFORT COUNTY PUBLIC SURVEY



# shape our future.

HELP US IDENTIFY ISSUES & NEEDS RELATED TO FLOODING & OTHER NATURAL EVENTS



TAKE THE ONLINE SURVEY:

[www.beaufortcountyfloodsurvey.org](http://www.beaufortcountyfloodsurvey.org)

PLEASE COMPLETE THE SURVEY BY NOV. 12, 2021

North Carolina  
**RESILIENT  
COASTAL  
COMMUNITIES  
PROGRAM**



**Request a paper survey  
by contacting:**



**JAMIE HEATH, MID-EAST COMMISSION  
(252) 296-1656**

BEAUFORT COUNTY



RESILIENCY

***PUBLIC OPEN HOUSES***

Thurs, Feb 17, Beaufort County Community College, Building 10, Multipurpose Room  
5337 US 264, 4:00 - 6:30 pm

**VIRTUAL OPTION**

Mon, Feb 21, 6:00 - 7:30 pm

Visit **BeaufortCountyResiliency.org**

for Zoom meeting information

**Help us prioritize projects to enhance our community's resilience to flooding**



# BEAUFORT COUNTY

## Public Input Survey

Severe weather events result in flooding and other storm-related effects and can cause widespread damage, displace residents, and restrict access and mobility, impacting the well-being of communities across eastern North Carolina. Climate change continues to amplify these risks, further threatening coastal development. Barriers, such as economic and capacity constraints, often hinder the actions needed to enhance resilience and reduce vulnerability.

Building resilience to natural hazards is vital for communities to help maintain quality of life, sustain healthy economies, and ensure the conservation of resources for present and future generations. The North Carolina Resilient Coastal Communities Program provides financial grants and technical assistance to support a proactive, locally driven, and equitable approach to coastal resilience planning and project implementation.

Please take a few minutes to complete this survey for Beaufort County's Resilient Coastal Communities Program. Your input will help us better understand existing issues and needs in Beaufort County. Thanks for your time!

This survey can also be completed online at: [www.beaufortcountyfloodsurvey.org](http://www.beaufortcountyfloodsurvey.org)

### **Please tell us about yourself.**

1. Do you live and/or work in Beaufort County?
2. If yes, how long have you lived and/or worked in Beaufort County?
3. Do you own and/or rent your property (home, business, or both as applicable)?
4. Please identify your zip code (home, work, or both as applicable).

**Coastal Storms & Flooding**

5. Which of the following statements about coastal storms do you most agree with?
  - I am very worried about coastal storms in the future
  - I am slightly worried about coastal storms in the future
  - I am not worried about coastal storms in the future
  
6. On a scale of 1-5, how significant of a risk do you think flooding currently poses to your community?
  - 1 – not a concern
  - 2 – minor challenge
  - 3 – moderate challenge
  - 4 – serious challenge
  - 5 – extreme challenge
  
7. On a scale of 1-5, how significant of a risk do you think flooding will pose to your community in the next 20-40 years, given climate change and rising sea levels?
  - 1 – not a concern
  - 2 – minor challenge
  - 3 – moderate challenge
  - 4 – serious challenge
  - 5 – extreme challenge
  
8. Throughout your time living and/or working in Beaufort County, has your experience with flooding changed?
  - Yes, I have witnessed increasing flooding issues.
  - Yes, I have witnessed decreasing flooding issues.
  - No, I have not witnessed a difference in flooding conditions.
  - Not sure.

Comments:

**Coastal Hazards & Impacts**

9. What type of coastal hazards have you witnessed in your community? Select all that apply.
  - Tidal flooding – flooding caused by daily or extreme high tides
  - Coastal erosion – loss or displacement of land or sediment along the coastline
  - Storm surge flooding – flooding caused by coastal storms including nor’easters and hurricanes
  - Freshwater/saltwater impacts – changes in the boundary between freshwater and saltwater
  - Riverine flooding – flooding caused by overflowing of rivers and streams
  - Stormwater flooding – flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall
  - Erosion of land under structure

- Direct damage to structure from wave action
- Direct damage to structure from high winds
- Direct damage to structure from fallen trees or branches
- Damage from airborne debris
- Contamination from overflowing septic systems or wastewater treatment facilities
- Secondary damage from floating debris
- Secondary damage from natural gas or propane leak
- Mold
- All of the above
- Other (please specify) \_\_\_\_\_
- None

Comments:

10. Which of those same hazards have directly impacted your home or your business? Select all that apply.

- Tidal flooding – flooding caused by daily or extreme high tides
- Coastal erosion – loss or displacement of land or sediment along the coastline
- Storm surge flooding – flooding caused by coastal storms including nor’easters and hurricanes
- Groundwater impacts – changes in the boundary between freshwater and saltwater
- Riverine flooding – flooding caused by overflowing of rivers and streams
- Stormwater flooding – flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall
- Erosion of land under structure
- Direct damage to structure from wave action
- Direct damage to structure from high winds
- Direct damage to structure from fallen trees or branches
- Damage from airborne debris
- Contamination from overflowing septic systems or wastewater treatment facilities
- Secondary damage from floating debris
- Secondary damage from natural gas or propane leak
- Mold
- All of the above
- Other (please specify) \_\_\_\_\_
- None

Comments:

11. Do you have measures in place to prevent and/or reduce flooding or flood-related damages and losses to your property? If yes, what type of actions have you taken? Check all that apply.

- Elevation of property and/or utilities
- Use of flood-resistant materials (e.g., using tile in place of carpet)
- Floodproofing of property, including basements
- Installation of flood vents
- Installation of a sump pump
- Use of flood-resistant insulation
- Installation of a sewer-backflow valve
- Use of reinforced caulking of windows and doors
- Other (please specify) \_\_\_\_\_
- My property does not have measures in place to prevent and/or reduce flooding and/or future damage.
- Not applicable. My property never floods and/or I do not anticipate future flooding.

12. Have you ever considered moving to another location (can be inside or outside of Beaufort County) to avoid future flood losses, impacts, or damages?

- Yes – I am considering buying/renting at a new location in the near future because of past and/or potential future flooding.
- Yes – I considered buying/renting at a new location but there are conditions that prevent me from doing so (e.g., cost, job, family nearby, etc.)
- No – I considered leaving but I have nowhere to go.
- No – I do not want to leave my current location.
- No – My property never floods so it is not a factor in my decision to stay or leave.

13. Aside from any impacts to your home or business, have you experienced any other negative impacts as a result of flooding events? Check all that apply.

- Damage to transportation networks (e.g., flooded roadways, closure of public transportation systems, transportation delays)
- Loss of electricity
- Lack of access to clean drinking water
- Injury, illness, and/or concerns for personal safety
- Limited access to services (e.g., closure of hospitals, schools, government offices)
- Damage to personal possessions (including vehicles)
- Sewer overflow
- Inability to perform work duties
- Other (please specify) \_\_\_\_\_
- I have not experienced any negative impacts as a result of flooding or a coastal hazard event.

Comments:

14. Are there any specific areas of your community vulnerable to coastal hazards? If so, please list them by location. Please use street intersections or landmarks to describe locations.

15. Please rank the following activities, intended to restore daily life after a coastal storm.

	1 – Not at all important	2	3	4	5 – Very important	No opinion
Re-opening roads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making my home livable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repairing damaged buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring water service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring wastewater collection and disposal (sewer or septic system)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring communication (telephones, cell phones, internet)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tourists returning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Businesses reopening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring beaches, wetlands, and other coastal landforms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Is there anything else you would like to share with us regarding flooding and coastal resilience in Beaufort County?

**Stakeholder Engagement**

17. How would you like Beaufort County to communicate with you and/or your community regarding this program or on similar programs in the future?

- E-mail
- Newsletter
- Social media
- Webinar/videos
- Mail
- In person or virtual meetings
- Other (please specify) \_\_\_\_\_
- Not interested in further communication

18. Are there any local or community groups or organizations you feel we should coordinate with to create awareness of this program or similar programs in the future? If yes, please provide their name, website, and contact information if possible.

19. Are there any upcoming events where we could share information about this program?

**Demographic Information (Optional)**

**Tell us your age.**

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75+

**What race/ethnicity best describes you? Select all that apply.**

- White/Caucasian
- Black or African American
- Asian
- American Indian or Alaskan Native
- Native Hawaiian/Pacific Islander
- Hispanic/Latino
- Multiple races or ethnicities
- Other (please specify): \_\_\_\_\_

**Which type of housing best describes your home?**

- Single-family, detached from other homes
- Townhome, attached to other homes
- Apartment or condominium
- Other (please specify): \_\_\_\_\_

**How do you travel in Beaufort County? Select all that apply.**

- Walk
- Bicycle
- Beaufort Area Transit System (BATS)
- Driving a personal vehicle
- Taxi or rideshare
- Carpool / Vanpool
- Motorcycle
- Other (please specify): \_\_\_\_\_

# Beaufort County, NC: Resilient Coastal Communities Program

51 responses

Please tell us about yourself.

## Do you live and/or work in Beaufort County?

- Yes (50 responses)
- No (1 response)

## If yes, how long have you lived and/or worked in Beaufort County?

- Less than one year (3 responses)
- 2-4 years (4 responses)
- 5-7 years (3 responses)
- 8-10 years (1 response)
- 11-15 years (5 responses)
- 16-20 years (7 responses)
- 21-30 years (3 responses)
- 31-40 years (4 responses)
- 41-50 years (2 responses)
- 50+ years (11 responses)
- All my life/lifetime (3 responses)
- Yes (1 response)

## Do you own and/or rent your property (home, business, or both as applicable)?

- Own (23 responses)
- Own home (9 responses)
- Rent (3 responses)
- Rent an apartment (1 response)
- Rent home (1 response)
- I own my home and rent my business space (1 response)
- Own home/rent property (1 response)
- Home (1 response)
- Yes (8 responses)
- No (1 response)

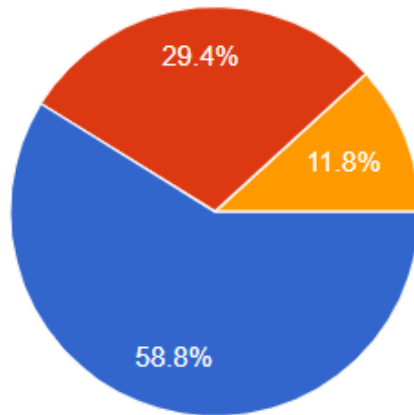
Please identify your zip code (home, work, or both as applicable).

- 27889 (21 responses)
- 27814 (13 responses)
- 27806 (1 response)
- 27808 (5 responses)
- 27810 (2 responses)
- 27817 (2 responses)
- 27806 for home, 27889 for work
- Home 27889, Office 27817
- 27817 Home, 27889 Work
- 28586 (2 responses) (outside county)
- 28556 (1 response) (outside county)
- 27880 (1 response) (outside county)

## Coastal Storms and Flooding

Which of the following statements about coastal storms do you most agree with?

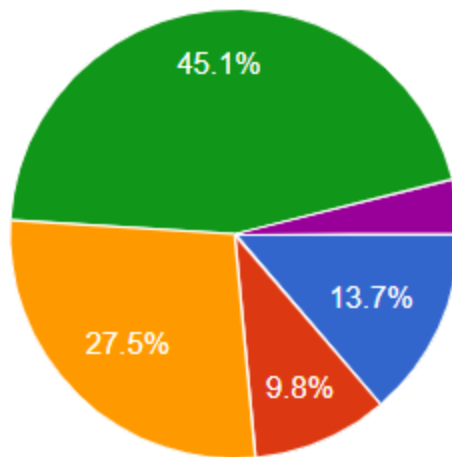
51 responses



- I am very worried about coastal storms in the future.
- I am slightly worried about coastal storms in the future.
- I am not worried about coastal storms in the future.

On a scale of 1-5, how significant of a risk do you think flooding currently poses to your community?

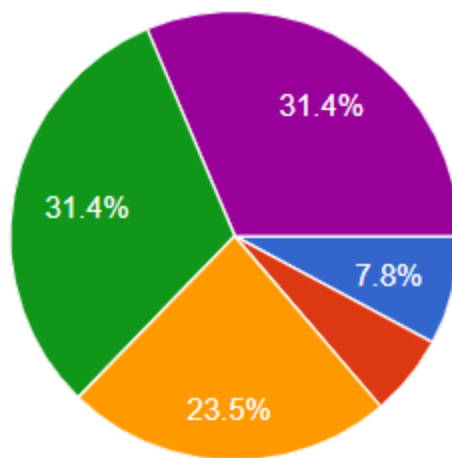
51 responses



- 1 - not a concern
- 2 - minor challenge
- 3 - moderate challenge
- 4 - serious challenge
- 5 - extreme challenge

On a scale of 1-5, how significant of a risk do you think flooding will pose to your community in the next 20-40 years, given climate change and rising sea levels?

51 responses

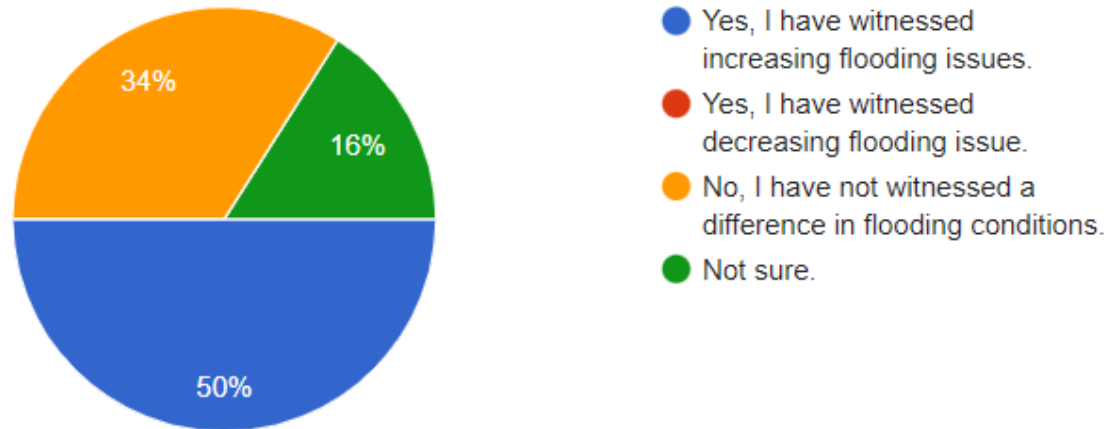


- 1 - not a concern
- 2 - minor challenge
- 3 - moderate challenge
- 4 - serious challenge
- 5 - extreme challenge

## Throughout your time living and/or working in Beaufort County, has your experience with flooding changed?



50 responses



### Comments on previous question (optional).

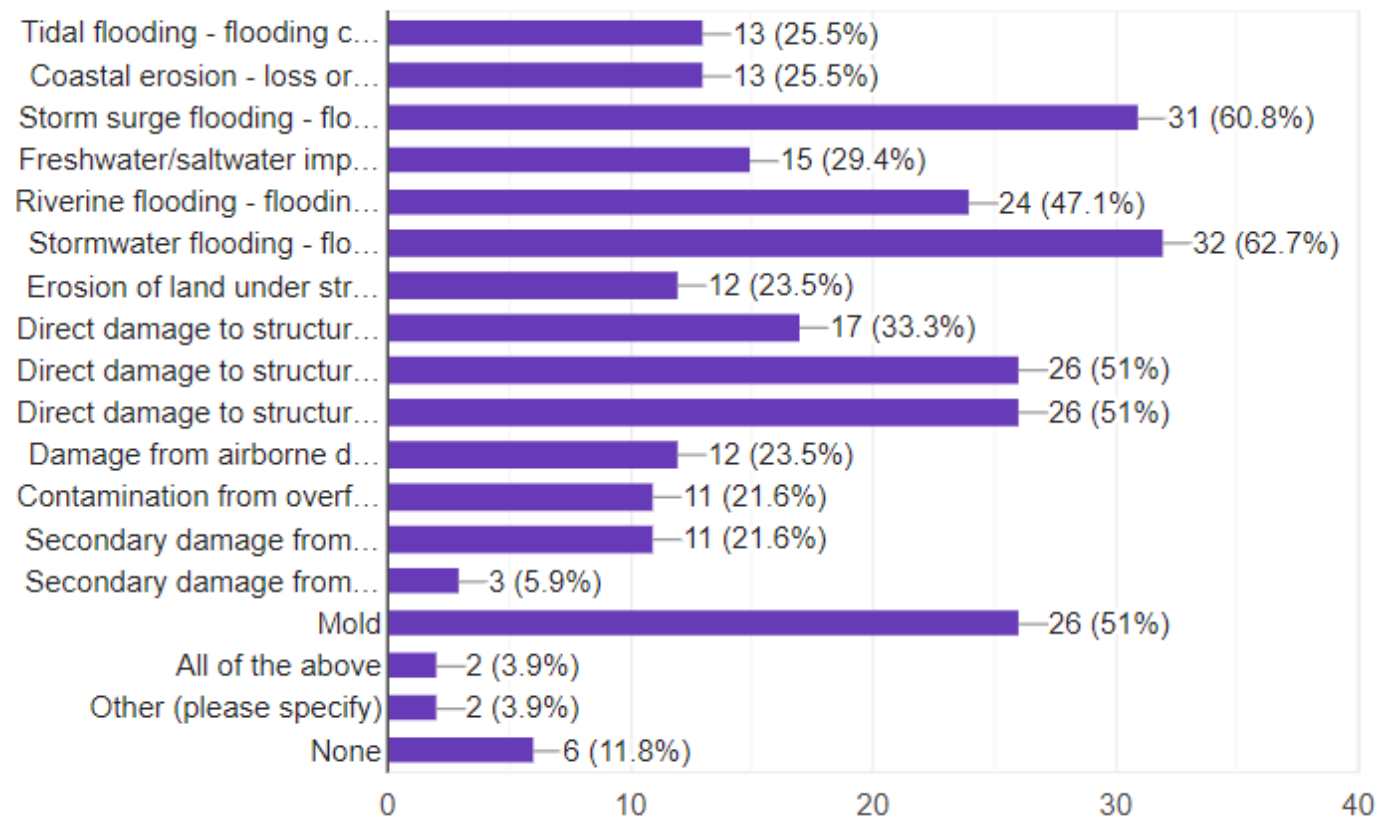
- I'm too new to the area
- I've seen frequent shallow street flooding around Havens Gardens, but major, hurricane associated flooding, hasn't seemed to have increased (lucky, I guess)
- I was very involved in helping the Aurora area after Hurricane Irene and was overwhelmed by the devastation that I saw.
- I have not experienced flooding yet in this area since we have lived here a short time.
- My house in Washington Park was flooded during Hurricane Florence; the garage of my previous house in Washington flooded during Hurricane Irene.
- Impacted by hurricane Florence
- Shoreline erosion, more casual flooding with runoff issues growing
- It appears that we continue to build in the OBX, then have the roads flood and fail and then fix them again. The same thing just keeps happening. STOP BUILDING on the coast and in flood plains. If there is flooding, develop ways to lessen or eliminate the flooding issues. Engineer you way out of the flooding problems.
- loss of beaches/sand along river banks. Increases water covering roads during king tides and strong winds
- None
- I live on the Pamlico and in the 16 years that we have lived here, the ambient water level has risen 3" above a mark I placed on one of our pier pilings when the pair was being built!
- The majority of Washington is in a flood zone. What if anything can be done to ensure that families will not lose their possessions or have to worry everytime there is a storm or heavy rain.
- We still flood living on the river. But downtown floods more often. Stewart Parkway is often flooded.
- From the early 1970s-1995 I am not aware of a single significant hurricane-related flooding event in Beaufort County. Since 1996 I can remember at least 8 serious floods from tropical storms/hurricanes, and a significant increase in nuisance level flooding from extremely heavy rains in recent years.
- I used to live on 12th Street, Washington. Flooding got progressively worse over the years so I moved.

## Coastal Hazards and Impacts

What type of coastal hazards have you witnessed in your community?

Select all that apply.

51 responses



### Comments on previous question (optional).

To new to the area

Erosion from rushing water.

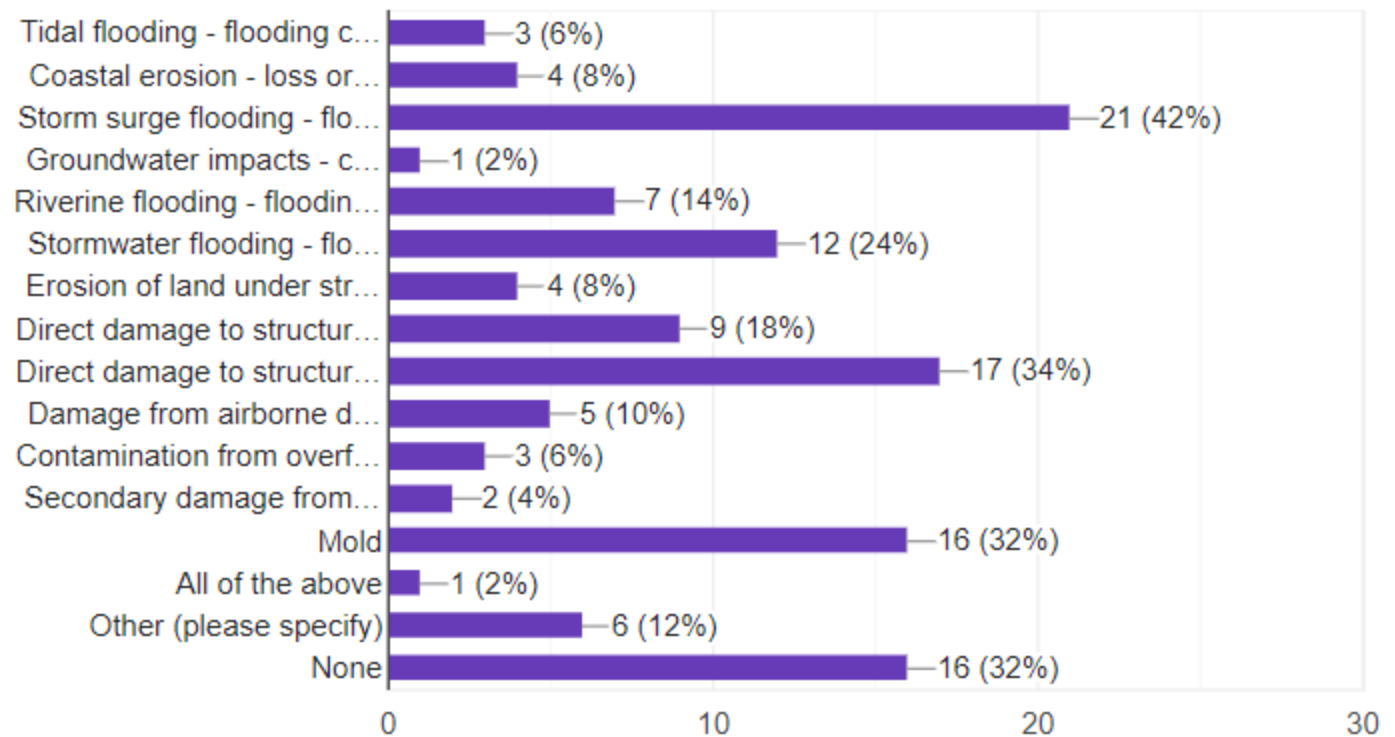
Length of storms has been a much greater concern.

None

Other: Constantly replacing duct work. Eventually went with ductless HVAC.

Which of those same hazards have directly impacted your home or your business? Select all that apply.

50 responses

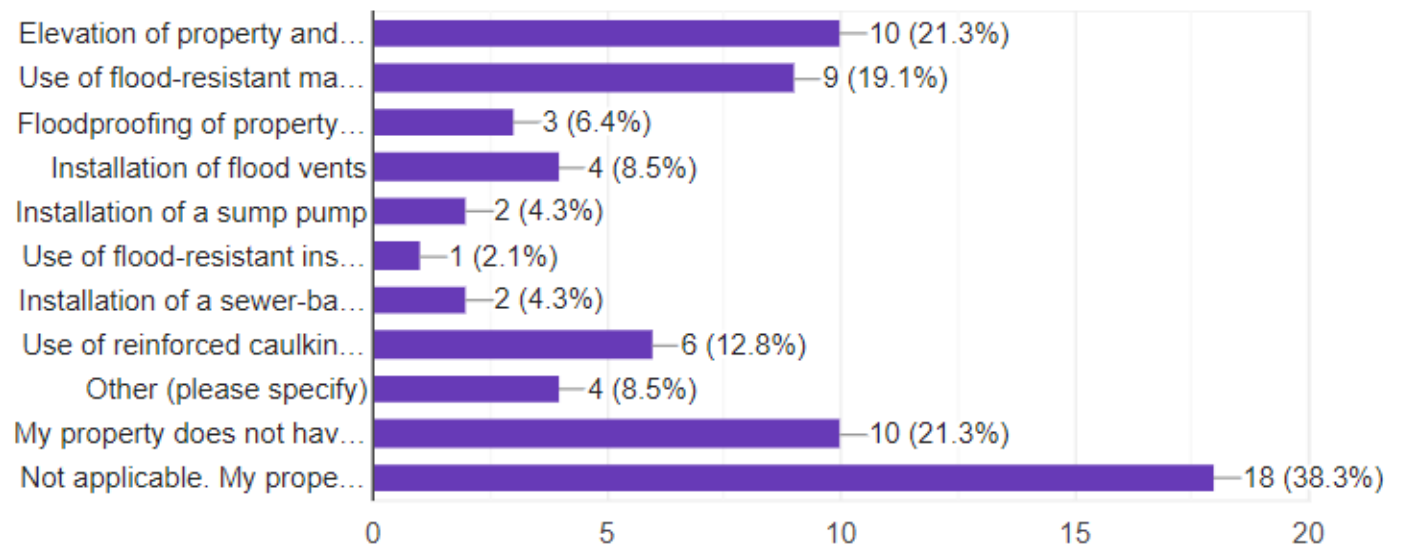


**Comments on previous question (optional).**

- Direct damage to structure from high winds (3 responses)
- Luck we are high up in elevation and do not get directly effected by the rise in water levels. This is how you solve flooding. Don't build in land with an elevation under 15-20 feet.
- None
- What can I do as a home owner, if that neighbor's tree is constantly losing limbs and falling on the top of my house and in the yard. By law is there anything that he can be made to do?
- below - hurricane rated windows
- below - Installed basement dehumidifier

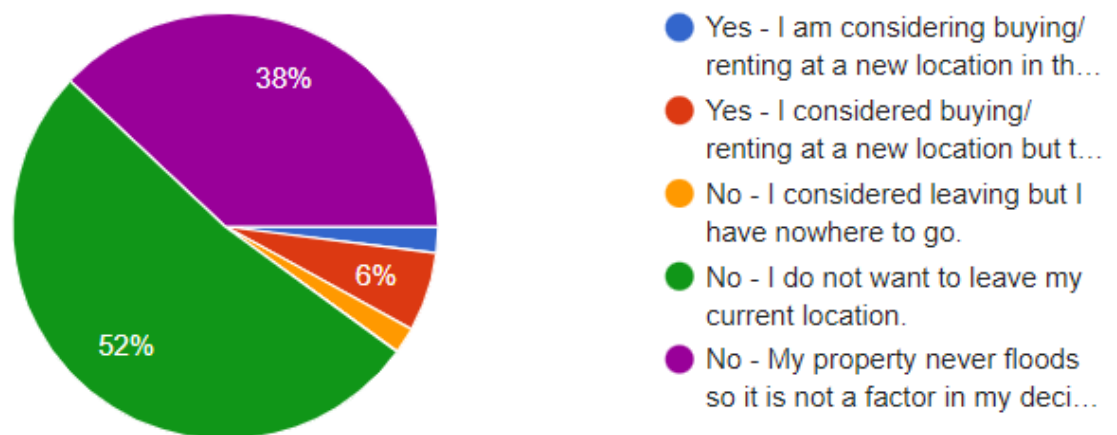
Do you have measures in place to prevent and/or reduce flooding or flood-related damages and losses to your property? If yes, what type of actions have you taken? Check all that apply.

47 responses



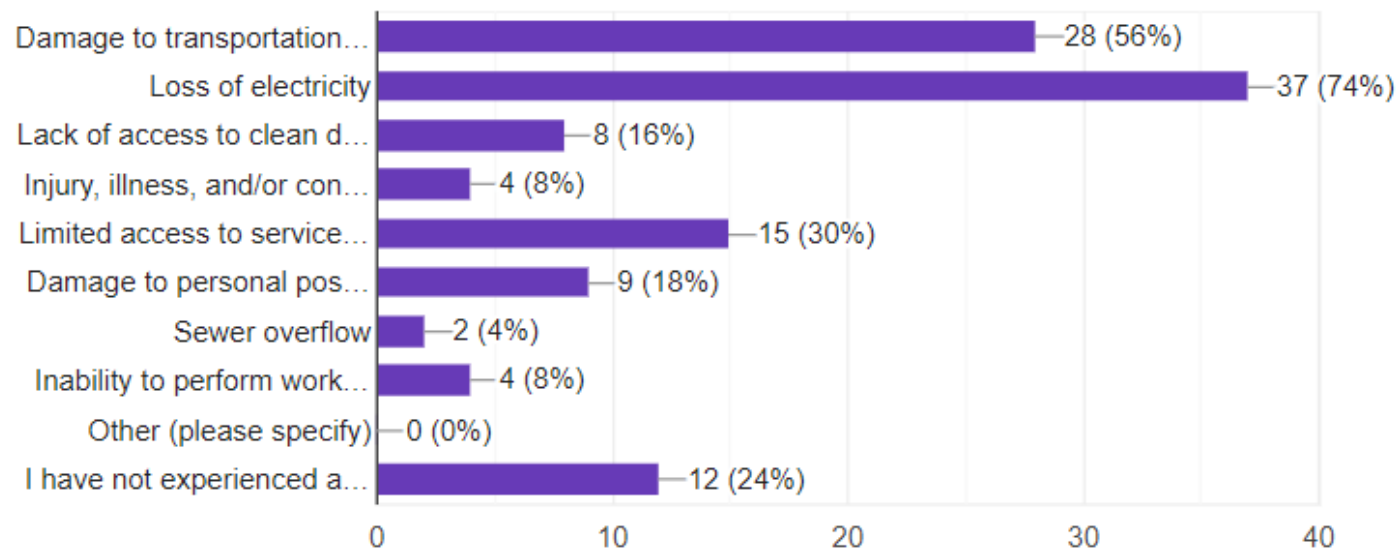
Have you ever considered moving to another location (can be inside or outside of Beaufort County) to avoid future flood losses, impacts, or damages?

50 responses



Aside from any impacts to your home or business, have you experienced any other negative impacts as a result of flooding events? Check all that apply.

50 responses



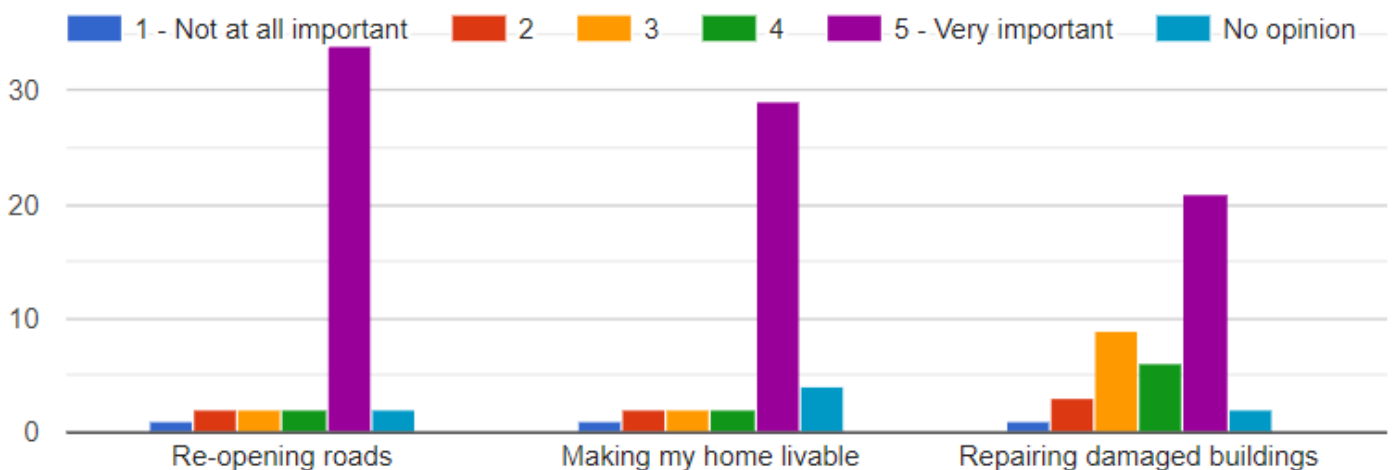
#### Comments on previous question (optional)

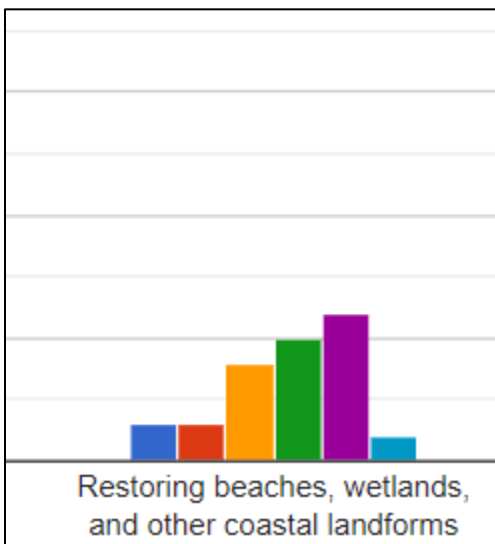
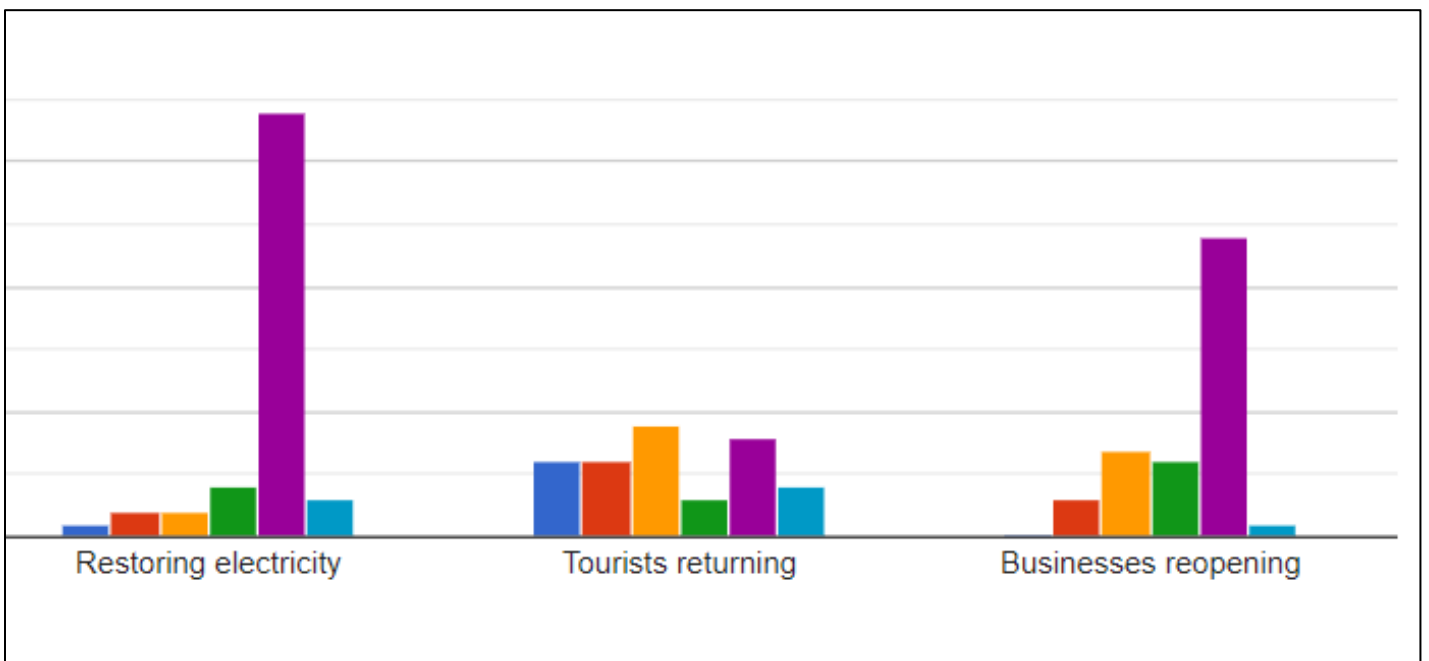
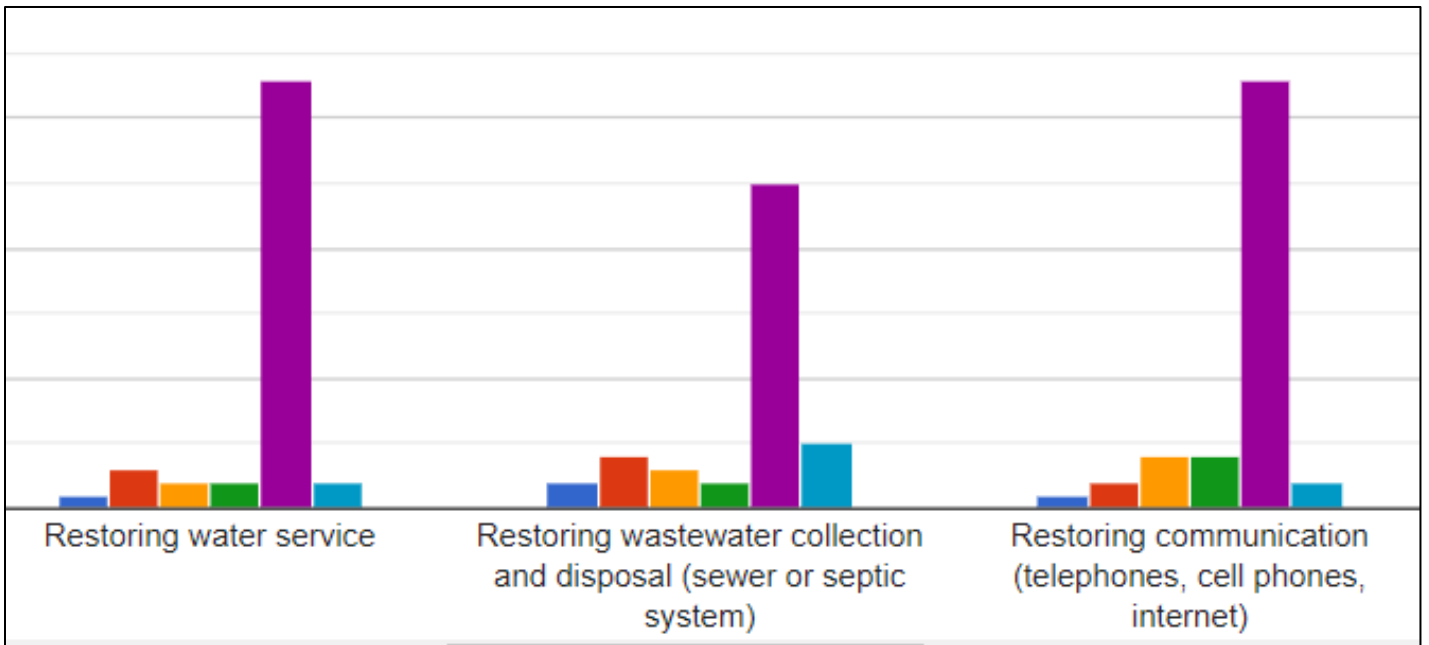
- The nonprofit with which I volunteered as director in Aurora was flooded and became unusable after Irene. This was just before my current vocation.
- I have yet to experience a major flooding event.
- Storm damage and wind resulting in downed power lines. It happens often so we installed a whole house generator.
- Power outages due to hurricanes
- During "Irene" we were on Generator for over 4 days and had no running water for nearly 6
- flooded roadways
- Everyone needs to be concerned about a storm. They are very dangerous.

Are there any specific areas of your community vulnerable to coastal hazards? If so, please list them by location. Please use street intersections or landmarks to describe locations.

- No
- Washington 15th st corridor and residential streets flooding sometimes impassible between 15th and 11th
- There seems to be increased erosion under the boardwalk along the eastern side of Moss Landing
- Main Street across 1st through 5th Sts. and the streets to the north in Aurora. All of the waterfront communities. Washington's waterfront. The parsonage on E. 12th has a history of flooding all the way up the street. I believe work has been done in the past few years to mitigate this problem.
- My husband and I work down near the waterfront so I am worried about travelling to work or missing work/income if there is extreme flooding.
- The roads to and from Belhaven are flooded after storms or high rains. Beaufort County schools have been closed because of flooding in Belhaven. That area is very vulnerable.
- All of Washington Park is vulnerable, but especially the area framed by College Avenue to the south; Spruce Street to the east; Bank Street to the north; and Pine Street to the west.
- Whichards Beach Road
- No, community elevation is over 15 feet above Chocowinity Bay.
- Downtown Washington, Parking at IBXO and Backwater Jacks, River Acres road at swamp crossing
- I live in Pamlico Dty. Flooded streets and loss of power are always a concern.
- None
- All of the Pamlico Beach area, our privater road (Chambers Point Rd) is often under water in places during big storms, sometimes for days.
- Not aware of any
- Tetterton Road and Snode Creek flooding over road
- 12th St, Washington and run off from the hospital parking lots make the area very flood prone.

Please rank the following activities, intended to restore daily life after a coastal storm.





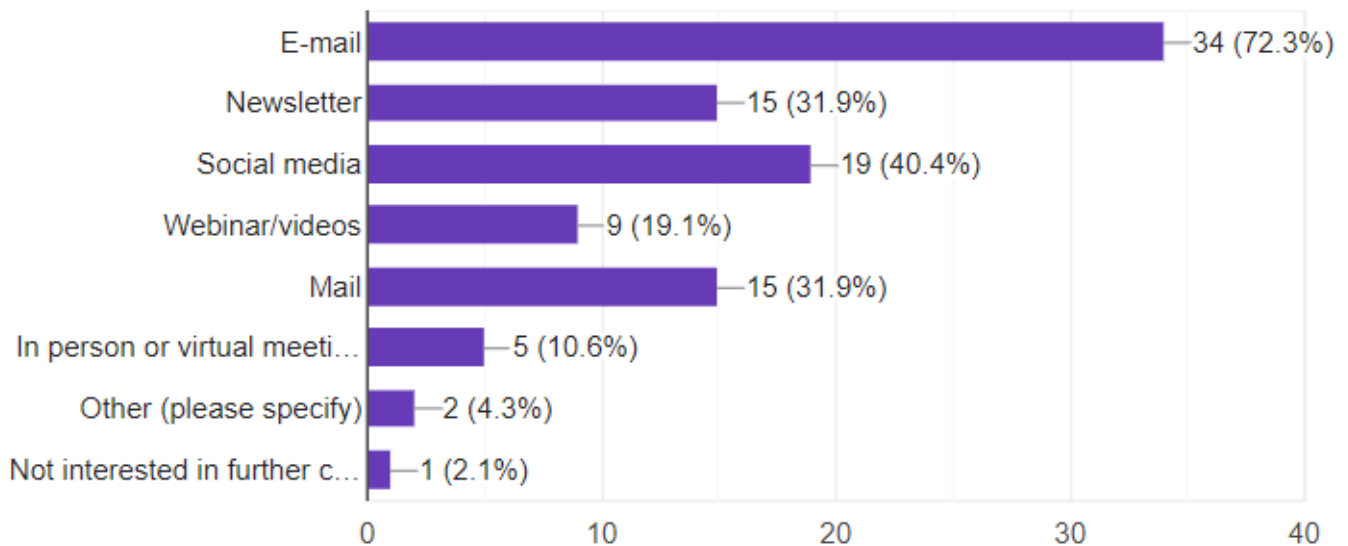
## Is there anything else you would like to share with us regarding flooding and coastal resilience in Beaufort County?

- Thank you for your efforts
- Educating public of damage to shorelines due to high speed power boats.
- If we didn't allow homes to be built near and around low elevation areas such as OBX and other areas, flooding would be kept under control and the resources could be used in those areas where people's homes can not just pick up and move or raise their homes.
- Although we live on the Pamlico, we built up 12' to reduce flooding. We have a generator for power. The first house on this property was destroyed during Fran. It was built in 1951 before hurricanes.
- Protection from future flooding should incorporate as many natural elements as possible and not be highly dependent on bulkheads and other immovable structures.

### Stakeholder Engagement

How would you like Beaufort County to communicate with you and/or your community regarding this program or on similar programs in the future?

47 responses



Comment field. Complete if "Other (please specify)" was checked in previous question.

- If there are ways that I can reasonably support your efforts, I am willing to do so.
- email for communications works fo us.
- News NO

Are there any local or community groups or organizations you feel we should coordinate with to create awareness of this program or similar programs in the future? If yes, please provide their name, website, and contact information if possible.

- Sound Rivers
- City of Washington
- The Creation Care Team of the Beacon District of the NC Conference of the United Methodist Church would like to continue the relationship that we have begun with Heather Deck.
- Sound Rivers, NC Estuarium, City of Washington
- Local churches: specifically St. Thomas Episcopal Church in Bath
- Red Cross
- United States Power Squadron, Coast Guard Auxiliary
- All local cities and town first responders prior to any storm events.
- NC Estuarium
- Sound Rivers only because our "County Commissioners" seldom can't be bothered with issues that effect the people they are supposed to represent! '
- Any information that affects the community should be shared with all businesses and with churches. As a senior, I always watch the news report, it should be shared with all local TV channel, or maybe even downloaded to our cell phones, depending on the seriousness of the issue.
- North Carolina Estuarium

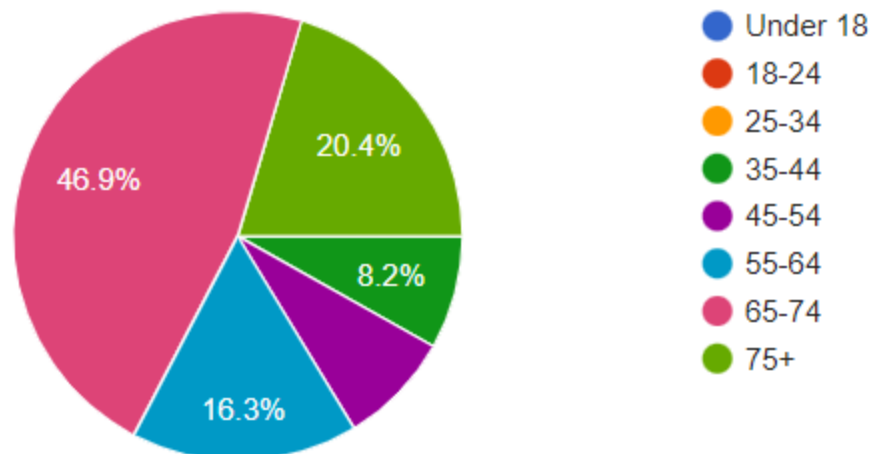
Are there any upcoming events where we could share information about this program?

- Ware Creek Rosenwald School Community Center
- Pirate Fest

## Demographic Information (optional)

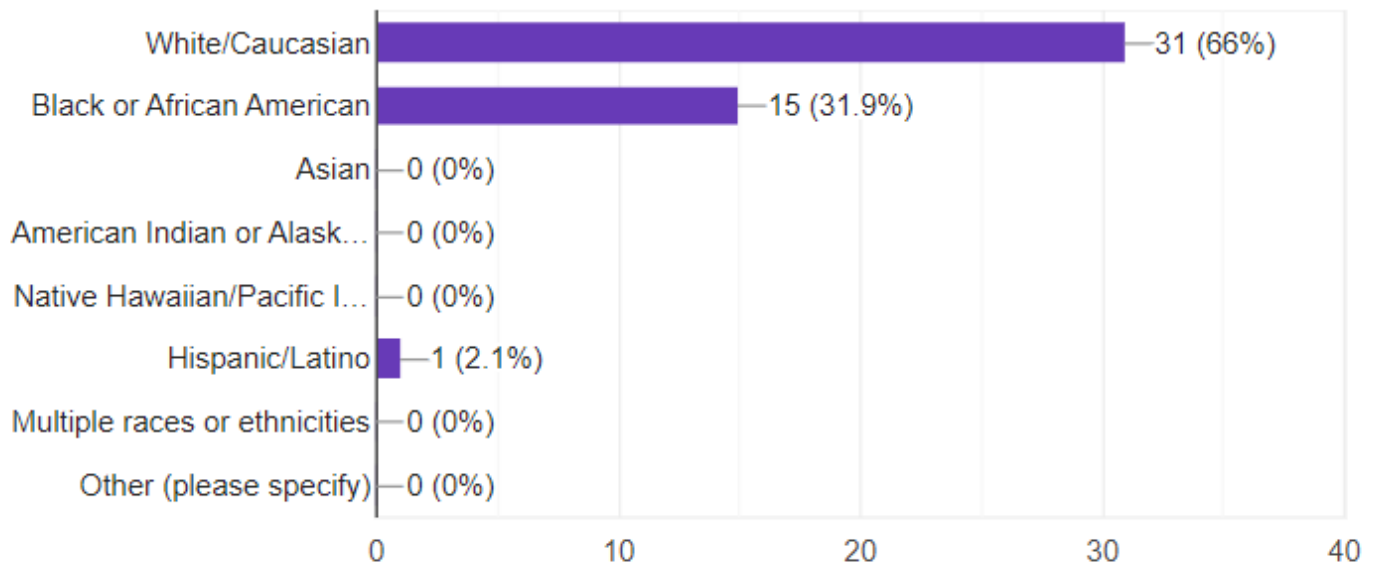
Tell us your age.

49 responses



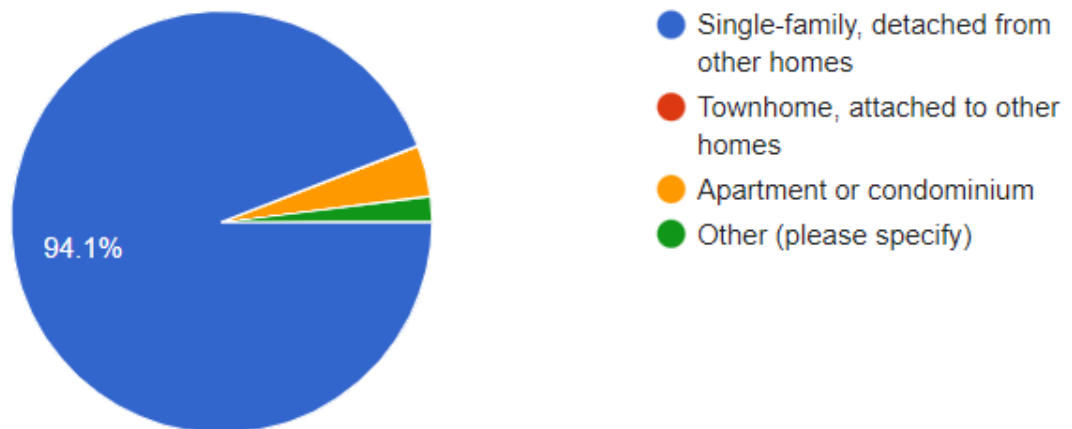
## What race/ethnicity best describes you? Check all that apply.

47 responses



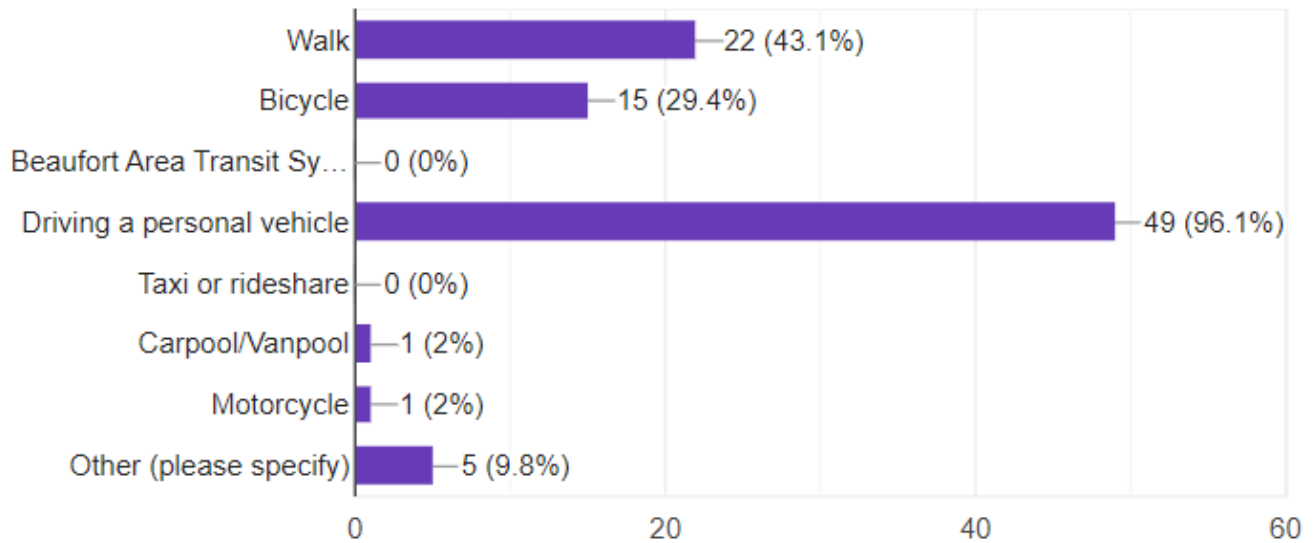
## Which type of housing best describes your home?

51 responses



## How do you travel in Beaufort County? Select all that apply.

51 responses



**Comment field. Complete if "Other (please specify)" was checked in previous question.**

- Wheelchair
- Kayak
- Boat
- Get Ride
- Choc.

# RESILIENCY PUBLIC OPEN HOUSES

*Drop in anytime during meeting hours.*

## AURORA

Mon, Feb 14  
4:00 - 6:00 pm  
Aurora Community Center  
295 Main St



## WASHINGTON

Tues, Feb 15  
4:00 - 6:30 pm  
Washington Civic Center  
Ballroom, 110 Gladden St

## BELHAVEN

Wed, Feb 16  
4:00 - 6:00 pm  
Belhaven Civic Center  
257 W Pungo St

## BEAUFORT COUNTY

Thurs, Feb 17  
4:00 - 6:30 pm  
Beaufort County Community  
College, Building 10,  
Multipurpose Room  
5337 US-264

## VIRTUAL VIA ZOOM

Mon, Feb 21, 6:00 - 7:30 pm  
Go to: [www.zoom.us](http://www.zoom.us)  
Click: Join A Meeting  
Meeting ID: 646 627 9358  
Meeting Passcode: 123  
Call-In Option:  
+1 301 715 8592

Jamie Heath  
Planner

Mid-East Commission  
(252) 296-1656



**VISIT US ON THE WEB**  
[BeaufortCountyResiliency.org](http://BeaufortCountyResiliency.org)



Part of the N.C. Resilient Coastal Communities Program

# BEAUFORT COUNTY PUBLIC SURVEY



# shape our future.

HELP US IDENTIFY ISSUES & NEEDS RELATED TO FLOODING & OTHER NATURAL EVENTS



TAKE THE ONLINE SURVEY:

[www.beaufortcountyfloodsurvey.org](http://www.beaufortcountyfloodsurvey.org)

PLEASE COMPLETE THE SURVEY BY NOV. 12, 2021

North Carolina  
**RESILIENT  
COASTAL  
COMMUNITIES  
PROGRAM**



**Request a paper survey  
by contacting:**



**JAMIE HEATH, MID-EAST COMMISSION  
(252) 296-1656**

**Link to Online Resiliency Storymap**

[www.BeaufortCountyResiliency.org](http://www.BeaufortCountyResiliency.org)

## Beaufort County seeks public input on resiliency projects to enhance community resilience to flooding

February 2, 2022

BEAUFORT COUNTY, NC - In Fall 2021, Beaufort County asked for public input on issues, needs, and opportunities related to flooding in our community via a public survey. Beaufort County is now inviting the public to attend an open house to gather input on community priorities. Draft resiliency actions will be provided for public review, including potential investments in policy and regulatory actions, public education, infrastructure improvements, and nature-based projects. Public input will be used to inform priority projects and actions.

### Beaufort County

- Thursday, Feb. 17 - Beaufort County Community College, Building 10, Multipurpose Room, 5337 US 264, 4:00 p.m. to 6:30 p.m.

The public may drop-in any time during meeting hours. There will be no formal presentation. A virtual open house will provide the same information as the in-person public meeting.

- Monday, Feb. 21 – Virtual Open House, Go to: [www.zoom.us](https://www.zoom.us), Click: Join A Meeting, Meeting ID: 646 627 9358, Meeting Passcode: 123, Call-In Option: +1 301 715 859, 6:00 p.m. to 7:30 p.m.

### Beaufort County Communities - Resiliency Web Information

- An online storymap with more information will be available from Feb. 11 through Feb. 28 at: [BeaufortCountyResiliency.org](https://BeaufortCountyResiliency.org).

These meetings are part of the N.C. Resilient Coastal Communities Program. The program facilitates a community-driven process for setting coastal resilience goals, assessing existing and needed local capacity, and identifying and prioritizing projects to enhance community resilience to coastal hazards. This initiative, funded through the N.C. State Legislature and the National Fish and Wildlife Foundation, provides funding to local governments to help overcome barriers in coastal resilience and adaptation planning, boost local government capacity, and support a proactive, sustainable, and equitable approach to coastal resilience planning and project implementation.

More information on the N.C. Resilient Coastal Communities Program is available at <https://deq.nc.gov/about/divisions/coastal-management/coastal-adaptation-and-resiliency/nc-resilient-coastal-communities-program>

For questions about the public open houses, contact Jamie Heath, Mid-East Commission, at (252) 296-1656.

Link to Washington Daily News open house article

<https://www.thewashingtondailynews.com/2022/02/08/public-invited-to-discuss-community-flood-resiliency-efforts/>

# WELCOME

Thank you for attending the Resiliency Open House!

- ✓ Sign In
- ✓ Collect a Handout
- ✓ Visit the Information Stations
- ✓ Talk with the Project Team
- ✓ Complete a Comment Sheet

## Public Open House Stations



### RESILIENCY

What is resiliency?

Flooding in Beaufort County



What does resiliency mean to you?

North Carolina Resilient Coastal Communities Program

 *Public input opportunity*



### A COMMUNITY PLAN

Resiliency vision

Community Action Team

Building upon previous plans

Public survey



### RISK & VULNERABILITY

Vulnerable community assets

Top flood related hazards



### PROJECTS & PRIORITIES

Suite of potential solutions

Preliminary strategies and their feasibility

Action strategy areas



Provide input on your top (3) preferred actions

Provide input on your top (1) preferred natural/nature-based or hybrid action 



### RESOURCES

Resiliency resources

Resident resources



### COMMENTS

Submit your comment sheet 



# NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM



## PROGRAM BASICS

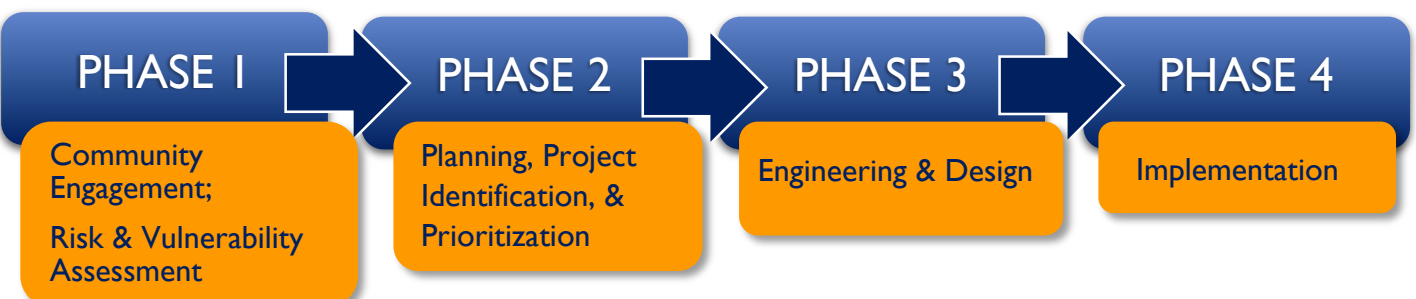
**THE ISSUE:** Flooding and other coastal hazards have devastating impacts on the economies and livelihoods of communities across eastern North Carolina. Coastal development and climate change continue to amplify these risks, and several barriers like economic and capacity constraints hinder the actions needed to enhance resilience and reduce vulnerability.

*Building resilience to natural hazards is vital for communities to help maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generations.*

**OBJECTIVES:** The NC Resilient Coastal Communities Program provides **financial grants and technical assistance** to support a proactive, locally-driven, and equitable approach to coastal resilience planning and project implementation.

**ELIGIBILITY:** County and municipal governments in the 20 CAMA counties are eligible to receive assistance through the RCCP. Any qualified organizations may apply to provide technical assistance.

**FRAMEWORK:** The RCCP provides a phased framework to assess coastal risks and vulnerabilities, engage community stakeholders, and develop projects to strategically improve the resiliency of communities and their natural and built infrastructure. The four phases of the program include:



## NC'S FUTURE

Intensity of tropical storms and hurricanes, storm surge flooding, heavy precipitation events, sea level rise, and tidal flooding are all expected to increase in our state (NC Climate Science Report 2020). More must be done to safeguard communities from loss of life, economic hardships, and the destructive impacts of intensifying coastal and climate risks.

## Program Goals:

- Address barriers to coastal resilience in North Carolina at the local level, such as limited capacity, economic constraints, and social inequities;
- Assist communities with risk and vulnerability assessments and developing a portfolio of well-planned and prioritized projects;
- Advance coastal resilience projects to “shovel-ready” status, or ready for implementation; and
- Provide funding for project implementation and link to additional funding streams.

**PROGRAM ORIGINS:** The Resilient Coastal Communities Program is a component of the statewide North Carolina Resilient Communities Program, called for in the North Carolina Climate Risk Assessment and Resilience Plan. It is also a continuation of several years of coastal resiliency work at DCM.

## PROGRAM PARTNERS:



## PROGRAM FUNDERS:



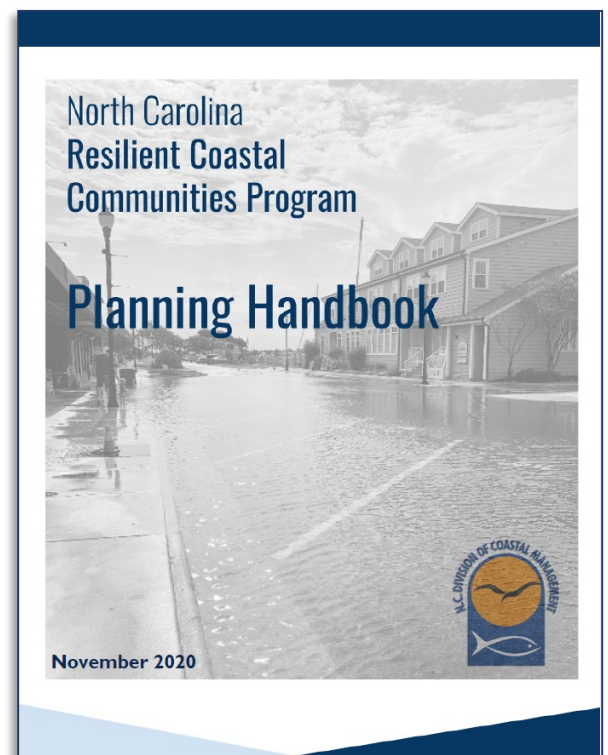
## PROGRAM PLANNING HANDBOOK:

Communities and contractors participating in this program are provided guidance to complete Phases 1 and 2 in DCM’s Program Planning Handbook, available [here](#).

**HOW TO APPLY:** Applications for Phases 1 and 2 are closed for the current round. Applications for grant funding to complete Phases 3 and/or 4 will open in Winter 2021. Communities wishing to receive funding for engineering, design, and/or implementation must complete the requirements of the RCCP Planning Handbook – via Phase I and 2 participation or independently.

**PROGRAM CONTACT:** Email us at [RCCP@ncdner.gov](mailto:RCCP@ncdner.gov) with any questions about the program.

**WEBSITE:** Also visit our website [here](#) for updates.



# COMMENT FORM

Thank you for attending the Beaufort County Resiliency Open House!

## CONTACT INFORMATION

Name			
Address (Optional)			
E-mail Address (Optional)			
Would you like to be informed of future resiliency efforts?	<input type="checkbox"/>	Yes	No

## Draft Resiliency Actions

### 1. Which of the following draft actions do you prefer? Please select your top three (3).

<input type="checkbox"/>	<b>Pamlico and Pungo River Wetland Restoration</b> <i>Comment:</i>	<i>Natural/Nature-Based Action</i>
<input type="checkbox"/>	<b>Open Space / Recreation Plan for Flood Mitigation</b> <i>Comment:</i>	<i>Policy/Regulatory-Based Action</i>
<input type="checkbox"/>	<b>Natural Shoreline Migration</b> <i>Comment:</i>	<i>Natural/Nature-Based Action</i>
<input type="checkbox"/>	<b>Greenway and Public Park Improvements</b> <i>Comment:</i>	<i>Hybrid Action</i>
<input type="checkbox"/>	<b>Living Shorelines Funding Program</b> <i>Comment:</i>	<i>Policy/Regulatory-Based Action</i>
<input type="checkbox"/>	<b>CAMA Land Use Plan Coordination</b> <i>Comment:</i>	<i>Policy/Regulatory-Based Action</i>
<input type="checkbox"/>	<b>Essential / Emergency Services Operations Redundancies</b> <i>Comment:</i>	<i>Emergency Services Action</i>
<input type="checkbox"/>	<b>Open Space Program</b> <i>Comment:</i>	<i>Policy/Regulatory-Based Action</i>
<input type="checkbox"/>	<b>Repetitive Loss Property Acquisition and/or Elevation</b> <i>Comment:</i>	<i>Staffing, Funding and Resources Action</i>

### 2. Which of the following natural/nature-based or hybrid actions do you prefer? Select one.

<input type="checkbox"/>	<b>Pamlico and Pungo River Wetland Restoration</b> <i>Comment:</i>	<i>Natural/Nature-Based Action</i>
<input type="checkbox"/>	<b>Natural Shoreline Migration</b> <i>Comment:</i>	<i>Natural/Nature-Based Action</i>
<input type="checkbox"/>	<b>Greenway and Public Park Improvements</b> <i>Comment:</i>	<i>Hybrid Action</i>



# COMMENT FORM

## Public Involvement

**3. How did you hear about this meeting? Please check all that apply.**

<input type="checkbox"/> Website	<input type="checkbox"/> Facebook	<input type="checkbox"/> Flyer
<input type="checkbox"/> Newspaper	<input type="checkbox"/> Friend/Family	<input type="checkbox"/> Community Organization
<input type="checkbox"/> Other: _____		

## Additional Comments

**4. Please add any additional comments about how we can improve resiliency to flooding in our community.**

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**Please submit your comments in the comment box tonight or send via mail or e-mail to Jamie Heath. Please submit your comments by Friday, February 25.**

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**Comment By Mail:** Jamie Heath, Mid-East Commission  
1502 N Market St, Suite A, Washington, NC 27889

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**Comment By E-mail:** [jheath@mideastcom.org](mailto:jheath@mideastcom.org)

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**Please Reference:** RCCP

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**Thank you for your feedback!**

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
<b>ACTION: Drainage Ditches and Tributaries Maintenance Plan</b> Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done).	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0	0	1	1	17	
<b>ACTION: Open Space / Recreation Plan for Flood Mitigation</b> Develop an open space/recreation plan for flood mitigation projects.	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	1	0	0	1	1	17	
Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances.	0	1	1	1	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	16	
<b>ACTION: Pamlico and Pungo River Wetland Restoration</b> Restore wetlands at the confluence of the Pamlico and Pungo Rivers.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	0	1	0	0	1	1	17	
Restore mudflat wetlands throughout Beaufort County.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	16	
Restore T.G Ponds (at Pamlico River and South Creek) to wetlands.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	16	
Move critical assets out of the floodplain.	1	1	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	0	1	0	0	1	1	16
<b>ACTION: Living Shorelines Funding Program</b> Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented.	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	20	
Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan).	1	1	1	1	0	0	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0	1	1	12
Research flooding concerns for NC Highway 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed.	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	16

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws		
<b>Considerations for Alternative Actions</b>																									
Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable.	1	1	1	1	0	1	0	0	0	1	0	1	1	0	1	1	1	1	1	0	0	1	1	15	
Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings.	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	1	16	
<b>ACTION: Special Flood Hazard Areas Educational Materials</b> Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, heavy rains, and flooding.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	17	
<b>ACTION: Essential / Emergency Services Operations Redundancies</b> Create redundancy for at risk infrastructure and emergency services.	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	17	
Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas.	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16	
<b>ACTION: Natural Shoreline Migration</b> Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement.	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	17	
Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management.	1	1	1	1	0	1	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	14	
Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests.	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16	

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
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<b>Considerations for Alternative Actions</b>																								
Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	15
<b>ACTION: CAMA Land Use Plan Coordination</b> Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	18
<b>ACTION: Greenway and Public Park Improvements</b> Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans).	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	17
Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel.	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	15
<b>ACTION: Open Space Program</b> Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20
<b>ACTION: Repetitive Loss Property Acquisition</b> Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20

# WELCOME

## Thank you for attending the Resiliency Open House!

- ✓ Sign In
- ✓ Collect a Handout
- ✓ Visit the Information Stations
- ✓ Talk with the Project Team
- ✓ Complete a Comment Sheet

### Public Open House Stations



#### RESILIENCY

What is resiliency?

Flooding in Beaufort County



What does resiliency mean to you?

North Carolina Resilient Coastal Communities Program



Public input opportunity



#### A COMMUNITY PLAN

Resiliency vision

Community Action Team

Building upon previous plans

Public survey



#### RISK & VULNERABILITY

Vulnerable community assets

Top flood related hazards



#### PROJECTS & PRIORITIES

Suite of potential solutions

Preliminary strategies and their feasibility

Action strategy areas



Provide input on your top (3) preferred actions

Provide input on your top (1) preferred natural/nature-based or hybrid action



#### RESOURCES

Resiliency resources

Resident resources



#### COMMENTS

Submit your comment sheet



# RESILIENCY

## What is Resiliency?

“Resilience is the ability to adapt to changing conditions brought about by climate change and withstand—and rapidly recover from—disruption due to hazardous events such as hurricanes, coastal storms, and flooding. This applies to individuals, to communities, to our infrastructure, to our economic vitality and to the environment.” (Adapted from NOAA definition)

## Flooding in Beaufort County







Flooding in Beaufort County is often caused by severe storms, hurricanes, and tropical storms that result in heavy rainfall and high coastal waters. Building resilience to flooding is vital for communities to maintain quality of life, sustainable systems, and conservation of resources for present and future generations.

**THE ISSUE:** Flooding and other coastal hazards have devastating impacts on the economies and livelihoods of communities across eastern North Carolina. Coastal development and climate change continue to amplify these risks, and several barriers like economic and capacity constraints hinder the actions needed to enhance resilience and reduce vulnerability.

**NORTH CAROLINA'S FUTURE:** Intensity of tropical storms and hurricanes, storm surge flooding, heavy precipitation events, sea level rise, and tidal flooding are all expected to increase in our state (NC Climate Science Report 2020). More must be done to safeguard communities from loss of life, economic hardships, and the destructive impacts of intensifying coastal and climate risks.



## did you know?

-  Approximately 25% of Beaufort County land is located in a flood zone.
-  Since 1991, there has been \$91,373,500 in property damage in Beaufort County (NOAA storm events database).
-  Vulnerable populations are often at higher risk during floods. In Beaufort County, vulnerable populations include low-income populations, seniors, limited English speaking populations, and zero car households.
-  North Carolina has been impacted by three “billion-dollar” flooding events Hurricanes Matthew (2016), Florence (2018), and Dorian (2019) since 2015, imposing financial burdens on many communities, particularly in the eastern part of the state. (UNC Financial Risk of Flood Events in Eastern North Carolina Study)
-  There are 1,616 total repetitive loss properties in Beaufort County with 5,816 total number of losses.
-  Hurricane Florence impacted 1,167 houses in Beaufort County as reported through individual assistance claims.

# WHAT DOES RESILIENCY MEAN TO YOU?



*a healthy  
future for our  
kids*

# NORTH CAROLINA

## RESILIENT COASTAL COMMUNITIES PROGRAM

### Program Overview

**Program Objectives:** The Resilient Coastal Communities Program (RCCP) provides financial grants and technical assistance to support a proactive, locally-driven, and equitable approach to coastal resilience planning and project implementation.

**Program Framework:** The RCCP provides a phased framework to assess coastal risks and vulnerabilities, engage community stakeholders, and develop projects to strategically improve the resiliency of communities and their natural and built infrastructure.

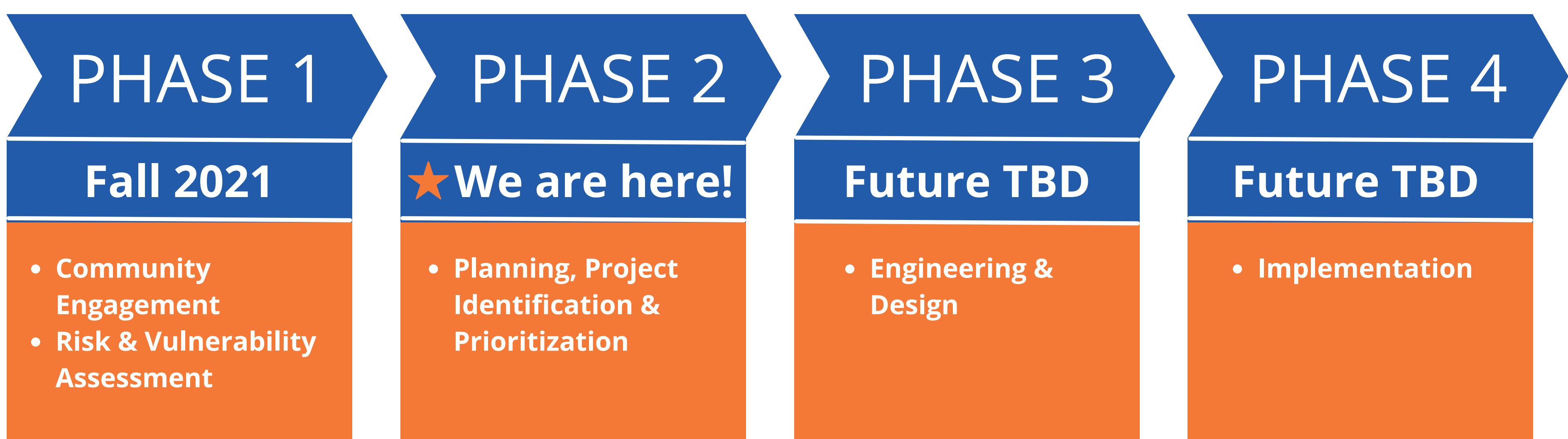
**Program Goals:**

- Address barriers to coastal resilience in North Carolina at the local level, such as limited capacity, economic constraints, and social inequities.
- Assist communities with risk and vulnerability assessments and developing a portfolio of well planned and prioritized projects.
- Advance coastal resilience projects to “shovel-ready” status, or ready for implementation.
- Provide funding for project implementation and link to additional funding streams.

**Beaufort County Communities**

In Spring 2021, four Beaufort County communities were selected to participate in the first two phases of the RCCP: Beaufort County, Town of Aurora, City of Washington, and Town of Belhaven. Following Phase 2, each community will have the opportunity to submit one (1) proposed project to the North Carolina Division of Coastal Management for consideration to enter into Phase 3. The proposed project must be a **nature-based solution**. 🌿

**RCCP Process**



### RCCP Program Information

**CONTACT:** Email us at [RCCP@ncdner.gov](mailto:RCCP@ncdner.gov) with any questions about the program.

**WEBSITE:** <https://deq.nc.gov/about/divisions/coastal-management/coastal-adaptation-and-resiliency/nc-resilient-coastal-communities-program>

# A COMMUNITY PLAN

## Beaufort County Resiliency Vision

Beaufort County exemplifies a culture of resilience to coastal hazards through inclusive partnerships focusing on both effective response and recovery, and pro-active measures to prevent or minimize future damage. The county is quickly able to rebound from all hazard events, thereby supporting thriving, healthy communities that offer opportunities for all residents.

### Community Action Team

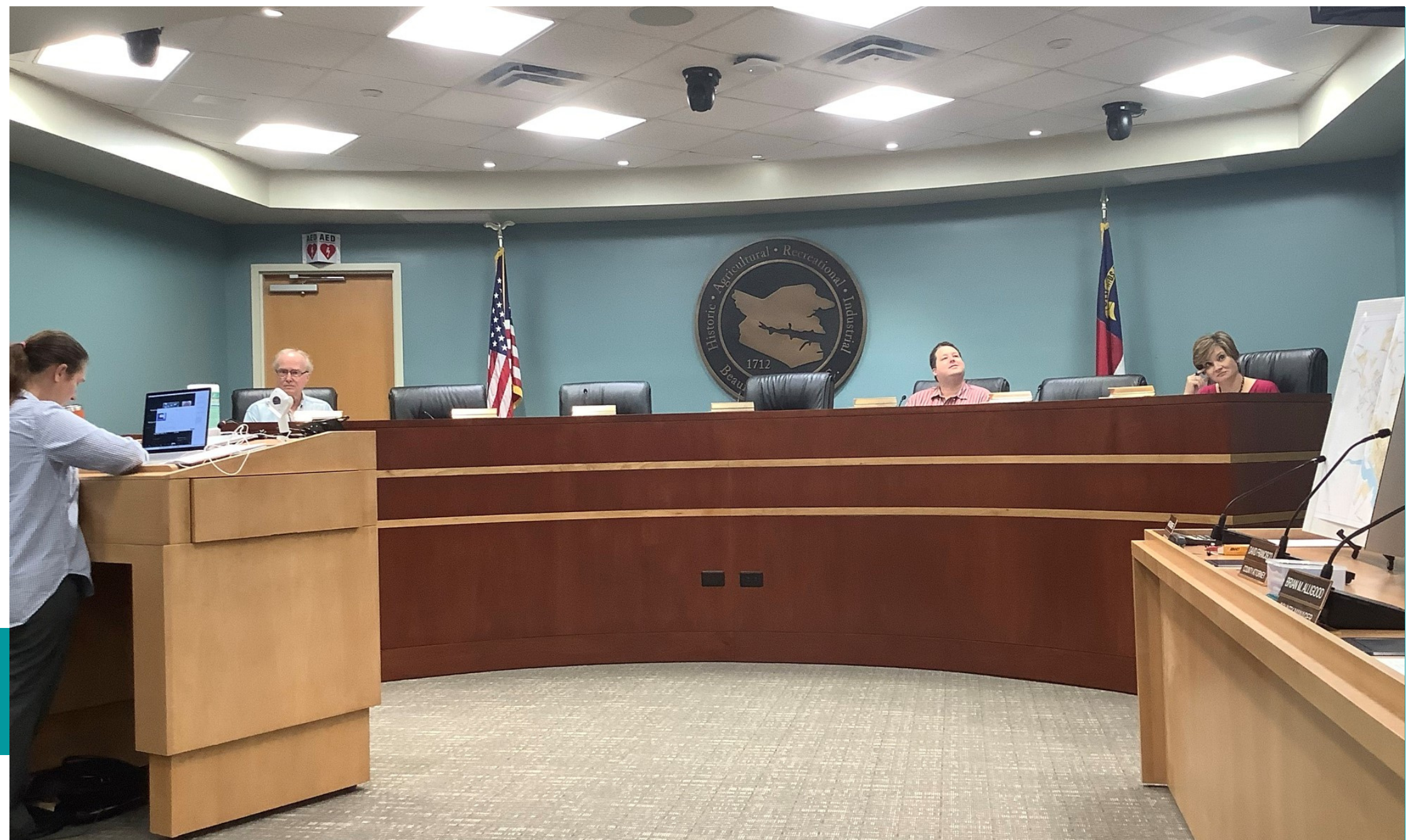
*Thank You!*

A Community Action Team participated throughout the planning process.

- Brian Alligood, Beaufort County, Manager
- Ed Booth, Beaufort County, Commissioner
- Heather Deck, Sound Rivers, Director
- Carnie Hedgepeth, Beaufort County Emergency Management, Director
- Jill Howell, Sound Rivers, Environmental Projects Manager
- Martyn Johnson, Beaufort County Economic Development, Director
- Dave Loope, Beaufort County Community College, President
- Bishop James S. McIntyre Sr., Cornerstone Family Worship Center, Pastor
- John Rebholz, Beaufort County, Commissioner
- Christina Smith, Beaufort County, Public Works Director
- Sue Squires, Beaufort County Economic Development, Economic Development Specialist
- Tom Stroud, NC Estuarium/Partnership for the Sounds, Deputy Director

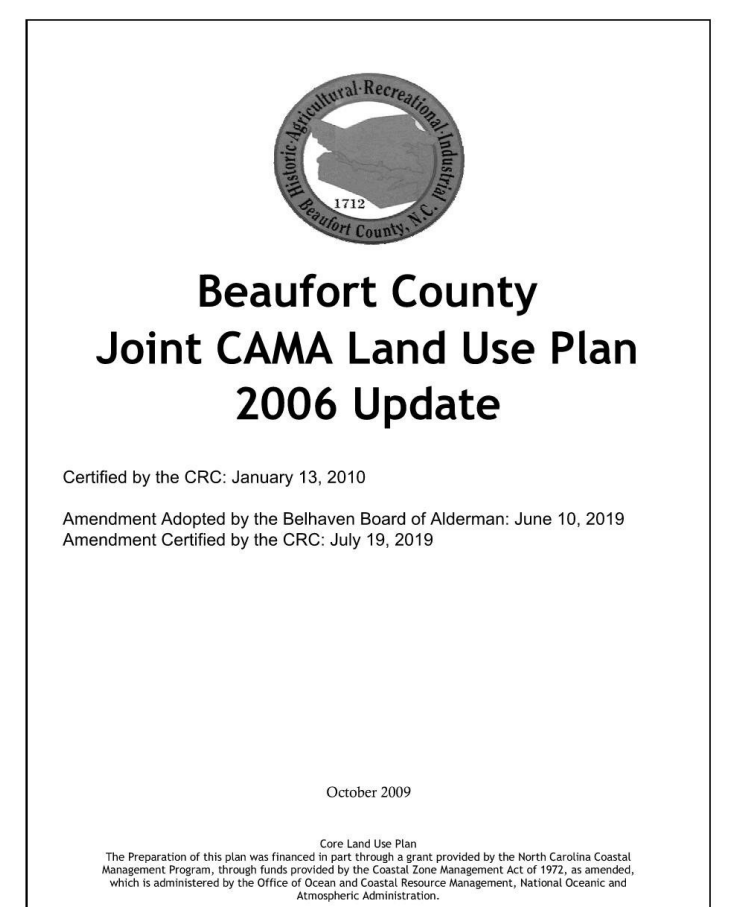
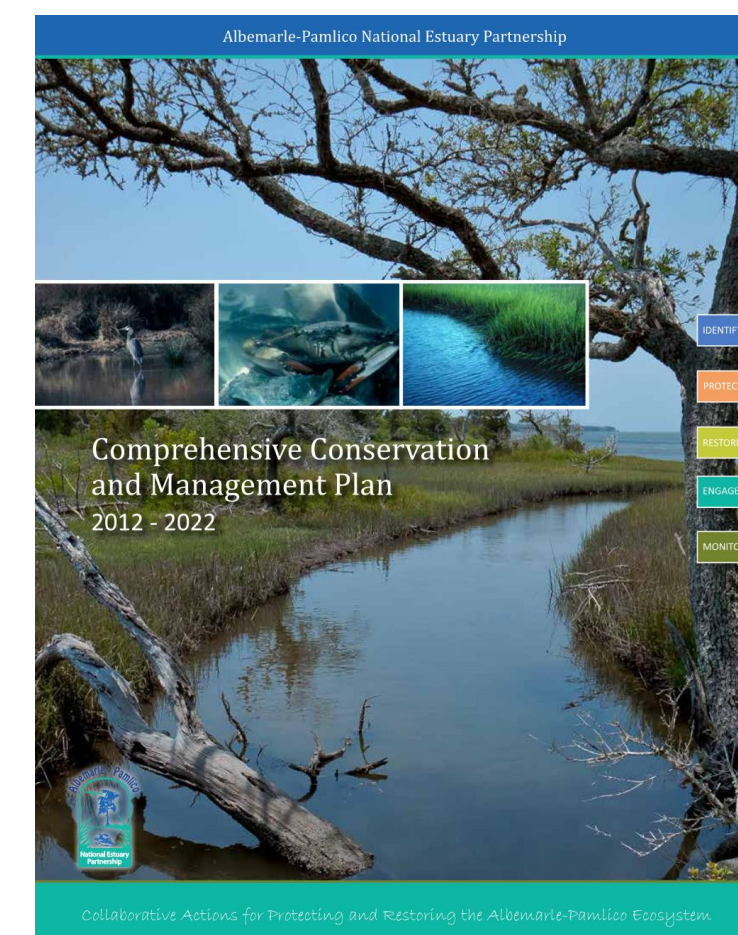
### Community Action Team Meetings

- 1: Vision and Goals, Existing Plans, and Community Engagement  
September 2021
- 2: Existing Conditions - Critical Assets & Natural Infrastructure  
October 2021
- 3: Risk & Vulnerability Assessment  
November 2021
- 4: Suite of Potential Strategies & Public Meeting Planning  
December 2021
- 5: Preliminary Project Prioritization  
January 2022
- 6: Public Input & Draft Resiliency Strategy Elements  
February 2022 (Future)



### Building upon previous plans

- Albemarle-Pamlico Comprehensive Conservation and Management Plan (CCMP)
- Beaufort County CAMA Land Use Plan
- Beaufort County Comprehensive Bicycle Plan
- Beaufort County Comprehensive Transportation Plan
- Beaufort County Economic Development FY 21-22 Work Plan
- Pamlico Peninsula Resilient Region Report
- Pamlico Sound Regional Hazard Mitigation Plan
- Rebuild NC Beaufort County Plan
- Rebuild NC Southeast Region Plan



**BEAUFORT COUNTY**  
North Carolina

# A COMMUNITY PLAN

## Public survey

### Identifying issues, needs, and opportunities

A public survey was used to gather public input related to flooding and other natural events in our community.

## BEAUFORT COUNTY

### Distribution methods

- Online survey at [BeaufortCountyFloodSurvey.org](http://BeaufortCountyFloodSurvey.org)
- Hard copy surveys distributed at Public County Buildings, North Carolina Estuarium, and by Cornerstone Family Worship Center Church Network
- Notifications included flyers, Beaufort County website and Facebook page, Sound Rivers website and Facebook page, North Carolina Estuarium Facebook page

### Respondents

- 51 survey respondents, mix of new and lifelong residents

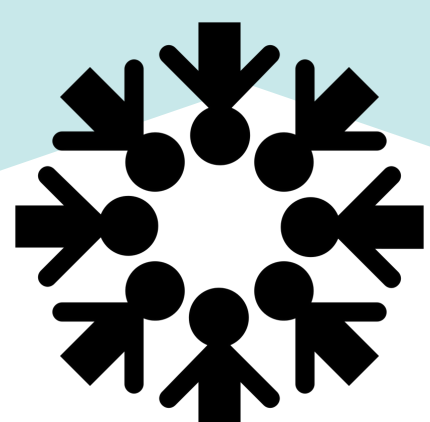
### What we heard from survey participants

*In general, we are concerned about flooding.*

- Most respondents worried (58.8%) or slightly worried (29.4%) about future coastal storms
- 50% experienced increasing flooding issues throughout their time living or working in the area
- 60.8% witnessed storm surge flooding
- 42% had their home or business directly impacted by storm surge flooding
- 74% experienced loss of electricity during storms
- 21.3% had elevated properties and utilized flood-resistant materials
- 21.3% had no protection to their property despite the threat of flooding

## Community outreach

- Community Action Team
- Public survey (online & hard copy)
- Flyers
- Public open house



## “ survey quotes

*“From the early 1970s-1995, I am not aware of a single significant hurricane-related flood event in Beaufort County. Since 1996, I can remember at least 8 serious floods from tropical storms/hurricanes, and a significant increase in nuisance level flooding from extremely heavy rains in recent years.”*

*“I live on the Pamlico and in the 16 years that we have lived there, the ambient water level has risen 3” above a mark I placed on one of our pier pilings when the pier was being built!”*

*“I used to live on 12th Street, Washington. Flooding got progressively worse over the years so I moved.”*

*“I was very involved in helping the Aurora area after Hurricane Irene and was overwhelmed by the devastation that I saw.”*

*“My house in Washington Park was flooded during Hurricane Florence; the garage of my previous house in Washington flooded during Hurricane Irene.”*

*“The roads to and from Belhaven are flooded after storms or high rains. Beaufort County schools have been closed because of flooding in Belhaven. That area is very vulnerable.”*

*“Storm damage and wind resulting in downed power lines. It happens often so we installed a whole house generator.”*

*“During Irene we were on a Generator for over 4 days and had no running water for nearly 6.”*

*“I have seen shoreline erosion, more casual flooding with runoff issues growing.”*

*“There seems to be increased erosion under the boardwalk along the eastern side of Moss Landing.”*

*“Loss of beaches/sand along riverbanks is a serious issue.”*

# RISK & VULNERABILITY

**Risks** refer to multi-hazard threats to communities such as flooding, storm surge, or sea level rise that may occur amidst storms or as a result of a changing climate.

**Vulnerability** of critical assets and natural infrastructure to a hazard is a function of the exposure, sensitivity, and adaptive capacity.

- **Exposure** refers to the probability of physical contact between an asset and a hazard.
- **Sensitivity** is the degree to which an asset is impacted by a hazard.
- **Adaptive Capacity** is the ability of an asset to change its characteristics or behavior in response to a hazard.

**Vulnerability =  
Exposure + Sensitivity - Adaptive Capacity**

## Beaufort County's most vulnerable assets

The planning team mapped critical assets and infrastructure with input from the Community Action Team. Critical assets included those that enabled the continuous operation of critical community functions essential to human health, safety, or economic security. The top flooding related hazards were then mapped as an overlay. The team then explored the vulnerability of each critical asset by evaluating potential exposure, sensitivity, and adaptive capacity.

The following assets were identified as being the most vulnerable to flooding:

- Beaufort County Courthouse and Jail
- Beaufort County Social Services
- Macedonia Church of Christ Food Bank
- Mobile Food Pantry Pantego
- Washington Area Shelter and Soup Kitchen
- Pungo Christian Academy
- Beaufort County Richland Water Treatment Plant
- Beaufort County Public Works Department / Water
- BJ's Convenience Store Well (Well #1)
- Dowry Creek Marina Well (Well #1)
- Town of Chocowinity System Well (Well #2A)
- Town of Chocowinity System Well (Well #3)
- Whitley's Mobile Home Park Well (Well #2)
- Whitley's Mobile Home Park Well (Well #1)
- New Hope Church of Christ Food Bank
- Beaufort County Wastewater Treatment Plant
- Bridges
- Rail Line
- Streams
- Roads, including Hwy 264
- Natural Areas
- Underground Storage Tanks
- Hazard Waste Sites



## FLOODING / FLOOD ZONES

The covering or submerging of normally dry land with a large amount of water.

## STORM SURGE

A rising of the sea because of atmospheric pressure changes and wind associated with a storm.

## SEA LEVEL RISE

An increase in the level of the world's oceans due to the effects of global warming.

**BEAUFORT COUNTY  
TOP FLOOD RELATED HAZARDS**

# DEVELOPING PROJECTS & PRIORITIES

## ▶ **Developed a suite of potential solutions**

Based on the results of the risk and vulnerability analysis, the Contractor and Community Action Team brainstormed potential projects aimed at reducing exposure and sensitivity to flooding related hazards. The team strived to capture a range of actions. Since Beaufort County is a Hurricane Florence-declared county, the projects must include natural/nature-based or hybrid options. Projects were organized in the following strategy areas:

- policy/regulatory
- staffing, funding and resources
- emergency services
- infrastructure
- natural/nature-based
- hybrid options (combination of natural/nature-based with another area)

Strategies were reviewed for their ability to avoid flooding, accommodate flooding, protect resources against flooding-related impacts, retreat resources from flooding, and/or build adaptive capacity to mitigate or respond to flooding.

## ▶ **Evaluated preliminary draft strategies and their feasibility**

The Contractor and Community Action Team then evaluated the potential strategies based on the STAPLEE Method developed by FEMA, which is a checklist to quickly evaluate and compare strategies using the following topics:

- **Administrative** - Which adaptation strategies are implementable by community leadership?
- **Political** - Which adaptation strategies are politically acceptable within the community?
- **Legal** - Which adaptation strategies are legally implementable by the community under state and municipal law?
- **Economic** - What are the cost-effective adaptation strategies available to the community?
- **Environmental** - Which adaptation strategies are most favorable to the environment as determined by community conservation plans?
- **Social** - What are the socially acceptable adaptation strategies in the community?
- **Technical** - What are the technically feasible adaptation strategies in the community?

The team also compared the benefit and cost of the draft strategies.



## **Solicit community input on draft strategies**

*Available at the **Projects and Priorities** station.*

## ▶ **Review community input and prioritize strategies**

## ▶ **Submit one (1) natural/nature-based or hybrid solution in application for Phase 3 consideration**

## ▶ **Develop Project Portfolio and Resiliency Plan**

# ACTION STRATEGY AREAS

## **Policy/Regulatory**

Actions, such as enacted ordinances, regulations, public policy, and/or laws to aid in increasing resilience and reaching program objectives. (Examples: Low-impact development (LID) practices, drainage easements, zoning requirements)

## **Staffing, Funding and Resources**

Actions that identify, assign, and/or allocate staffing, funding, and/or resources to bolster local ability/capacity. (Examples: Dedicated staff to clear storm debris)

## **Emergency Services**

Actions aimed at ensuring no disruptions to emergency services during and/or following a hazardous event. These strategies help ensure that the community has adequate capacity to plan for and respond in case of an emergency. (Examples: Redundant communication systems, back-up emergency command center, emergency response routes on elevated roadways, relocated police station)

## **Infrastructure**

Actions that build structures or install equipment (e.g., powerlines, communication systems, roads, bridges, stormwater infrastructure) that are needed for the community and/or region to function properly during and after hazardous events. (Examples: stormwater management systems, WWTP upgrades, flood attenuation structures)

## **Natural/Nature-Based**

Actions that consider and enhance the natural landscape's ability to provide ecosystem services like flood reduction and wave dampening. Natural infrastructure (aka green infrastructure) refers to ecosystems or natural systems, including wetlands, forests, beaches, dunes, and rivers or streams. (Examples: conserving or restoring existing forests and wetlands)

## **Hybrid (Combination of Natural/Nature-Based + Other Strategy Area Above)**

Actions that incorporate traditional, or "grey", infrastructure, with natural, or green, infrastructure. This may also include a combination of natural/nature-based with another strategy area defined above. (Example: new stormwater drain/outfall + a living shoreline)



***To qualify for Phase 3, the selected project must be a Natural/Nature-Based or Hybrid strategy.***



## Additional Items to Consider Adding to an Emergency Supply Kit:

- Prescription medications and glasses
- Infant formula and diapers
- Pet food, water and supplies for your pet
- Important family documents such as copies of insurance policies, identification and bank account records in a portable waterproof container
- Cash and change
- Emergency reference material such as a first aid book or information from [www.ready.gov](http://www.ready.gov)
- Sleeping bag or warm blanket for each person. Consider additional bedding if you live in a cold-weather climate.
- Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes. Consider additional clothing if you live in a cold-weather climate.
- Fire Extinguisher
- Matches in a waterproof container
- Feminine supplies, personal hygiene items and hand sanitizer
- Mess kits, Paper cups, plates and disposable utensils, paper towels
- Paper and pencil
- Books, games, puzzles or other activities for children



# Ready

Prepare. Plan. Stay Informed.®



## Emergency Supply List



# FEMA

[www.ready.gov](http://www.ready.gov)



## Recommended Items to Include in a Basic Emergency Supply Kit:

- Water and non-perishable food for several days**
- Extra cell phone battery or charger**
- Battery-powered or hand crank radio that can receive NOAA Weather Radio tone alerts and extra batteries**
- Flashlight and extra batteries**
- First aid kit**
- Whistle to signal for help**
- Dust mask, to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place**
- Moist towelettes, garbage bags and plastic ties for personal sanitation**
- Non-sparking wrench or pliers to turn off utilities**
- Can opener (if kit contains canned food)**
- Local maps**

### FEMA's Ready Campaign

educates and empowers Americans to take some simple steps to prepare for and respond to potential emergencies, including those from natural hazards and man-made disasters. Ready asks individuals to do three key things: get an emergency supply kit, make a family emergency plan, and be informed about the different types of emergencies that could occur and appropriate responses. Everyone should have some basic supplies on hand in order to survive several days if an emergency occurs. This list of emergency supply kit items is only a starting point. It is important that individuals review this list and consider the unique needs of their family, including pets, for items to include. Individuals should also consider having at least two emergency supply kits, one full kit at home and smaller portable kits in their workplace, vehicle or other places they spend time.



Ready.



FEMA

**Federal Emergency Management Agency**  
Washington, DC 20472

**Most homeowners insurance does not cover flooding.**

**But with flood insurance  
you're covered.**



FEMA



## Why You Need Flood Insurance

Flooding is the most common and costly natural disaster in the United States, affecting every region and state. Floods cause physical and emotional anguish, as well as financial devastation. In fact, just one inch of water in an average sized home can cause more than \$25,000 in damage.

Federal disaster assistance is not always the answer. Most types of federal disaster assistance require a presidential disaster declaration and come in the form of low-interest disaster loans that must be repaid—with interest!

Only flood insurance reimburses you for flood damage, providing the necessary funds for recovery—and you don't have to pay it back.

## Learn More

Call your insurance agent today to ask about the National Flood Insurance Program (NFIP). There is no better way to protect the life you've built.

To learn more, call the NFIP Help Center at **1-800-427-4661**, or visit **FloodSmart.gov**.

## With federal flood insurance, your home is covered. You'll be reimbursed up to:

- \$250,000 for your residential property
- \$100,000 for your personal belongings
- \$500,000 for your non-residential property
- \$500,000 for your non-residential property contents

## Did you know?

- 1 in 4 flood insurance claims come from outside high-risk areas.
- Most homeowners and renters insurance policies do not cover flood damage.
- Flood insurance coverage for homeowners living in moderate- to low-risk flood areas can be as low as \$325 a year!

**La mayoría de los seguros de vivienda no cubren inundaciones.**

**Para cubrirlas es necesario tener un seguro contra inundación.**



**FEMA**



## Por qué es necesario el seguro contra inundación

Las inundaciones representan el desastre natural más frecuente y costoso en los Estados Unidos; afectan todas las regiones y todos los estados. Una inundación no solo causa angustias físicas y emocionales, sino también estragos económicos. De hecho, una casa de tamaño promedio inundada con apenas una pulgada de agua puede sufrir más de \$25,000 en daños.

La asistencia federal por desastre no es siempre la respuesta a este problema. La mayoría de los tipos de asistencia federal por desastre requieren que el presidente emita una declaración de desastre; además, la ayuda se ofrece en forma de préstamos por desastre a bajo interés, que hay que pagar... ¡con intereses!

Un seguro contra inundación le reembolsará el costo de los daños por inundación, proporcionándole los fondos necesarios para la recuperación. Y usted no tendrá que devolver el dinero.

## Aprenda más

Llame hoy mismo a su agente de seguros para preguntar sobre el Programa Nacional de Seguro contra Inundación (NFIP, por sus siglas en inglés). No hay mejor manera de proteger la vida que usted se ha forjado.

Para obtener más información, llame al Centro de Ayuda del NFIP al **1-800-427-4661**, o visite **FloodSmart.gov**.

## Con el seguro contra inundación federal, su vivienda está cubierta. Recibirá un reembolso de hasta:

- \$250,000 por su propiedad residencial
- \$100,000 por sus pertenencias personales
- \$500,000 por su propiedad no residencial
- \$500,000 por sus pertenencias no residenciales

## ¿Sabía usted?

- Una de cada 4 reclamaciones de seguro contra inundación proviene de áreas que están fuera de las zonas de alto riesgo.
- La mayoría de las pólizas de propietarios de viviendas e inquilinos no cubren daños por inundación.
- La cobertura de un seguro contra inundación podría costarles apenas \$325 al año a los propietarios de viviendas de zonas de riesgo moderado a bajo.

# Initial Restoration for Flooded Buildings



## HURRICANE KATRINA RECOVERY ADVISORY

**NOTE:** This advisory is specifically intended for buildings subject to the effects of long-term flooding and widespread mold growth following Hurricane Katrina. For additional information on more common water leakage and mold situations, refer to the FEMA website (<http://www.fema.gov>) and related links to the Environmental Protection Agency (EPA) and the Centers for Disease Control and Prevention (CDC) sites listed at the end of this advisory.

During the initial visit to a flood-damaged building, the situation often appears overwhelming (Figure 1). However, despite the shock that often accompanies an individual's first look at the damage, there are a number of straightforward principles that can be applied to assist with the flood restoration effort. In addition to following the steps outlined below, individuals should review the Hurricane Katrina Recovery Advisory, *The ABC's of Returning to Flooded Buildings*.



**Figure 1. Typical flood damage to furniture and interior walls (Hurricane Katrina).**

### 1. Air Out

- To promote drying, open all doors and windows whenever you are present and leave as many open when you are not present as security concerns allow. Some styles of windows (double-hung) and patio doors may be able to be left partially open and secured from external opening by inserting a nail in the window frame or using a wooden dowel or stick. Upper floor windows can usually be left open all the time and will also assist in drying the whole house. Try to take advantage of cross-ventilation by opening windows on multiple levels and opposite sides of the building.
- Open interior doors, especially closets and interior rooms, to allow air movement to reach all areas of the building. Take doors off their hinges if necessary to promote air flow.
- Open kitchen cabinet and bathroom vanity doors; remove drawers and stack them to dry.
- Open the attic access, if available, to increase ventilation. Consider the benefits (improved drying) and risks (falling dust, insulation, or other debris) of adding an attic access where none exists.
- When electricity is available, use fans to push moist air outside. However, avoid use of fans if the house is contaminated with sewage as the air movement may spread bacterial contamination.

### 2. Move Out

- Remove salvageable contents that were not impacted by the water. If the upper floors are dry, it may be possible to move such items to those areas. When moving items from impacted areas of the building to other locations, consider using protective mats or non-slip drop cloths (e.g., fabric painter cloths) to avoid contamination of unimpacted surfaces.
- Remove saturated porous materials such as mattresses or upholstery, especially those with visible fungal growth. These items should be moved out of the building as soon as possible. Cover contaminated items with plastic drop cloths prior to moving to prevent spread of contaminants. Appropriate personal protective equipment should be utilized to avoid injury from possible exposure to mold and bacteria.

### 3. Tear Out

- Prior to beginning tear out, install plastic barriers between affected and unaffected areas of the premises (typically between the first and second floors). This will reduce the potential for secondary damage occurring in the unaffected areas.
- Remove wet carpet and padding. Tack strips should also be removed completely when the carpet is taken out to minimize injury during subsequent activities. Since carpet tack strips have protruding nails, wear leather gloves to protect hands from puncture wounds while removing and handling tack strips. Removing wooden baseboards prior to carpet tear out may allow for their later reinstallation.
- Remove any curled vinyl tiles or linoleum over concrete floors, and remove all vinyl tiles or linoleum over wooden sub-floors to allow the wood to dry. Respiratory protection should be worn as many older (pre-1970s) flooring products, such as 9-inch square tiles and adhesives, often contain asbestos.
- Although punching holes in walls for drainage is commonly recommended, this practice does not drain water nor does it cause the wall to dry faster. If holes are not punched in the walls, the drywall (gypsum board) may be able to be easily repaired and restored.
- If drywall or plaster has been saturated by contaminated floodwater, it should be removed. Respiratory protection should be worn when removing drywall as some older drywall joint compound contains asbestos. If the water level was less than 2½ feet, the wall material should be removed to a height of 4 feet to facilitate reinstallation of full sheets of drywall. If the water level was greater than 2½ feet, the wall material should be removed to a height of 8 feet or the ceiling junction, whichever is higher. Electrical outlet and wall switch plates and door and window moldings must be removed prior to the tear out of the wall material.
- Fibrous wall insulation (fiberglass, mineral wool, cellulose, wood fiberboard, etc.) saturated by floodwater should be removed completely. Foam plastic insulation may be left in place and allowed to dry.
- Flooded electrical receptacles should be removed completely after the appropriate circuit breakers or fuses are deactivated.
- Wall paneling should be removed if it is swollen or if saturated drywall is behind the paneling.

### 4. Clean Out

- Following any necessary tear out, clean up any remaining debris and muck. Squeegees, shovels, and brooms are effective for such cleaning. Personal protective equipment should be utilized. Detailed cleaning and sanitizing of the remaining materials should be conducted. A shop vacuum with dry filters in place and with a solution of clean water and disinfectant in the tank (2-inch depth) to minimize the spread of dust can be used.
- Mold removal. Treatment with commercial mold removers does eliminate visible evidence of mold growth on exposed surfaces and is recommended for restoring flood-damaged homes. Tests have found very little or no evidence of mold growth in the non-exposed (hidden) portions of the walls. Treating the non-exposed portions of the walls for mold control does not appear warranted in most cases. Spraying vertical surfaces using a compression (pump-up) garden sprayer with a commercial mildew remover is recommended.
- Understand the limitations of bleach. While this material is convenient and appropriate as a sanitizer for hard, non-porous items after they have been cleaned, it has distinct drawbacks when cleaning flood-impacted buildings. Application of bleach water can cause corrosion of electrical components and other metal parts of mechanical systems, and can compromise the effectiveness of termite treatments in the soil surrounding the building. Its effectiveness at killing bacteria and mold is significantly reduced when it comes in contact with residual dirt. Moldy surfaces should be cleaned first and then disinfected. Residual mold spores should then be removed, since killing them does not reduce their toxicity.
- Remove mud and gross contamination from floors by shoveling into suitable containers. Reduce soil and



**Figure 2. Using a pressure washer to clean contaminated surfaces.**

contaminant levels on surfaces by flushing off with clear water. The fastest and most efficient method to clean and decontaminate materials and surfaces is by using a residential-type pressure washer to apply a cleaner-disinfectant solution to the affected areas (Figure 2). Brushes improve decontamination of floors and some walls by scrubbing solution into affected surfaces. Avoid scrubbing drywall and plaster walls at this time because they have become softened by the flooding and moisture and may have their surface damaged by scrubbing. Following the first cleaning, floors and walls should be rinsed with water and the cleaning process redone a second time. Squeegees can be used to control or direct spent solution, and wet vacuums can be used to collect spent solution.

**Warning:** Failure to allow for adequate drying prior to reconstruction can trap moisture in the building, which can cause structural damage and potential health problems in the future.

## 5. Dry Out

- Once the clean process is completed, the building and any remaining contents need to dry. Drying is a naturally occurring process. Over time, all wetted building materials will dry. Drying of structural materials will take an extended period of time to dry to pre-flood conditions. Exterior rooms with excellent ventilation can take 2 to 4 weeks to dry, depending on the temperature and humidity outside. Interior rooms, or those with minimal ventilation, can take 4 to 6 weeks or more to dry and are candidates for the use of mechanical drying equipment. The use of fans, dehumidifiers, air conditioners, and/or auxiliary electric heaters will speed drying. Allowing materials to dry naturally will take considerably longer.
- Wood framing. The moisture content of wood framing must be checked professionally or with a commercially available moisture meter before refinishing or recovering so that excessive moisture does not become trapped in the materials and cause future problems (Figures 3a and 3b). Dryness of wood framing materials can be determined quantitatively using the table on the right above. Wetted materials are presumed dry when their moisture content readings are less than or equal to 15 percent when taken with an intrusive/penetrating moisture meter (Figure 3a). If an intrusive/penetrating moisture meter is not available, a non-intrusive/penetrating moisture meter (Figure 3b) may be used; however, keep in mind that the material moisture results measured from non-intrusive meters may be less accurate than intrusive meters.
- Walls, floors, and other building materials. The moisture content of drywall (gypsum board), plywood floors, and other building materials must also be checked professionally or with a commercially available moisture meter before refinishing or recovering so that excessive moisture does not become trapped in the materials and cause future problems (Figures 3a and 3b). Unlike wood framing, the dryness of other building materials must be confirmed qualitatively by comparing readings between like materials in affected areas of the building (at or below flood level) and unaffected areas of the building (a room or upper floor above the flood

Summary of Moisture Reading Results for Wood Framing Materials	
Moisture Reading	Results
> 20%	Wet - no good
15 - 20%	Partially dry - caution
< 15%	Dry - OK



**Figure 3a.** An intrusive/penetrating moisture meter—recommended for final moisture readings.



**Figure 3b.** A non-intrusive/non-penetrating moisture meter—recommended for initial and interim moisture readings.

level, or inside a nearby building that was not flooded). Wetted materials are presumed dry when their moisture content readings are within 5 percent of those of like materials in unaffected areas of the building when taken with an intrusive/penetrating moisture meter (Figure 3a). If an intrusive/penetrating moisture meter is not available, a non-intrusive/penetrating moisture meter (Figure 3b) may be used; however, keep in mind that the material moisture results measured from non-intrusive meters may be less accurate than intrusive meters.

- Kitchen cabinets, bathroom vanities, and other “built-in” furnishings that were subjected to flood water should be removed from their location to permit drying of the material behind them. Once these “hidden” areas are dried, the furnishings can be reinstalled if they are salvageable.
- When saturated wood, drywall, and/or other structural materials vulnerable to fungal growth are naturally air dried over an extended period (weeks), the application of a disinfectant prior to drying can prevent mold growth. Materials should be closely observed and disinfectant reapplied at the first sight of mold.

## General Notes for Drying Foundation Floors

- **Crawlspaces.** Access to crawlspaces is necessary for decontamination purposes. For crawlspaces that do not have an existing access opening, the simplest method to access the crawlspace is by strategically removing sections of overlying flooring to permit access. When the flooring is not salvageable, removal of the flooring provides the necessary access openings. Once access is obtained, gross (solid) contamination should be removed from the ground underneath the building for health and sanitation purposes. Next, any remaining water should be removed. If there is an existing vapor retarder on the ground, it can be left in place to collect spent water and cleaning solutions. Following remediation and any necessary final cleaning, the vapor retarder can be left in place to facilitate drying. If there is exposed ground within the crawlspace after cleaning, it should be covered with a plastic vapor retarder to minimize potential mold growth and future moisture migration into the house. Plastic vapor retarders can be made watertight by overlapping and sealing them together using either glue or heavy-duty adhesive. Suitable adhesives can be obtained from hardware stores or home improvement centers. After the vapor retarder is placed, the underlying support structure of salvageable wooden floor joists, wood sub-floors, and foundation walls should be cleaned and sanitized. Following cleaning, application of a wood preservative will provide protection against fungi and wood destroying insects.
- **Grade slabs.** Concrete grade slabs provide a dense barrier between the ground and the interior of the home. Remove mud and gross contamination from slabs by shoveling into suitable containers. Reduce soil and contaminant levels on surfaces by flushing off with clear water. The fastest and most efficient method to clean and decontaminate contaminated grade slabs and adjacent building materials and surfaces is by using a residential type of pressure washer to apply a cleaner-disinfectant solution to affected areas. Brushes improve decontamination of floors and base of walls by scrubbing solution into affected surfaces. Following the first cleaning, floors and base of walls should be rinsed with water and the cleaning process redone a second time. Squeegees can be used to control or direct spent solution, and wet vacuums can be used to collect spent solutions. Following cleaning, the slab should be visually examined for signs of heaving or cracking due to hydrostatic pressure. When in doubt, contact the local building inspector, structural engineer or other appropriate professional.

## Additional Resources

- Repairing Your Flooded Home (ARC #4477/FEMA 23)  
[http://www.redcross.org/services/disaster/0,1082,0\\_570\\_,00.html](http://www.redcross.org/services/disaster/0,1082,0_570_,00.html)
- Cleaning Flood-Damaged Homes (LSU AgCenter)  
[http://www.louisianafloods.org/en/family\\_home/hazards\\_and\\_threats/recovery\\_assistance/cleaning\\_up/structural\\_damage/Cleaning+FloodDamaged+Homes.htm](http://www.louisianafloods.org/en/family_home/hazards_and_threats/recovery_assistance/cleaning_up/structural_damage/Cleaning+FloodDamaged+Homes.htm)
- Mold Fact Sheet (LSU AgCenter)  
[http://www.louisianafloods.org/en/family\\_home/home/health\\_safety/indoor\\_air\\_quality\\_mold/Mold+Fact+Sheet.htm](http://www.louisianafloods.org/en/family_home/home/health_safety/indoor_air_quality_mold/Mold+Fact+Sheet.htm)

For additional information on more common water leakage and mold situations:

- Environmental Protection Agency (EPA), <http://www.epa.gov/mold>
- Centers for Disease Control and Prevention (CDC), <http://www.cdc.gov/mold>

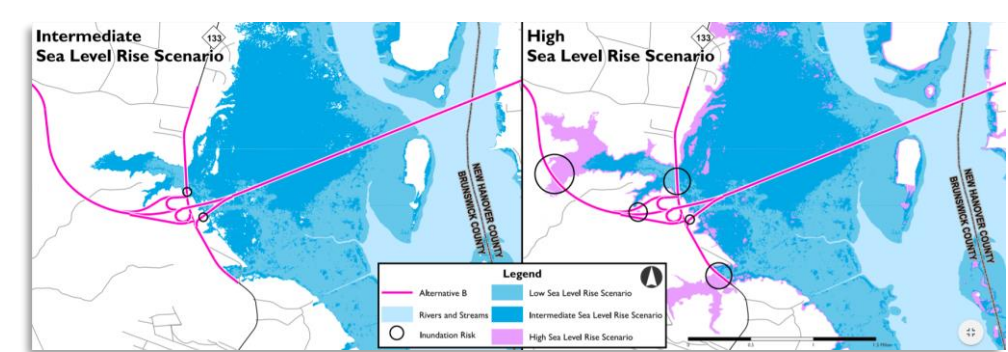
## Building Retrofits & Weatherization

- Retrofitting homes and businesses to have more energy and cost efficient fixtures can help save money to invest in other resilience measures (elevating structure, purchasing a back-up generator, etc.)
- Example: Coastal Community Action – Weatherization Assistance Program



## Elevating Water Utility and Transportation Assets

- Changes like elevating critical and vulnerable transportation routes above the level of potential floodwaters, or ensuring access to critical water facilities ensure that these services and public infrastructure are designed for their lifespan and account for future conditions.
- New construction or repairs should consider the future risks of sea level rise and other hazards using scenario planning when possible



2019 Sea Level Rise Assessment  
Cape Fear Crossing – Alternative B – Intermediate and High SLR Scenarios (NC DOT)



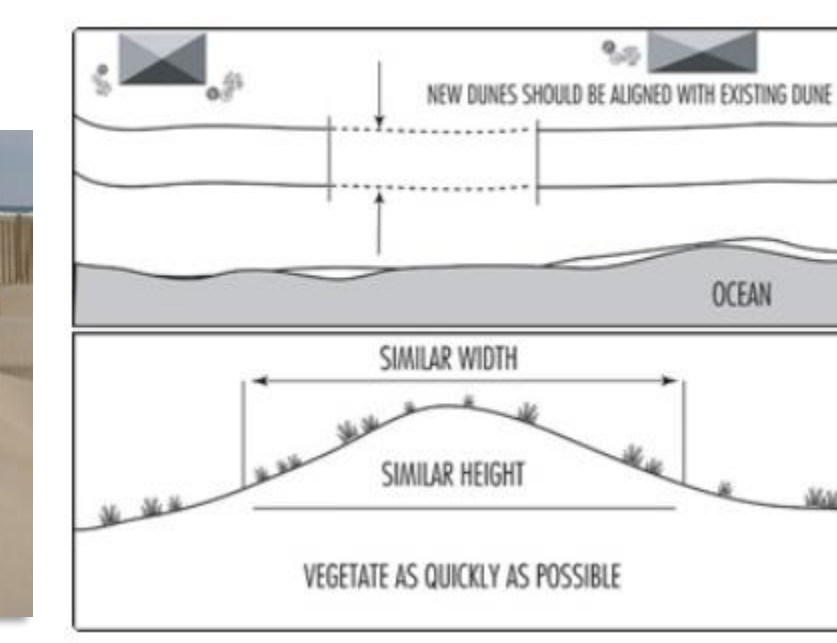
Wellhead Elevated above BFE (U.S. EPA)

## Dune Management

- Sand dunes provide a natural buffer against the erosive forces of wind, water and waves. Sometimes it's necessary to stabilize or strengthen existing sand dunes or build new ones to protect oceanfront buildings and roads.
- Dune establishment and stabilization projects must be thoughtfully planned and carried out to avoid damaging the beach and dune system.



Town of Nags Head Sand Fences

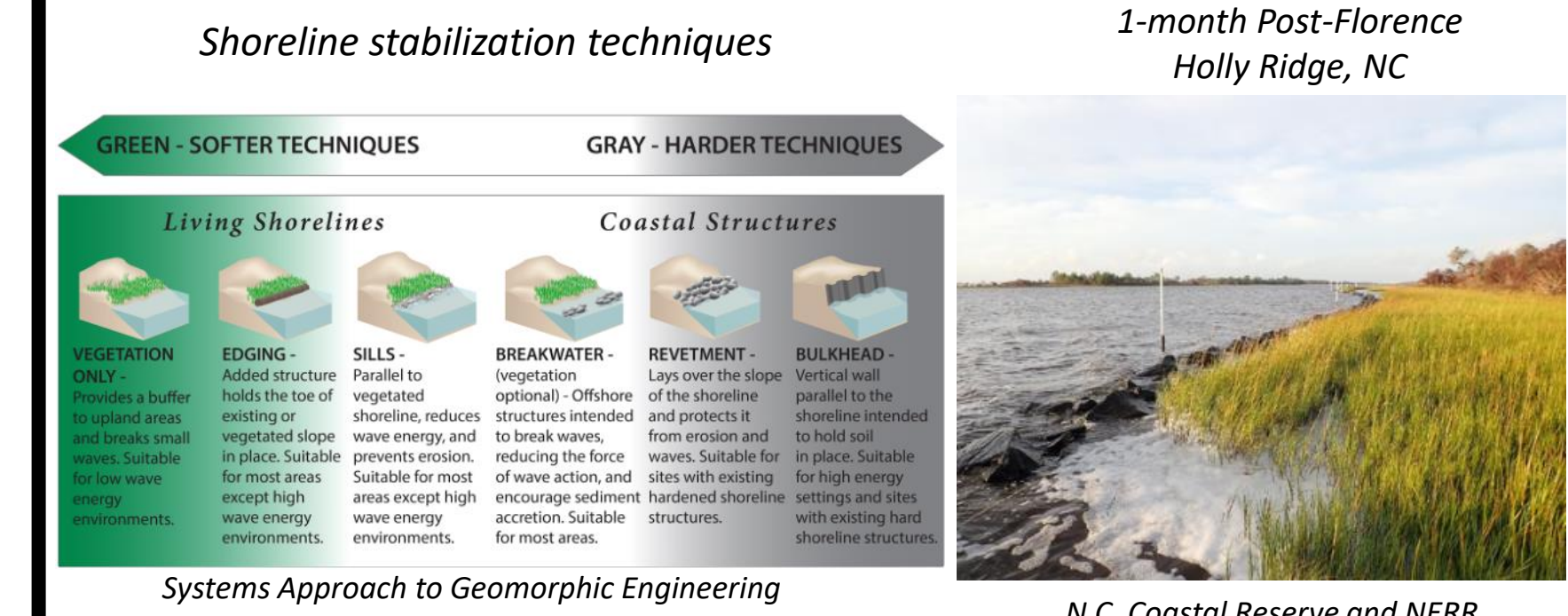


N.C. DCM

## Marsh Sills: A Type of Living Shoreline

- Shoreline stabilization technique using natural habitat elements (e.g. tall grasses and wetlands) that increases resilience to coastal erosion and flooding
- Traps sediment reducing wetland or marsh edge loss, dissipates wave energy and storm surges, provides ecosystem services
- \*NEW\* Marsh Sill General Permit (15A NCAC 7H .2700)

Little to No Damage to Morris Landing Rock Sill 1-month Post-Florence Holly Ridge, NC



Systems Approach to Geomorphic Engineering

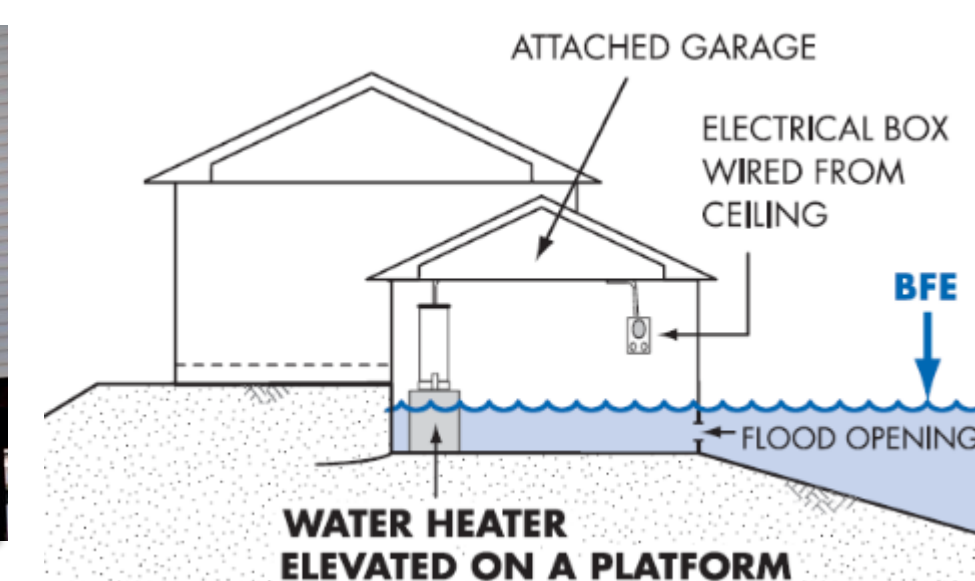
N.C. Coastal Reserve and NERR

## Elevating Critical Components Above BFE

- Unlike entire buildings or structures, elevating critical components like HVAC, electrical panels, and back-up generators can ensure key assets (e.g. pump station or other) aren't completely compromised during a flood.
- A higher design flood elevation standard may be appropriate for critical facilities rather than for single-family homes.



U.S. EPA



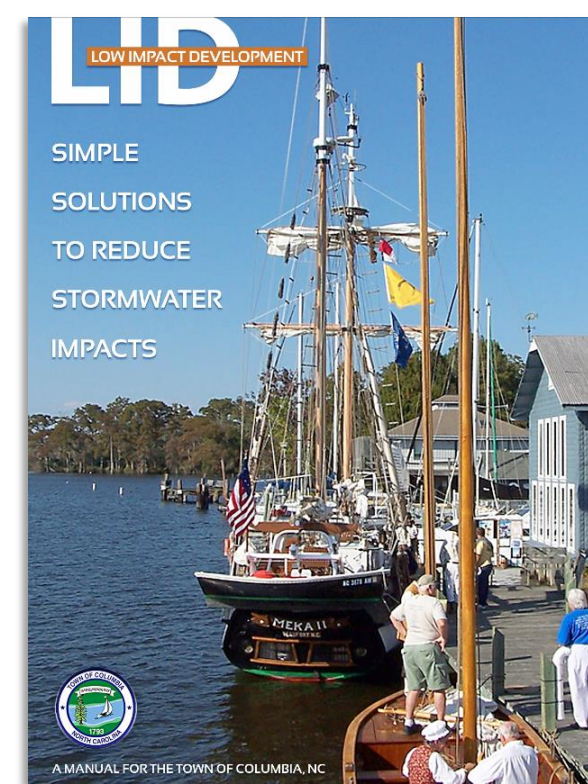
NC Floodplain Management QuickGuide

## Low Impact Development (LID) & Green Infrastructure

- Replacing impervious surface with natural features allows for more effective water quantity and quality management

### Example measures include:

- Downspout Disconnection
- Rainwater Harvesting
- Rain Gardens
- Planter Boxes
- Bioswales
- Permeable Pavements
- Green Streets and Alleys
- Green Parking
- Green Roofs
- Urban Tree Canopy
- Land Conservation



Town of Columbia LID Manual



Street Features



Building Features



Landscape Features

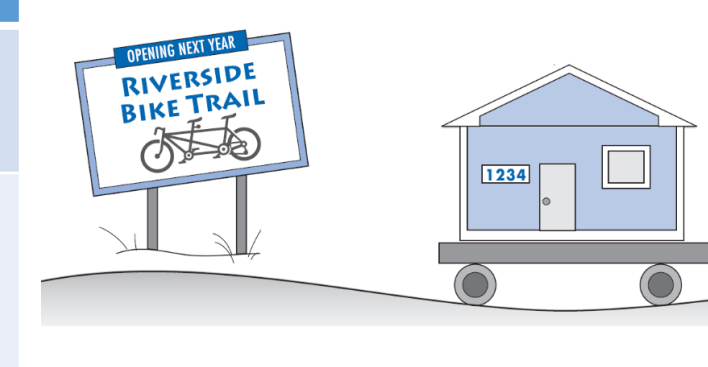
Georgetown Climate Center: Green Infrastructure Toolkit

## Pre- & Post-disaster Home Buyout Program

- A form of hazard mitigation
- Property owner gets paid fair-market value (pre-storm) to have home demolished and kept as open space in perpetuity falling under the ownerships of the municipality or county (unless a third party is arranged such as a community land trust, or the land is leased for \$1 to a neighboring resident).
- Buyout properties have been: restored as wetlands, reforested, turned into parks, pedestrian or biking trails, Frisbee golf courses, community garden space, or left vacant to be used as temporary excess parking space.

### Federal Funds for Home Buyouts

Pre-disaster	FEMA PDM FEMA FMA
Post-disaster	FEMA FMA FEMA HMGP HUD CDBG-DR



NC Floodplain Management QuickGuide

## Habitat Conservation

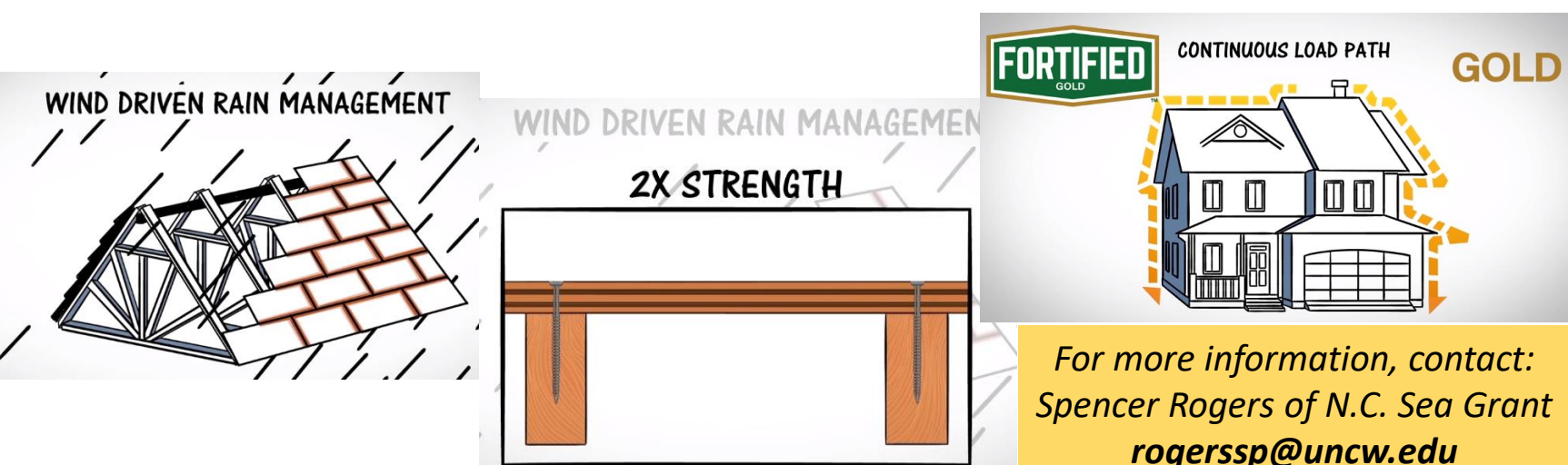
- Public acquisition of undeveloped land lessens or prevents the impacts of flooding, keeps development out of risky areas and protects water resources.
- Communities can purchase land outright or use tools such as land use/regulation or easements to ensure flood prone areas are set aside.
- This strategy is most effective on a large scale with (1) identification or mapping of existing conservation areas and available open space, (2) prioritization of parcels and (3) acquisition of land.



Wildlife & Natural Resource Stewardship in Planning  
North Carolina Wildlife Resources Commission provides a guidebook, training and Natural Heritage data to help communities with conservation planning.

## FORTIFIED Roof/Building Construction

- FORTIFIED is a nationally recognized building method and standard (3 levels: Roof, Silver & Gold) based on observations by the Insurance Institute for Business and Home Safety (IBHS)
- It is code-plus and exceeds the vast majority of building codes by improving the performance of buildings against natural hazards and reducing the risk of personal property losses.
- A FORTIFIED Evaluator is the only professional who can help you earn a FORTIFIED Designation and take advantage of all the programs benefits.
- The program starts by focusing on the roof, which is the most important and vulnerable part of every building.
- The FORTIFIED Commercial Program makes new and existing commercial buildings more resistant to damage from severe weather



For more information, contact:  
Spencer Rogers of N.C. Sea Grant  
rogerssp@uncw.edu

## Urban Forest and Tree Management

A single tree may store 100 gallons or more of rainfall, and it is estimated that the urban forest can reduce annual runoff by 2 to 7 percent.

Trees offer many advantages to an urban landscape:

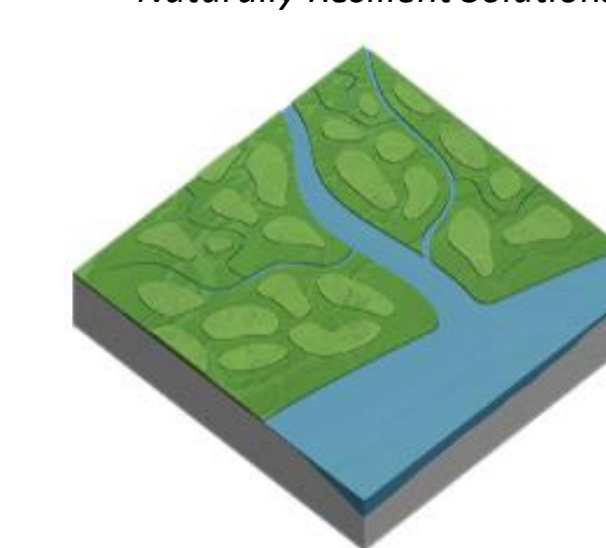
- Raise the attractiveness of an urban area.
- Form part of the ambiance of shopping districts.
- Shade a pedestrian walkway or open-air mall.
- Draw businesses, such as shops and street vendors.
- Revive blighted urban areas.
- Keep city streets cooler and reduce indoor air conditioning costs.
- Filter pollutants from the air and provide oxygen.
- Reduce stress and otherwise improve health.
- Offer shade for seating, children's play areas and other recreation sites.
- Reduce stormwater runoff.
- Provide respite from the heat and opportunities for social gathering as pocket parks and squares.
- Provide recreational opportunities and wildlife corridors, such as urban river walks and other tree-lined routes.
- Provide habitat for birds and other wildlife.



## Coastal & Wetland Restoration

- Natural features like coastal marsh and wetlands can absorb flood waters and provide a buffer to coastal communities from flooding, erosion and storm surge.
- Coastal marshes provide flood protection, shoreline stabilization, erosion control, and protect water quality by filtering water.
- Wetlands mitigate floods and droughts, purifying and storing surface water.
- Restoring these areas allow for storage of water increasing the overall ability of a system to handle extreme weather.

Naturally Resilient Solutions



HAZARDS ADDRESSED  
Coastal Erosion  
Coastal Flooding

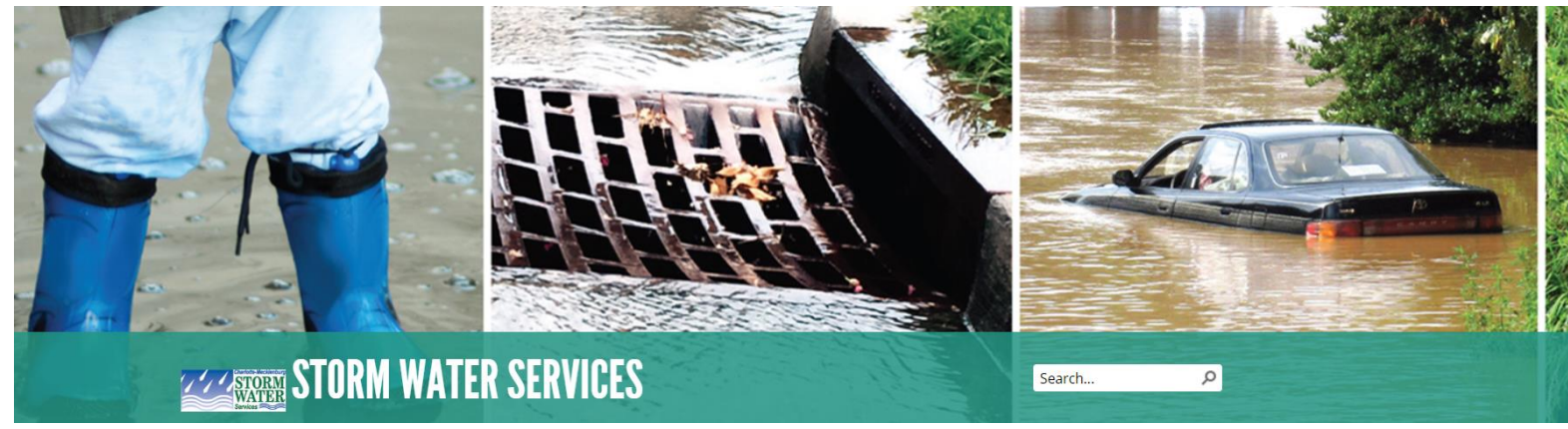
## Other Examples? Insert Sticky Note Below

- Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved

These types of actions usually fall into one of four categories: **#1. Avoid** (prohibit or discourage putting infrastructure in harm's way); **#2. Accommodate** (build/retrofit so asset can maintain critical function during disruption); **#3. Protect** (installing barriers to reduce hazard exposure) and **#4. Relocate** (retroactively moving critical infrastructure and through voluntary programs, homes and businesses out of harm's way).

## Stormwater Utility Fee

- Adding fees in addition to normal drinking water and sewer bills can fund improvements to water infrastructure.
- If feasible, the establishment of a local stormwater utility and collection of stormwater permit fees during new development can be used to upgrade stormwater infrastructure and even fund hazard mitigation projects for structure (e.g., acquisition).
- These measures can help address water quality concerns and community flooding issues.



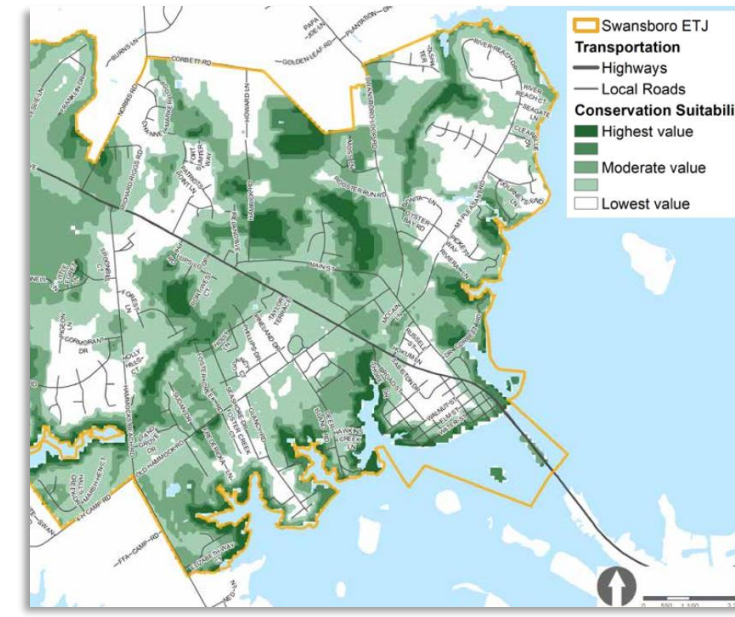
Charlotte-Mecklenburg's Storm Water Services utilizes stormwater fees to partly fund a [floodplain buyout or acquisition program](#)

## Conservation Overlay Zone

- Using multi-criteria land suitability analysis or other screening tool can help prioritize areas that are most valuable in terms of protecting or enhancing natural habitat and ecosystem services, reducing hazard (flood, sea level rise, storm surge) risks, and other benefits – these areas can be identified as part of a Conservation Overlay Zone
- Limit intensity and density of uses and location of development to minimize impacts to these critical conservation areas

### CONSERVATION PRIORITY AREA (CPA)

Conservation Priority Areas (CPA) represent opportunities to allow lower density development clustered away from and respectful of environmentally sensitive areas, important natural views, and priority conservation preservation areas as identified by the community. Agricultural preservation was also identified as a community priority, but where Rural Agricultural (RA) areas overlap the CPA, the development character and density restrictions of the RA area shall prevail, and not be further restricted by the CPA.



Swansboro Conservation Priority Area Overlay & Underlying Conservation Suitability

## Dune and Beach Protection Ordinance

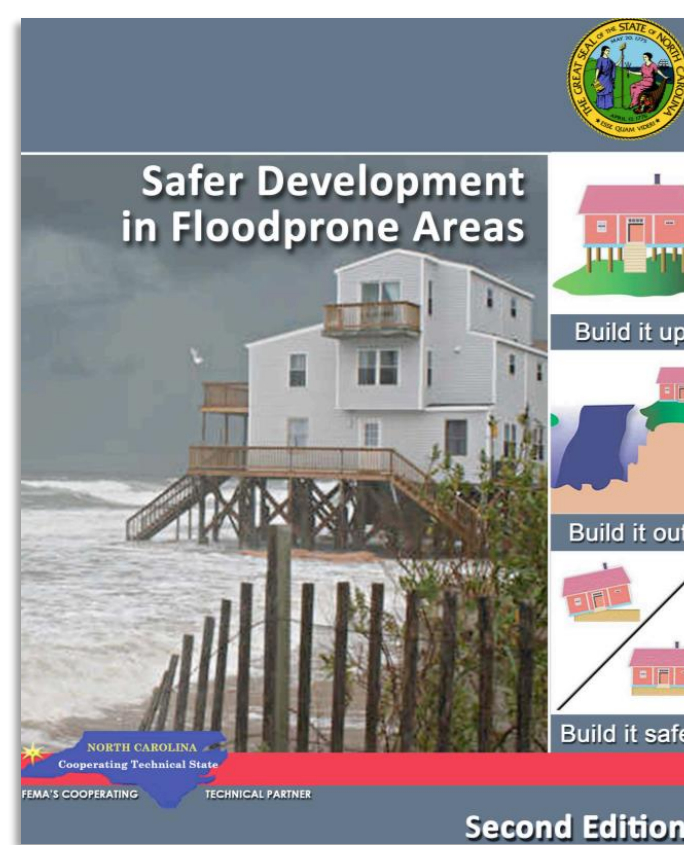
- To manage and protect dunes and beaches regulations such as zoning, buffers, and setbacks that restrict development in these natural areas will encourage this type of shoreline protection.
- **Other Examples:** Provide description of how it contributes to future resilience, where it occurs, as well as what partners are involved

## Other Examples? Insert Sticky Note Below

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## Flood Damage Prevention Ordinance

- Designed to minimize public and private losses due to flood conditions within flood prone areas by: restricting or prohibiting uses, controlling alteration of floodplain, channels, or natural barriers, control filling, grading, dredging or other development that may increase erosion or flood damage
- At minimum, regulates development in the special flood hazard area (SFHA) or 1% annual chance flood area & required for NFIP communities
- Can account for 'future floodplain conditions' affected by climate change impacts, increased development, etc. through higher regulatory standards such as increased 'freeboard' in 1% and 0.2% flood zones



### Cost to raise footprint of 1,500 s.f. house by 1 ft

Pre-construction	~ \$4,100
Post-storm	~ \$30,000

## Landscaping, Vegetation, and Tree Ordinances

Encouraging or requiring use of native plants and other best management practices for green infrastructure can better retain flood waters, treat non-point source pollution

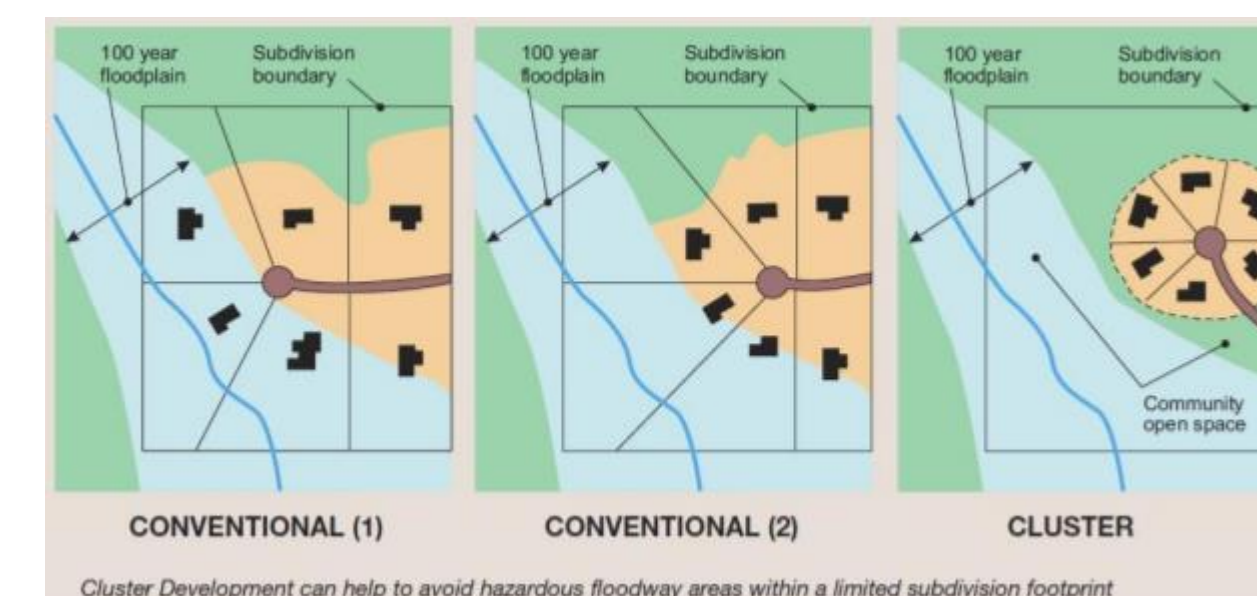
Tree conservation ordinances can

- creates a framework for the municipality to monitor tree removal and protect trees or areas deemed to be of value to the community.
- create an income stream to help finance tree planting, tree maintenance and staff.
- helps educate residents and developers about trees and the practices that affect them



## Residential Cluster Development Ordinance

- Guides development to certain portion of a property while retaining certain percentage as permanent open space or undeveloped natural resources (e.g. conservation easement, agriculture or buffer)
- The preserved open space or natural habitat that results from clustering development can serve as flood retention or prevention areas (e.g., forests, marshes, low-lying wetlands which reduce storm surge)



## Other Examples? Insert Sticky Note Below

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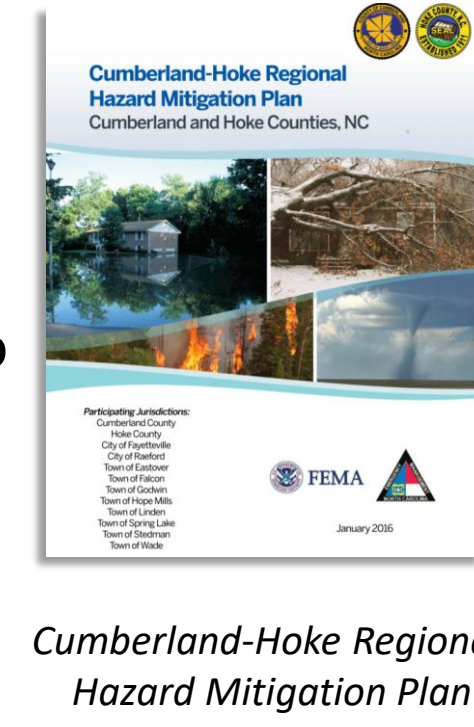
## Comprehensive/ CAMA Land Use

- Description:** 20- to 30- year planning horizon, tackling broad scope of community goals by guiding future growth, development, and land use; includes significant public engagement
- Requirement:** Yes, for Coastal Area Management Act (CAMA) communities per 15A NCAC 07B
- Resilience Connection:** Can provide fact-base, public engagement/education and policy guidance linking hazard mitigation, floodplain management, sea level rise projections, and long-term recovery to support development of regulations/higher standards and incentive programs



## Hazard Mitigation Plan

- Description:** Includes a detailed hazard identification and risk assessment (HIRA) for residential and commercial builds, critical infrastructure/assets.
- Requirement:** Yes, for FEMA funding eligibility (PDM, FMA, HMGP, etc.)
- Resilience Connection:** Provides analysis to justify investment in pre-and post-disaster mitigation or adaptation actions to reduce risk posed by natural hazards, including those exacerbated by climate change (coastal flooding and sea level rise)



## Open Space and Recreation Plan

- Description:** Developed to protect and enhance community open space resources
- Requirement:** No, but can receive FEMA Community Rating System points
- Resilience Connection:** Can absorb and store water with natural features, and coastal open spaces (such as wetlands and marsh) can act as erosion and wave buffers. Equitable access to open spaces/recreation can lead to better public health outcomes thereby reducing vulnerability. May tie into flood buyout or future transfer of development rights program.



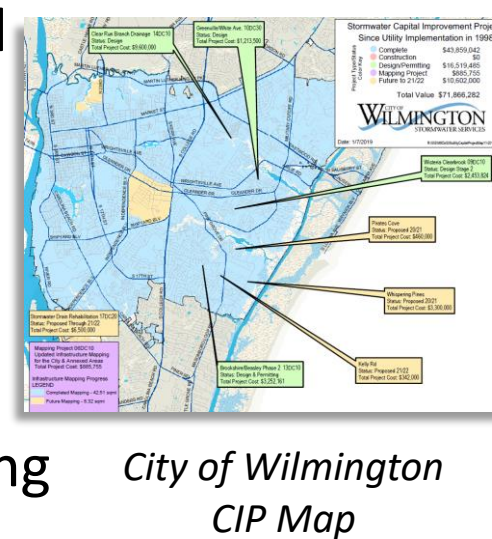
## Beach/Shore Protection Management Plan

- Description:** Up to 50-yr planning horizon, outlining strategies for actual and potential coastal erosion and its relation to planned or existing development activities on the coast. Plans focus on projects with minimal environmental harm; ideally regional & self-sustaining.
- Requirement:** Yes, to be eligible for FEMA Public Assistance per 44 CFR 206.225(j)(2)
- Resilience Connection:** Often the primary strategy for reducing risks to beach communities associated with ocean-front erosion caused by storms; projected elevation profile should account for sea level rise scenarios; an important example of pre-disaster recovery planning



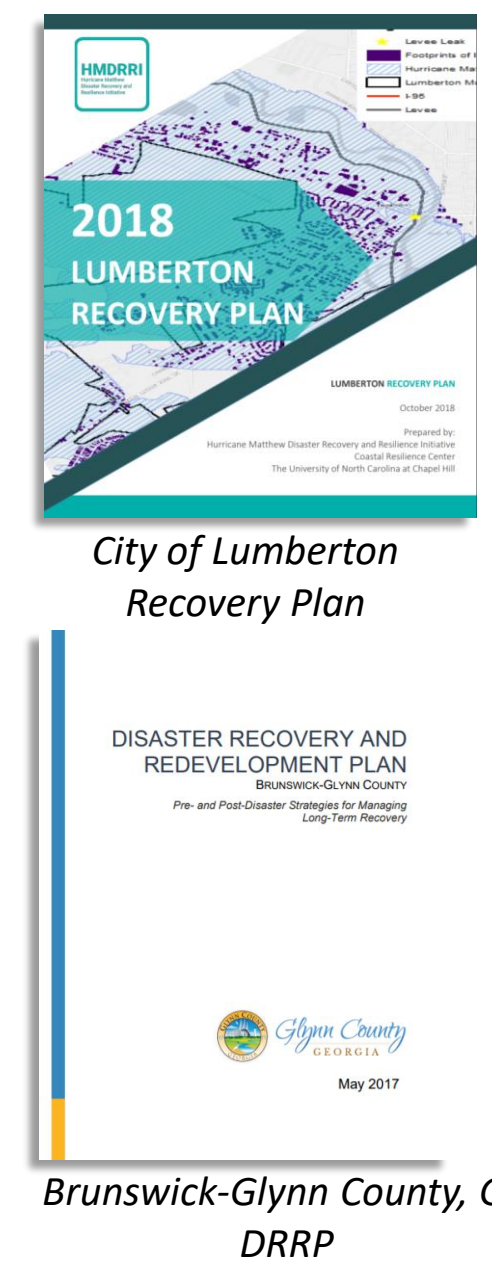
## Capital Improvements Plan (CIP)

- Description:** 4- to 6-year plan identifying capital projects (stormwater, transportation, water supply, and other infrastructure) and forecasting funding.
- Requirement:**
- Resilience Connection:** Can leverage funding to implement hazard mitigation measures that take future conditions into account and provides opportunity to review and consider the impact of proposed improvements on hazard vulnerability (e.g. guide new growth to safer areas); legal question of abandoning or not repairing vulnerable infrastructure post-disaster.



## Pre- or Post-Disaster Recovery Plan

- Description:** Ideally done during 'blue-sky' conditions, this type of plan identifies policies, operational strategies, and roles and responsibilities for implementation that will guide decisions that affect long-term recovery and redevelopment of the community after a disaster
- Requirement:** No
- Resilience Connection:** Planning for recovery before a disaster can lead to a faster, more efficient and more equitable recovery, allow a community to 'build back better', and provides more local control over the lengthy and complicated recovery process.



## Watershed Restoration Plan

- Description:** aims to identify causes of impairment and pollutant sources, necessary nutrient load reduction levels and management measures and other components to increase favorable water quality and quantity outcomes that support a healthy environment and economy
- Requirement:** Yes, to be eligible for 319(h) grant funding
- Resilience Connection:** maintaining and restoring the natural functions of watersheds and their floodplains can reduce flood risks and, enhance natural habitat and protect a variety of economic interests (aquaculture, beaches, etc.)



## Floodplain Management Plan

- A localized floodplain management plan that goes beyond a regional hazard mitigation plan to conduct a risk assessment that identifies and profiles flood hazards that pose a risk to the community, assesses community vulnerability to these hazards, and examines the capabilities in place to mitigate them. The flood hazards typically profiled in this type of plan include:
  - Climate Change and Sea Level Rise (1-3 ft)
  - Dam/Levee Failure
  - Flood: 100-/500-year
  - Flood: Stormwater/Localized Flooding
  - Hurricane and Tropical Storm
  - Stream Bank Erosion
- Results and recommendations from this type of effort should account for future conditions (more extreme rainfall events, higher sea levels & storm surge, etc.) and inform updates to other plans and ordinances guiding development or investment.



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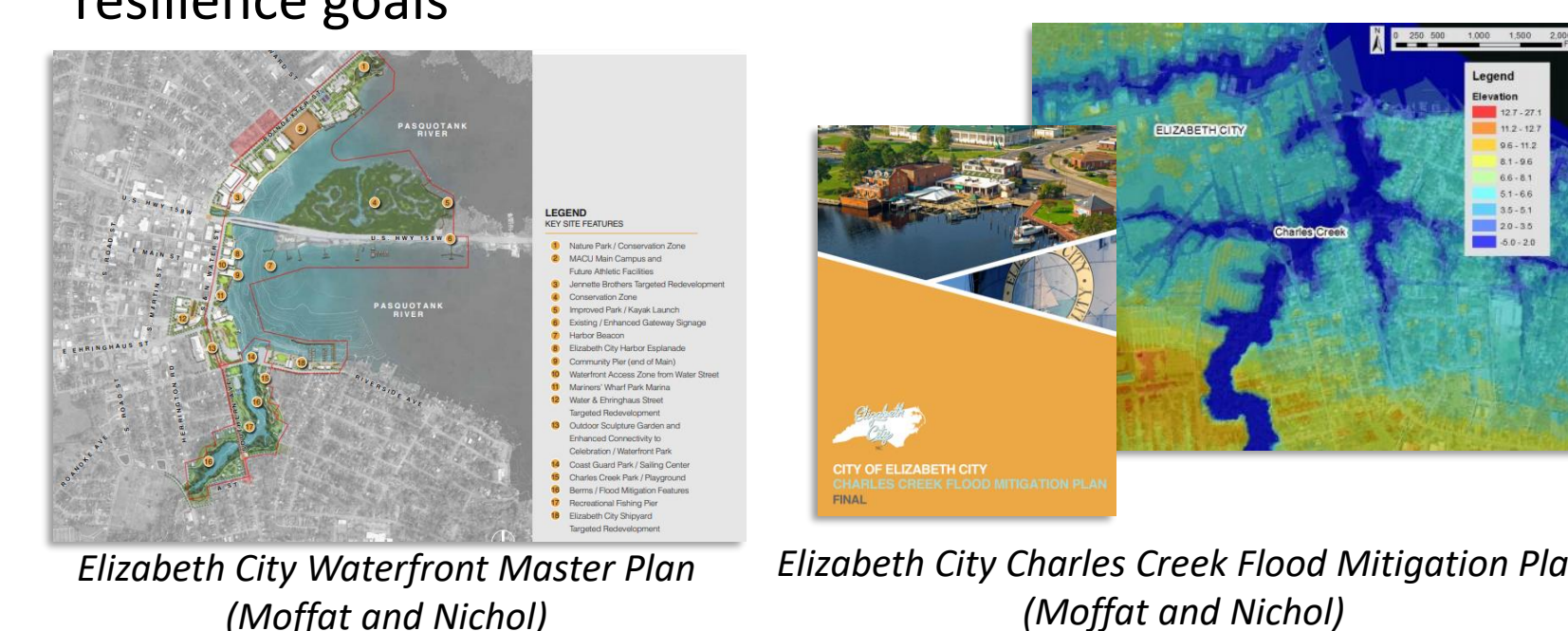
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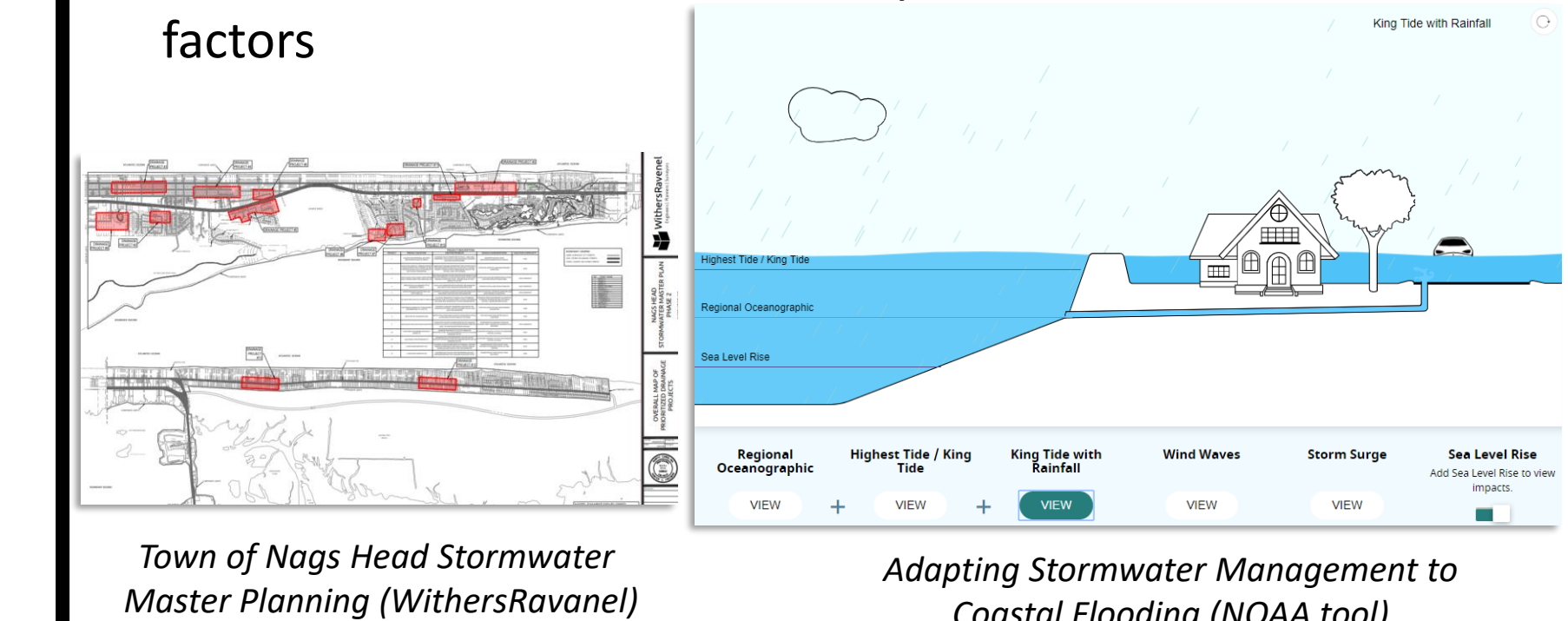
## Economic Development or Waterfront Master Plan

- Economic prosperity and opportunities are key to building a community's resilience to disruptions caused by major events or slow-onset stressors
- Ensuring that goals, policies, and incentives used for economic development purposes are aligned and do not conflict entirely with hazard mitigation or disaster recovery activities
- Strategic placement, relocation, reinvestment, and infrastructure retrofits of key assets can help achieve multiple resilience goals



## Stormwater Master Plan

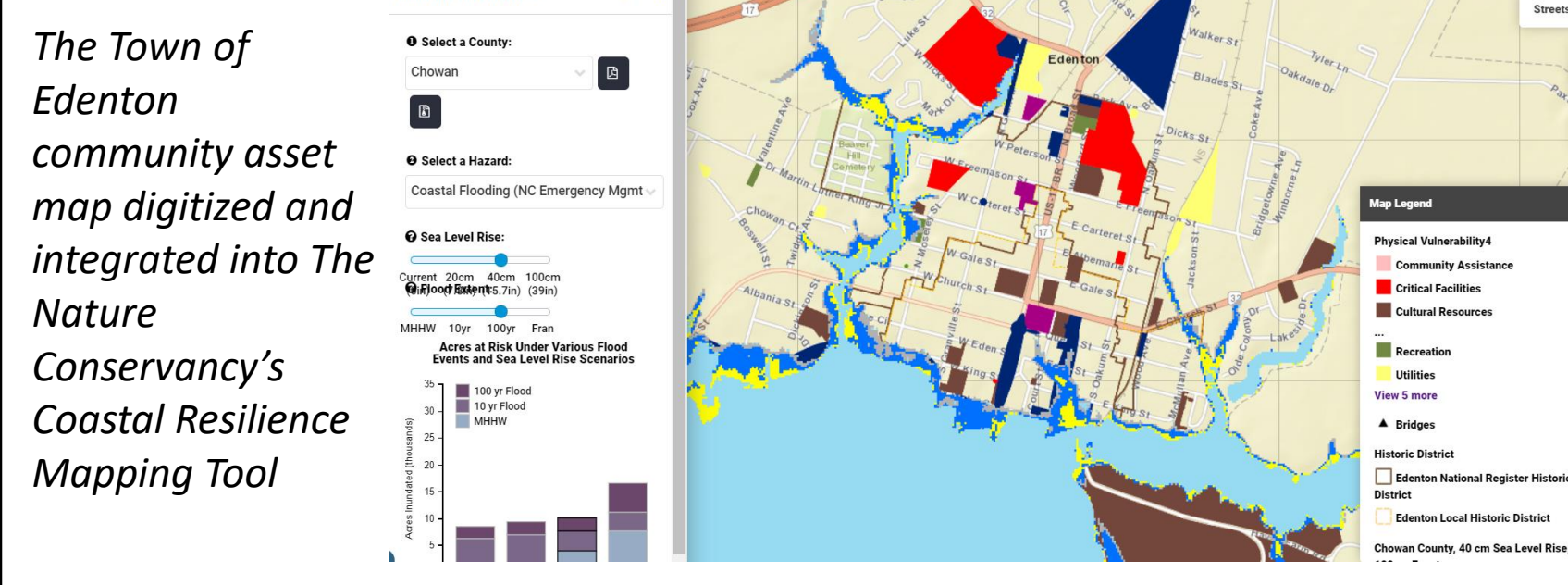
- Description:** a long-term strategy to reduce flood damages and water quality issues associated with outdated or inadequate stormwater drainage systems
- Requirement:** No, unless an MS4 community
- Resilience connection:** increasing extreme rainfall events, higher sea levels, and storms put stress on stormwater infrastructure built before there was a clear picture of flood risks. New investments should try to take into account these factors



**A successful approach to resilience depends on incorporating future conditions/scenarios as well as integrating across plans where feasible to maximize co-beneficial policies/actions and staff capacity and minimize conflicting actions.**

## Digitizing Community Knowledge of Hazards

- It's crucial to supplement hazard risk maps and models along with the knowledge of residents get the 'complete picture'
- Community asset mapping exercises help identify chronic problem areas or 'hot spots' for poor or inadequate drainage as well as give insight into various flood depth history
- Used to 'ground-truth' risk for updates to hazard mitigation plans, flood map updates, comprehensive plans, stormwater master plans and parks and recreational strategies



## Staff Training & Professional Development

- Sound community decision-making relies heavily on a knowledgeable and well-trained staff – attending trainings and workshops to stay sharp on resilience-related best practices is crucial

North Carolina Programs

- N.C. Coastal Training Program** - North Carolina National Estuarine Research Reserve: sign up to receive email announcements about upcoming and past workshops covering a range of important coastal management topics such as: living shoreline installation, social science basics, tools for flooding adaptation, and more.
- N.C. Training, Exercise, Response Management System (TERMS)** - North Carolina - Division of Emergency Management: view in-person and online schedules for training and workshops on hazards planning, community emergency response teams, and more.
- UNC School of Government** - take online and in-person courses on local government finance and administration, planning and development regulation, and more.
- N.C. State Extension Stormwater, Erosion Control, Stream Restoration Workshops** - NC State Department of Biological and Agricultural Engineering Extension Program: access various certification courses, training, and workshops.

Federal Programs

- Digital Coast Training** - National Oceanic and Atmospheric Administration: explore and filter training by type, skill desired or focus area and learn about a range of subjects important for building coastal resilience.
- FEMA Training Portal** - Federal Emergency Management Agency: view available online and in-person training and workshops covering all phases of emergency management from preparedness to recovery.

## NWS 'StormReady' Community Status

- StormReady uses a grassroots approach to help communities develop plans to handle all types of extreme weather—from tornadoes to winter storms. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations. Applying is easy. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public
- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Example: Pine Knoll Shores



## Flood Risk and Flood Insurance Outreach

- Making Flood insurance more accessible and affordable is one of the most effective resilience measures
- Coordinated outreach campaigns done at a multi-jurisdictional level (e.g. Dare County) can lead to more effective messaging and lead to greater action

"LOW RISK" Is Not "NO RISK"

OBXFloodMaps.com

1 Inch WATER DAMAGE = \$21,000 IN PROPERTY DAMAGE (2,000 Square Foot Home On Average)

Protect your home with flood insurance — call an insurance agent and discuss a flood policy. Protect your investment for today and future generations.

OBXFloodmaps.com

## Dune Vegetation Cost-Share Program

- Encourage the preservation and enhancement of dunes through a cost-share program that reimburses ocean-front property owners for costs associated with planting vegetation.



## Citizen Science – N.C. King Tides Project

- Engage public in monitoring and responding to high water events. Install a water level gauge in publicly accessible and visible locations. Encourage the public to document events through photos shared on the website.

Fort Macon State Park 2015 Heavy Rain + King Tide

2019 North Carolina King Tides Calendar

King Tide: Elevated Higher & Longer Water Events

Other Tides: Lower High Tide, Full Moon, Super Full Moon (Higher Full Moon), Super New Moon (Lower New Moon)

Snap the shore See the future

## Community Emergency Response Teams (CERTs)

- CERT educates individuals about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using training learned in the classroom and during exercises,
- CERT volunteers can assist others in their community following a disaster when professional responders are not immediately available to help. CERT volunteers are also encouraged to support emergency response agencies by taking an active role in emergency preparedness projects.
- Existing or newly created CERTs may be helpful for informing long-term recovery and resilience planning
- "The true first responders are your neighbors"
- "Disasters begin and end at the local level"



## FEMA Community Rating System (CRS)

- FEMA's CRS is a voluntary point-based program that encourages communities to earn a discount on flood insurance premiums for actions that contribute to their flood risk reduction. See CRS Manual and CRS Green Guide.
- Serves as one potential measure for a community's resilience
- Activity 420 - Open Space Preservation (OSP) is most often the highest point-getter – partners at The Nature Conservancy can help identify these areas
- N.C.'s coastal region has an OBX CRS Users group and Southeast CRS Users group that meet to learn from and help each other find ways to get the most points possible

CRS Class	Credit Points (cT)	Premium Reduction in SFHA	Premium Reduction Outside SFHA
1	4,500+	45%	10%
2	4,000-4,499	40%	10%
3	3,500-3,999	35%	10%
4	3,000-3,499	30%	10%
5	2,500-2,999	25%	10%
6	2,000-2,499	20%	10%
7	1,500-1,999	15%	5%
8	1,000-1,499	10%	5%
9	500-999	5%	5%
10	0-499	0%	0

The Nature Conservancy

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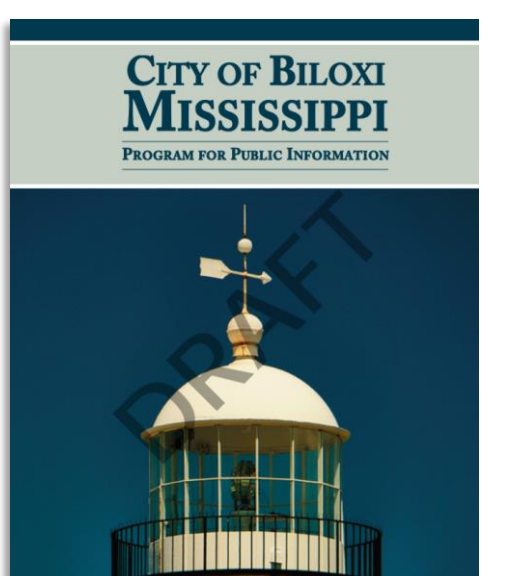
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## CRS Program for Public Information (PPI)

- National Flood Insurance Community Rating System offers credit to communities that establish a Program for Public Information (PPI). Points are available for public information related to hazard disclosure, flood protection information and assistance, open space preservation, and drainage system maintenance
- PPI is an ongoing local effort to identify, prepare, implement, and monitor a range of public information activities on hazard awareness
- PPIs can be done by a single jurisdiction or be done at a regional scale
- Examples: City of Biloxi, Mississippi



City of Biloxi PPI for CRS



# A Citizen's Guide to Understanding Stormwater



United States Environmental Protection Agency

EPA 833-B-03-002

January 2003

Internet Address (URL): <http://www.epa.gov>  
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## After the Storm

For more information contact:  
[www.epa.gov/nps/stormwater](http://www.epa.gov/nps/stormwater)  
or visit  
[www.epa.gov/nps](http://www.epa.gov/nps)



## What is stormwater runoff?



Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

## Why is stormwater runoff a problem?



Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

## The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- ◆ Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- ◆ Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- ◆ Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- ◆ Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- ◆ Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.



- ◆ Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

# Stormwater Pollution Solutions

## Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

### Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.



- ◆ Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- ◆ Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- ◆ Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- ◆ Cover piles of dirt or mulch being used in landscaping projects.

### Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.



- ◆ Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- ◆ Don't dispose of household hazardous waste in sinks or toilets.

### Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.



- ◆ Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- ◆ Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

### Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.



- ◆ When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

## Residential landscaping

**Permeable Pavement**—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

**Rain Barrels**—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.



**Rain Gardens and Grassy Swales**—Specially designed areas planted with native plants can provide natural places for



rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

**Vegetated Filter Strips**—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.



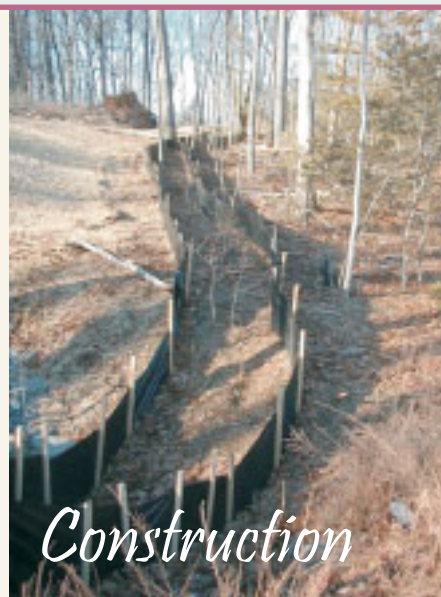
## Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- ◆ Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- ◆ Cover grease storage and dumpsters and keep them clean to avoid leaks.
- ◆ Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- ◆ Divert stormwater away from disturbed or exposed areas of the construction site.
- ◆ Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- ◆ Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



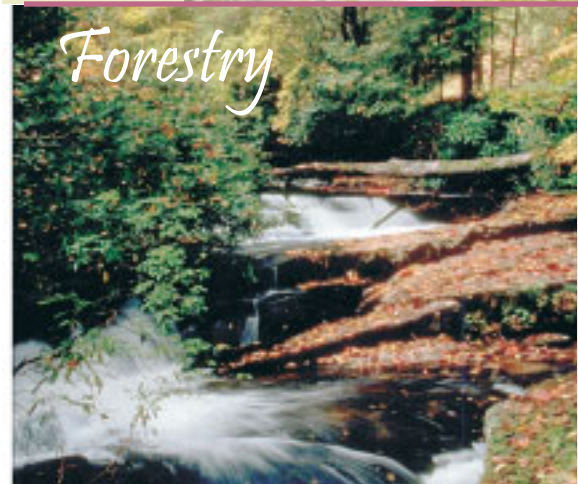
## Construction



## Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- ◆ Keep livestock away from streambanks and provide them a water source away from waterbodies.
- ◆ Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- ◆ Vegetate riparian areas along waterways.
- ◆ Rotate animal grazing to prevent soil erosion in fields.
- ◆ Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

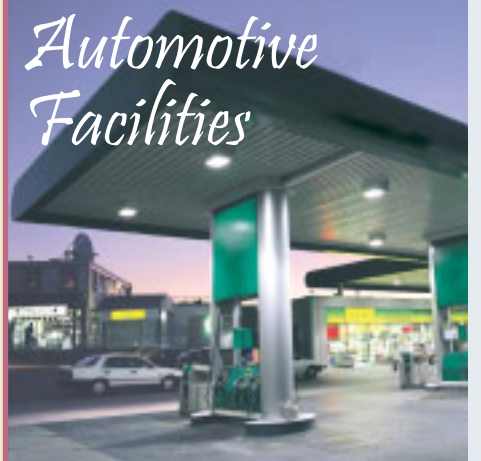


## Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- ◆ Conduct preharvest planning to prevent erosion and lower costs.
- ◆ Use logging methods and equipment that minimize soil disturbance.
- ◆ Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- ◆ Construct stream crossings so that they minimize erosion and physical changes to streams.
- ◆ Expedite revegetation of cleared areas.

## Automotive Facilities

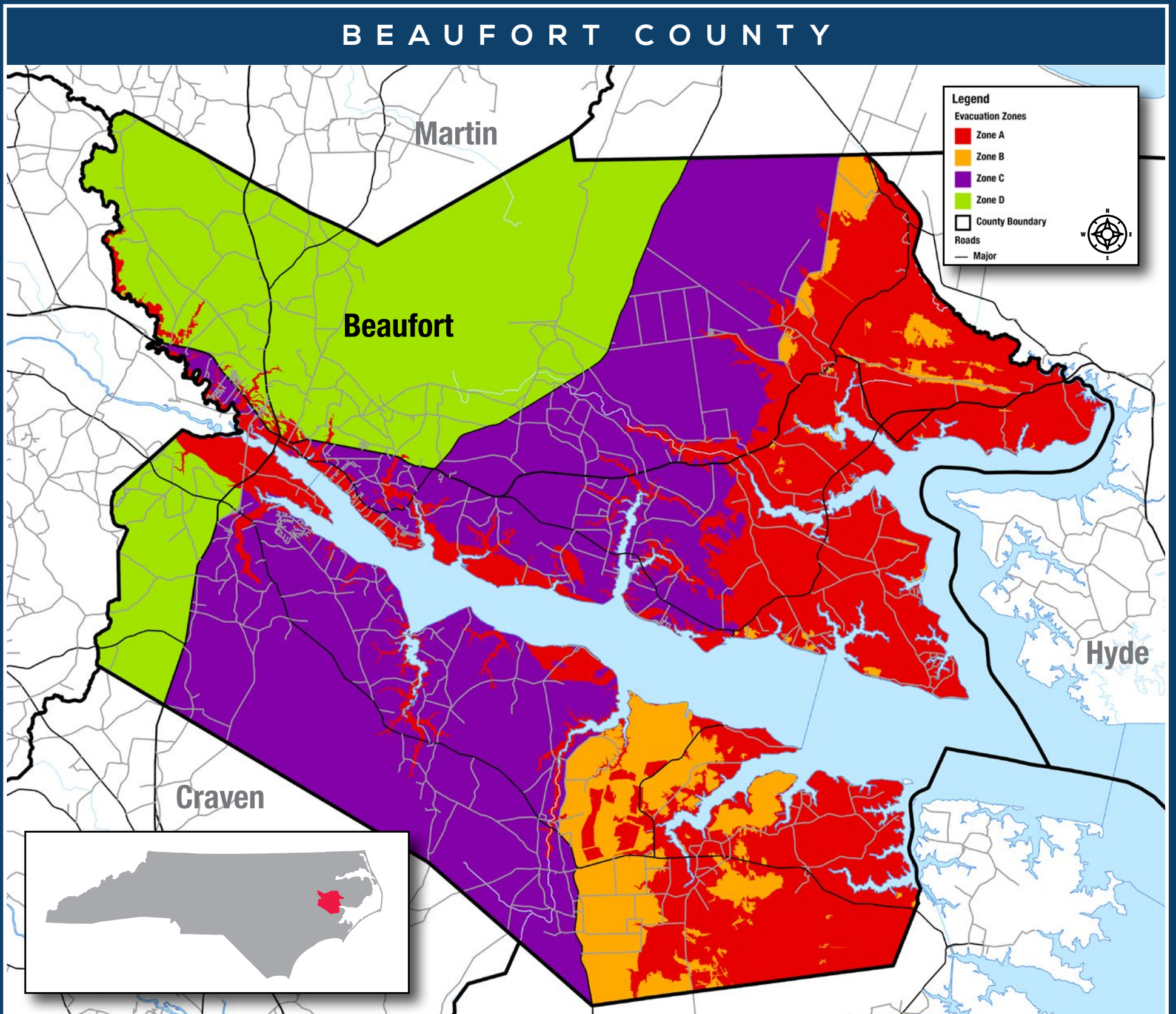


Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- ◆ Clean up spills immediately and properly dispose of cleanup materials.
- ◆ Provide cover over fueling stations and design or retrofit facilities for spill containment.
- ◆ Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- ◆ Install and maintain oil/water separators.

# KNOW YOUR ZONE

In an emergency, local officials will order evacuations using zones to keep your family safe. These zones highlight areas most at risk to impacts from hurricanes, tropical storms, and other hazards.



Find your evacuation zone where you live, work or play.  
**KNOWYOURZONE.NC.GOV**



### What Is a Rain Garden?

Rain gardens are beautiful natural landscape features that require less maintenance and fewer chemicals than lawns. Rain gardens capture runoff from impervious areas such as roofs and driveways and allow it to seep slowly into the ground. Most importantly, rain gardens help preserve nearby streams and lakes by reducing the amount of runoff and filtering pollutants.



### Why Plant a Rain Garden?

Rain gardens provide for the natural infiltration of rainwater into the soil. This helps to filter out pollutants including fertilizer, pesticides, oil, heavy metals and other chemicals that are carried with the rainwater that washes off your lawn, rooftop and driveway. Rain gardens also reduce peak storm flows, helping to prevent stream bank erosion and lowering the risk for local flooding. By collecting and using rainwater that would otherwise run off your yard, rain gardens allow you to have an attractive landscape with less watering.



### How Do Rain Gardens Work?

A rain garden receives runoff water from roofs or other impervious (hard) surfaces such as driveways. The rain garden holds the water on the landscape so that it can be taken in by plants and soak into the ground instead of flowing into a street and down a storm drain or drainage ditch. The plants, mulch and soil in a rain garden combine natural physical, biological and chemical processes to remove pollutants from runoff. Many pollutants will be filtered out and break down in the soil over time.

Water should stand in a rain garden no longer than 24 hours after the rain stops. Mosquitoes cannot complete their breeding cycle in this length of time, so a rain garden should not increase mosquito populations.

*Special thanks to Rose Mary Seymour, Ph. D., P.E. of the University of Georgia, College of Agricultural and Environmental Science, Biological and Agricultural Engineering, Griffin Campus, UW-Extension Office, the Pollution Prevention Assistance Division (P2AD), Alfred Vick, ECOs Environmental Designs and Maplewood, Minnesota (for photos).*



# RAIN GARDENS FOR HOME LANDSCAPES



40 Courtland Street, NE  
Atlanta, Georgia 30303

[WWW.CLEANWATERCAMPAIGN.COM](http://WWW.CLEANWATERCAMPAIGN.COM)



## Where Are The Best Places to Locate Rain Gardens?



Rain gardens are best located in natural depressions (low lying areas where water flows naturally). They should be sited at least 10 feet from a house or building. While they should not be next to building foundations, rain gardens near impervious surfaces such as driveways, patios and sidewalks help capture the runoff from these areas.

Sites with steep slopes (an elevation change of more than 12 feet down per 100 feet in length) may not be

suitable for rain gardens. Further, if you have a septic system, avoid planting a rain garden over the top of the drainfield. It is recommended that a landscape professional be consulted if you plan to build a rain garden larger than 300 square feet.



## Where Are Rain Gardens Not Beneficial?

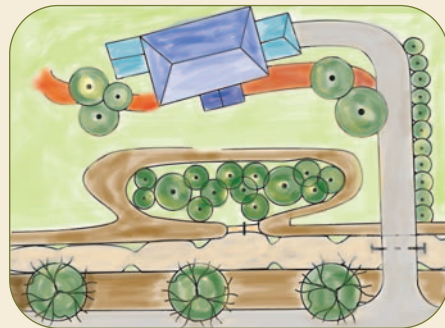
- Rain gardens are not appropriate where the seasonal high water table is within 24 inches of the soil surface because the water table will prevent infiltration.
- Rain gardens should not be placed over a septic system.
- Rain gardens should not be located next to building foundations.



## How To Create a Rain Garden

1. Locate a site for a rain garden in a natural depression in the landscape.
2. Determine the size and shape of the rain garden.

- To calculate the size, consider the area draining to a rain garden, including the roof area or impervious area that drains to the downspout and the area of land between the downspout and the rain garden. The larger the roof or impervious (hard) area and the slower that water infiltrates into the soil, the more area of rain garden needed.



- An effective rain garden depends on water infiltrating into the soil of the garden. Soils with a lot of clay will infiltrate water very slowly, so the size of a rain garden in clay soils should be 60 percent of the total drainage area. Sandy soils infiltrate water more quickly, so a rain garden in a sandy location does not need to be as large. For sandy soils, the rain garden size should be about 20 percent of the area draining to it. Loamy soils can be sized somewhere between 20 and 60 percent, keeping in mind that the slower the infiltration, the larger the area should be. It is important to know your soil before you start a rain garden project. To test the infiltration of your soil, dig a hole 6-8 in deep in the area that the rain garden will be located. Fill the hole with water. Observe how long it takes for the water to move (infiltrate) into the soil. If any water stays in the hole for 12 hours or longer, then the soil is not suitable for a rain garden.

- If you determine that your rain garden area needs to be greater than 300 square feet and you wish to plan the site without outside assistance, divide the drainage area between two or more rain gardens, and build each so you can easily manage them both.

- A rain garden should be curvy in shape and is best situated with the longest length perpendicular to the slope of the land.

- Use rope to lay out the boundary of the rain garden.

3. Once the rain garden is laid out, you can start digging.

- Begin by removing soil in the rain garden so that the deepest part is about 8 -10 inches deep.

- The bottom of the rain garden should be as level as possible so some minor grading may be necessary.

- The extra soil removed from the rain garden should be used on the downhill side of the garden to create a berm, an earthen dam or barrier that will keep the water in the rain garden. The top of the berm should not be higher than the uphill edge of the rain garden (no more than 12 inches high). The rain garden should be designed to hold no more than 6 inches of water above the ground surface.



4. Mix organic matter into the soil within the rain garden by spreading 2 to 4 inches of compost over the area and mixing the organic matter in with the existing soil.

- If the soil is acidic (has a low pH), add lime to neutralize the pH of the soil. Contact a local University of Georgia Cooperative Extension Service office for a soil sampling test by calling 770-228-7274 or go online to [www.ces.uga.edu](http://www.ces.uga.edu).

- For soils with high clay content, it may be beneficial to remove about 1-2 feet of the soil and replace it with a more porous "rain garden soil." A soil mix suitable for rain gardens is 50-60 percent sand, 20-30 percent topsoil, and 20-30 percent compost. The clay content in the rain garden soil replacement mix should be no more than 10 percent.

5. A shallow swale or corrugated drain pipe should be set up to carry the water from the roof downspout to the rain garden.

- Make sure that the ground slopes away from the house so that water does not collect around the foundation.

6. Establish a grass or groundcover border along the upper edge of the rain garden to slow down the runoff water as it enters the rain garden, and do the same over the berm to stabilize it as a border of the rain garden.

7. Select and plant drought tolerant, wet tolerant and hardy plants. A mix of ornamental grasses, shrubs and self-seeding perennials are good choices. *See chart of plants.*



8. Once plants are in place, cover the garden with a 3" layer of mulch. Lighter mulches such as pine bark and straw will float in water and may be washed away to the edges of the rain garden. Better mulch choices for a rain garden are more dense materials such as pine straw, wood chips or shredded wood.

9. To maintain your rain garden, remove weeds on a regular basis as the landscape plants grow, and replenish mulch as needed.

- As the plants in the rain garden mature, there will be less need for mulch and weeding.

- Rain gardens should be relatively low maintenance if the correct plants are chosen.

10. IMPORTANT NOTE: Plan on providing an "overflow" path for water to take if the rain garden fills and more rain comes. This path should be stabilized with a hardy grass or groundcover.



## What Plants Should You Use?

Finding plants for your rain garden is not difficult. Many well-suited plants are available at your nearest landscaping supply store. Here are some suggested plants (common and *scientific* names):



### Trees

Trees are effective in rain gardens that are larger than 150 square feet. Plant trees at least eight feet apart.

Bald Cypress  
Black Gum  
Crape Myrtle  
Fringetree  
Green Ash  
Musclewood/American Hornbeam  
Red Maple  
River Birch  
Sweetbay Magnolia  
Willow Oak  
Witch Hazel

*Taxodium distichum*  
*Nyssa sylvatica*  
*Lagerstroemia indica*  
*Chionanthus virginicus*  
*Fraxinus pennsylvanica*  
*Carpinus caroliniana*  
*Acer rubrum*  
*Betula nigra*  
*Magnolia virginiana*  
*Quercus phellos*  
*Hamamelis virginiana*

### Shrubs

American Beautyberry  
Bottlebrush Buckeye  
Buttonbush  
Common Winterberry/Winterberry Holly  
Inkberry  
Oakleaf Hydrangea  
Rose of Sharon  
Summersweet Clethra  
Virginia Sweetspire  
Wax Myrtle

*Callicarpa americana*  
*Aesculus parviflora*  
*Cephalanthus occidentalis*  
*Ilex verticillata*  
*Ilex glabra*  
*Hydrangea quercifolia*  
*Hibiscus syriacus*  
*Clethra alnifolia*  
*Itea virginica*  
*Myrica cerifera*

### Perennials, Grasses and Groundcovers

Asters  
Blackeyed Susan  
Blue Lobelia  
Broadleaf Uniola/Indian Woodoats  
Broomsedge  
Cardinal Flower  
Cinnamon Fern  
Clubed Begonia  
Golden Ragwort  
Goldenrod  
Ironweed  
Joe-Pye Weed  
Liatris  
Narrowleaf Dragonhead  
New England Aster  
Red Columbine  
Royal Fern  
St. John's Wort  
Scarlet Rosemallow/Swamp Hibiscus  
Swamp Milkweed  
Swamp Sunflower  
Switchgrass  
Wild Ginger  
Yellow Stargrass

*Aster spp.*  
*Rudbeckia hirta*  
*Lobelia siphilitica*  
*Chasmanthium latifolium*  
*Andropogon virginicus*  
*Lobelia cardinalis*  
*Osmunda cinnamomea*  
*Begonia cucullata*  
*Packera aurea*  
*Solidago flexicaulis*  
*Vernonia noveboracensis*  
*Eupatorium fistulosum*  
*Liatris pycnostachya*  
*Physotegia angustifolia*  
*Aster novae-angliae*  
*Aquilegia canadensis*  
*Osmunda regalis*  
*Hypericum fasciculatum*  
*Hibiscus coccineus*  
*Asclepias incarnata*  
*Helianthus angustifolius*  
*Panicum virgatum*  
*Asarum canadense*  
*Hypoxis spp.*

For help in finding a location to purchase native plants, go to the Georgia Native Plant Society's website at [www.gnps.org](http://www.gnps.org).

An additional list of plants suitable for rain gardens can be obtained through the University of Georgia Cooperative Extension Service. The bulletin, called "A Compilation of Low-Maintenance Plants for Georgia Landscapes" (H-91-009), lists both native and non-native plants that are drought and moisture tolerant. The bulletin can be found at a local extension office or online at [www.ces.uga.edu](http://www.ces.uga.edu).

# BE PREPARED FOR A FLOOD

Failing to evacuate flooded areas, entering flood waters, or remaining after a flood has passed can result in injury or death.



FEMA

FEMA V-1005/ March 2018

Flooding is a temporary overflow of water onto land that is normally dry. It is the most common natural disaster in the U.S.



Results from rain, snow, coastal storms, storm surge, and overflows of dams and other water systems



Develops slowly or quickly. Flash floods can come with no warning



Causes outages, disrupt transportation, damage buildings, create landslides

## IF YOU ARE UNDER A FLOOD WARNING, FIND SAFE SHELTER RIGHT AWAY

Do not walk, swim, or drive through flood waters.



Stay off bridges over fast-moving water.



Determine your best protection based on the type of flooding.



Evacuate if told to do so.



Move to higher ground or a higher floor.



Stay where you are.

# HOW TO STAY SAFE

## WHEN A FLOOD THREATENS

### Prepare NOW

**Know your area's type of flood risk.** Visit FEMA's Flood Map Service Center at <https://msc.fema.gov/> portal for information.

**Sign up for your community's warning system.** The Emergency Alert System (EAS) and National Oceanic and Atmospheric Administration (NOAA) Weather Radio also provide emergency alerts.

**If flash flooding is a risk in your location,** monitor potential signs such as heavy rain.

**Learn and practice evacuation routes, shelter plans,** and flash flood response.

**Gather supplies in case you have to leave immediately or if services are cut off.** Keep in mind each person's specific needs, including medication. Don't forget the needs of pets. Obtain extra batteries and charging devices for phones and other critical equipment.

**Obtain flood insurance.** Homeowner's policies do not cover flooding. Get flood coverage under the National Flood Insurance Program (NFIP).

**Keep important documents in a waterproof container.** Create password-protected digital copies.

**Protect your property.** Move valued items to higher levels. Declutter drains and gutters. Install check valves. Consider a sump pump with a battery.

### Survive DURING

**Depending on where you are,** and the impact and the warning time of flooding, go to the safe location that you have identified.

**If told to evacuate, do so immediately.** Never drive around barricades. Local responders use them to safely direct traffic out of flooded areas.

**Listen to EAS, NOAA Weather Radio,** or local alerting systems for current emergency information and instructions.

**Do not walk, swim, or drive through flood waters.** Turn Around. Don't Drown.® Just six inches of fast-moving water can knock you down, and one foot of moving water can sweep your vehicle away.

**Stay off of bridges over fast-moving water.** Fast-moving water can wash bridges away without warning.

**If your vehicle is trapped in rapidly moving water,** stay inside. If water is rising inside the vehicle, seek refuge on the roof.

**If trapped in a building, go to its highest level.** Do not climb into a closed attic. You may become trapped by rising floodwater. Go on the roof only if necessary. Signal for help.



**FEMA**

FEMA V-1005  
Catalog No. 17233-6

### Be Safe AFTER

**Listen to authorities for information and instructions.**

**Avoid driving, except in emergencies.**

**Be aware that snakes and other animals** may be in your house. Wear heavy gloves and boots during clean up.

**Avoid wading in floodwater,** which can contain dangerous debris and be contaminated. Underground or downed power lines can also electrically charge the water.

**Use a generator or other** gasoline-powered machinery **ONLY** outdoors and away from windows.

**Be aware of the risk of electrocution. Do not touch electrical equipment** if it is wet or if you are standing in water. If it is safe to do so, turn off the electricity to prevent electric shock.

### Take an Active Role in Your Safety

Go to **ready.gov** and search for **flood**. Download the **FEMA app** to get more information about preparing for a **flood**. Find Emergency Safety Tips under Prepare.

# DRAFT ACTIONS

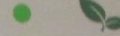
## BEAUFORT COUNTY

*Place a dot on your preferred action.*



### **Greenway and Public Park Improvements**

Integrate greenway and public park improvements into comprehensive planning and capital improvement efforts. This initiative will help the county improve its existing greenway and public park system, while attracting new adventurers and naturalists to the county.



*Place a dot on your preferred action.*



### **Living Shorelines Funding Program**

Coordinate with the Coastal Federation and other non-profit organizations to determine funding availability for living shorelines. Living shorelines are a relatively new approach that incorporate natural elements to create a more effective buffer to absorb wave energy and protect against shoreline erosion.

*Place a dot on your preferred action.*



### **CAMA Land Use Plan Coordination**

Continue to coordinate all development/planning decisions with review of appropriate CAMA Land Use Plans, including stated redevelopment policies and actions.

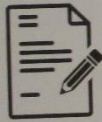
## DRAFT ACTIONS

BEAUFORT COUNTY



### **Special Flood Hazard Areas Educational Materials**

Develop Special Flood Hazard Areas brochures and other educational materials for residents. Distribute materials to local real estate agencies and manufactured home vendors. The materials should create awareness of risks related to development in flood prone areas and provide tools for homeowners to make their homes more disaster resistant to strong winds, lightning, heavy rains, and flooding.



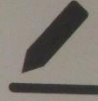
### **Drainage Ditches and Tributaries Maintenance Plan**

Develop a maintenance plan to clean out drainage ditches and tributaries to decrease flooding by improving flow. This plan would focus on areas located outside of existing drainage districts.

# DRAFT ACTIONS

BEAUFORT COUNTY

**Do you have ideas for how to improve resiliency to flooding in our community? Please add your ideas here.**

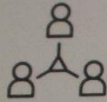


LED example  
\$40 at BCC,  
discounted at  
the Sand Rivers  
DE in my home  
educational website  
for desktop + tablet

# DRAFT ACTIONS

## BEAUFORT COUNTY

Place a dot on your preferred action.



### Essential / Emergency Services Operations Redundancies

Create redundancy for government employees located within high risk infrastructures and emergency services buildings to decrease the potential for lack of services directly after severe weather events. This would include establishing backup office space and equipment at other facilities in order to return to operational status as quickly as possible.

Place a dot on your preferred action.



### Open Space Program

Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Areas as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.



### Repetitive Loss Property Acquisition and/or Elevation

Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA-sponsored residential acquisition and elevation programs. Continue to apply for hazard mitigation grant and hazard mitigation assistance funding for residential acquisition and elevation.

# DRAFT ACTIONS

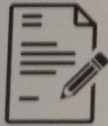
## BEAUFORT COUNTY



### Pamlico and Pungo River Wetland Restoration

Place a dot on your preferred action.

Restore wetlands at the confluence of the Pamlico and Pungo Rivers (Great Gut Bay) to increase storm surge capacity and reduce flooding. This will include: increasing native plant diversity, retaining water in the wet area, and adding habitat features.



### Open Space / Recreation Plan for Flood Mitigation

Place a dot on your preferred action.

Develop an open space/recreation plan for flood mitigation projects. This document will help the county plan for future conservation and recreational resources by implementing necessary zoning ordinances. The plan will identify a range of diverse flood mitigation strategies that could be implemented throughout the county.



### Natural Shoreline Migration

Place a dot on your preferred action.

Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement. This will reduce repetitive loss structures and increase stormwater capacity.

























## **APPENDIX C**

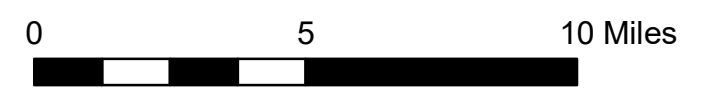
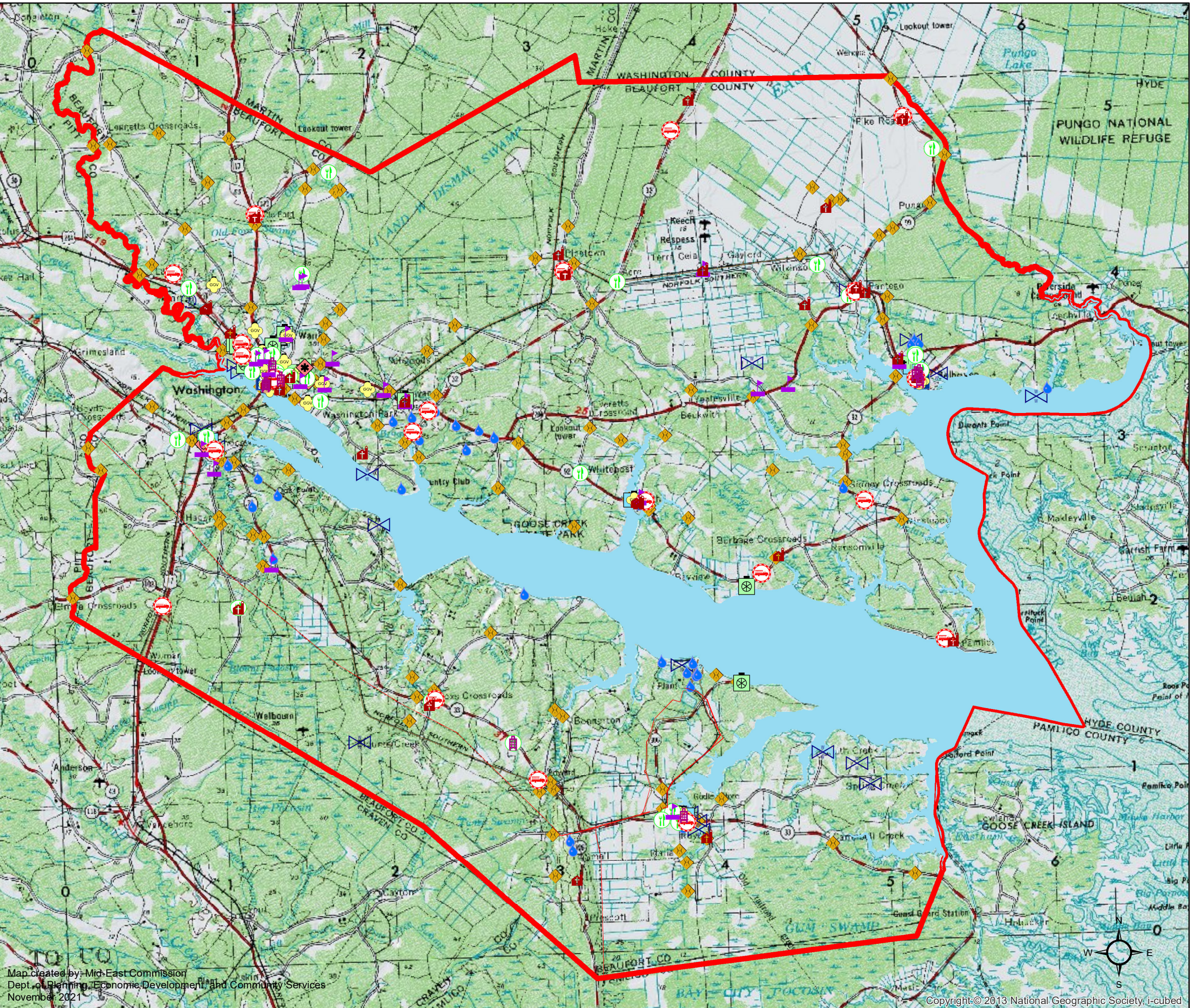
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### **Risk and Vulnerability Assessment Materials**

# NC Resilient Coastal Communities Program Beaufort County Critical Assets & Topography























## Legend

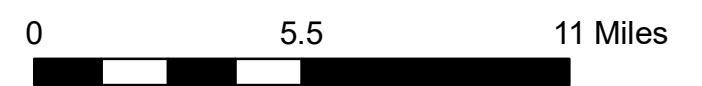
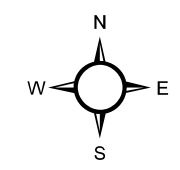
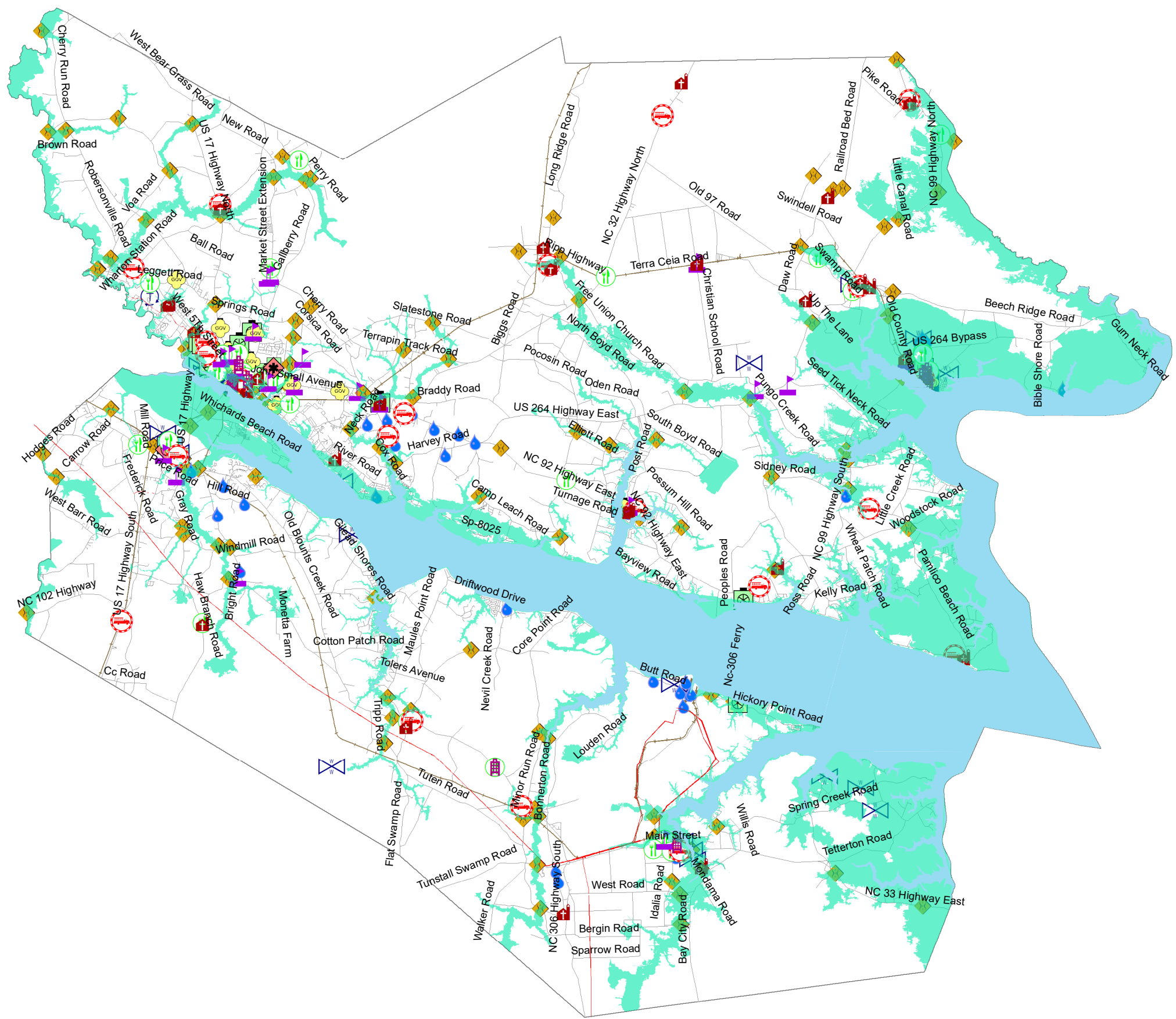
-  Community Buildings and Facilities
-  Community Response Partners
-  Duke Transmission Easements
-  Education
-  Emergency Management
-  Fire and EMS Stations
-  Food
-  Government Services
-  Law Enforcement/Security
-  Libraries
-  Medical
-  Public Water Supply Wells
-  Public Works Offices
-  Solid Waste
-  Transportation Facilities
-  Wastewater Discharge Permits
-  Bridges
-  Surface Water
-  Rail
-  Beaufort County



# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 100-year Floodplain























## Legend

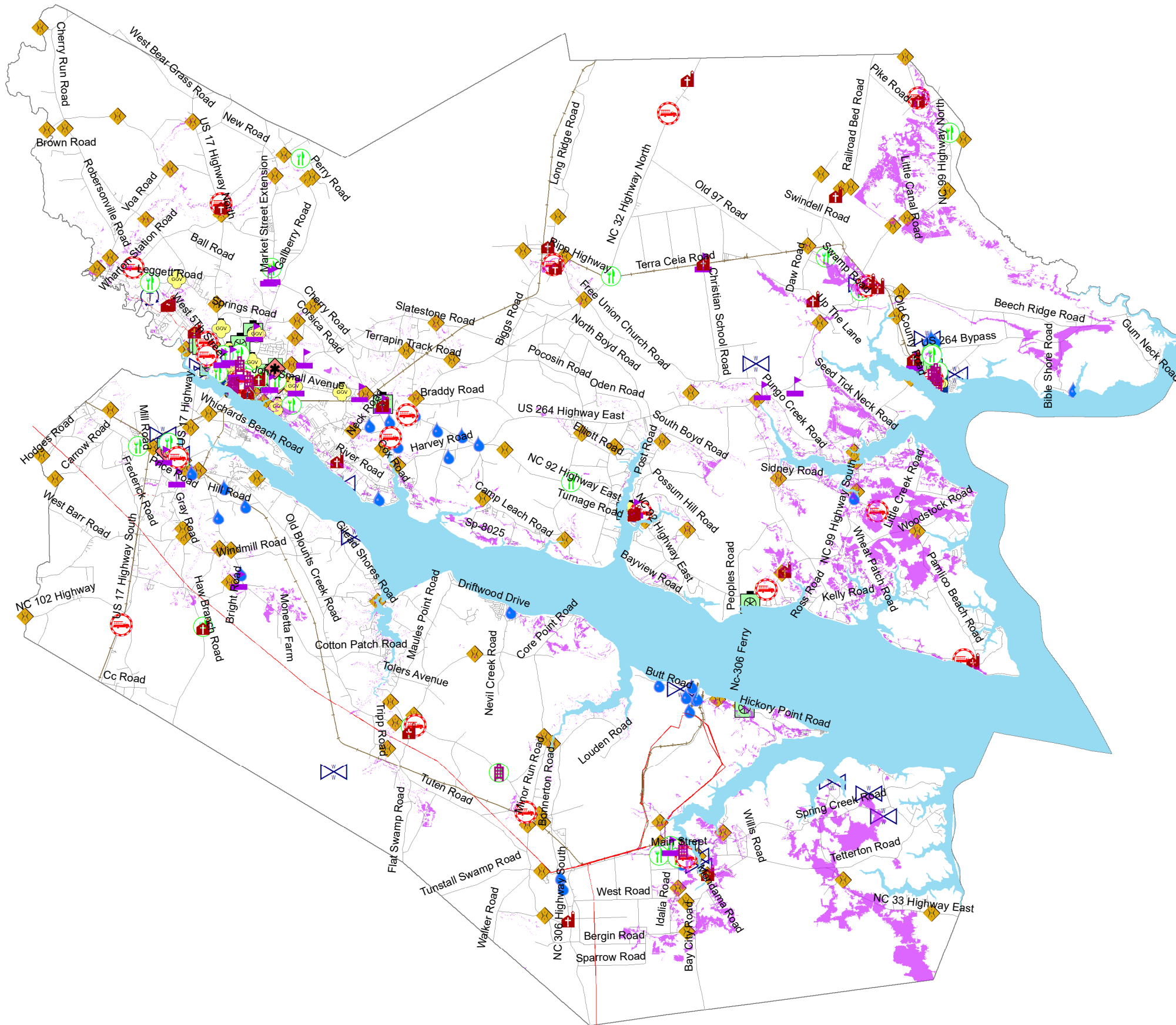
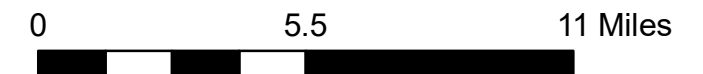
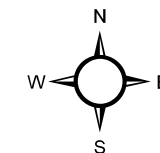
-  100-year Floodplain
-  Surface Water
-  Community Buildings and Facilities (33.3% in 100-yr FP)
-  Community Response Partners (17.9% in 100-yr FP)
-  Duke Transmission Easements (22.8% in 100-yr FP)
-  Education (5% in 100-yr FP)
-  Emergency Management (None in 100-yr FP)
-  Fire and EMS Stations (12.5% in 100-yr FP)
-  Food (17.2% in 100-yr FP)
-  Government Services (14.3% in 100-yr FP)
-  Law Enforcement/Security (16.7% in 100-yr FP)
-  Libraries (25% in 100-yr FP)
-  Medical (27.8% in 100-yr FP)
-  Public Water Supply Wells (22.9% in 100-yr FP)
-  Public Works Offices (16.7% in 100-yr FP)
-  Solid Waste (None in 100-yr FP)
-  Transportation Facilities (None in 100-yr FP)
-  Wastewater Discharge Permits (60% in 100-yr FP)
-  Bridges (81.5% in 100-yr FP)
-  Rail
-  Road Network (34.1% in 100-yr FP)
-  Beaufort County



# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 500-year Floodplain

## Legend

-  500-year Floodplain
-  Surface Water
-  Community Buildings and Facilities (22.2% in 500-yr FP)
-  Community Response Partners (3.6% in 500-yr FP)
-  Duke Transmission Easements (13.9% in 500-yr FP)
-  Education (None in 500-yr FP)
-  Emergency Management (None in 500-yr FP)
-  Fire and EMS Stations (8.3% in 500-yr FP)
-  Food (3.4% in 500-yr FP)
-  Government Services (14.3% in 500-yr FP)
-  Law Enforcement/Security (None in 500-yr FP)
-  Libraries (25% in 500-yr FP)
-  Medical (5.6% in 500-yr FP)
-  Public Water Supply Wells (2.9% in 500-yr FP)
-  Public Works Offices (16.7% in 500-yr FP)
-  Solid Waste (None in 500-yr FP)
-  Transportation Facilities (10% in 500-yr FP)
-  Wastewater Discharge Permits (5% in 500-yr FP)
-  Bridges (0.8% in 500-yr FP)
-  Rail
-  Road Network (19.4% in 500-yr FP)
-  Beaufort County

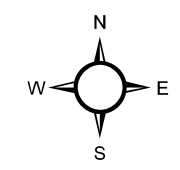
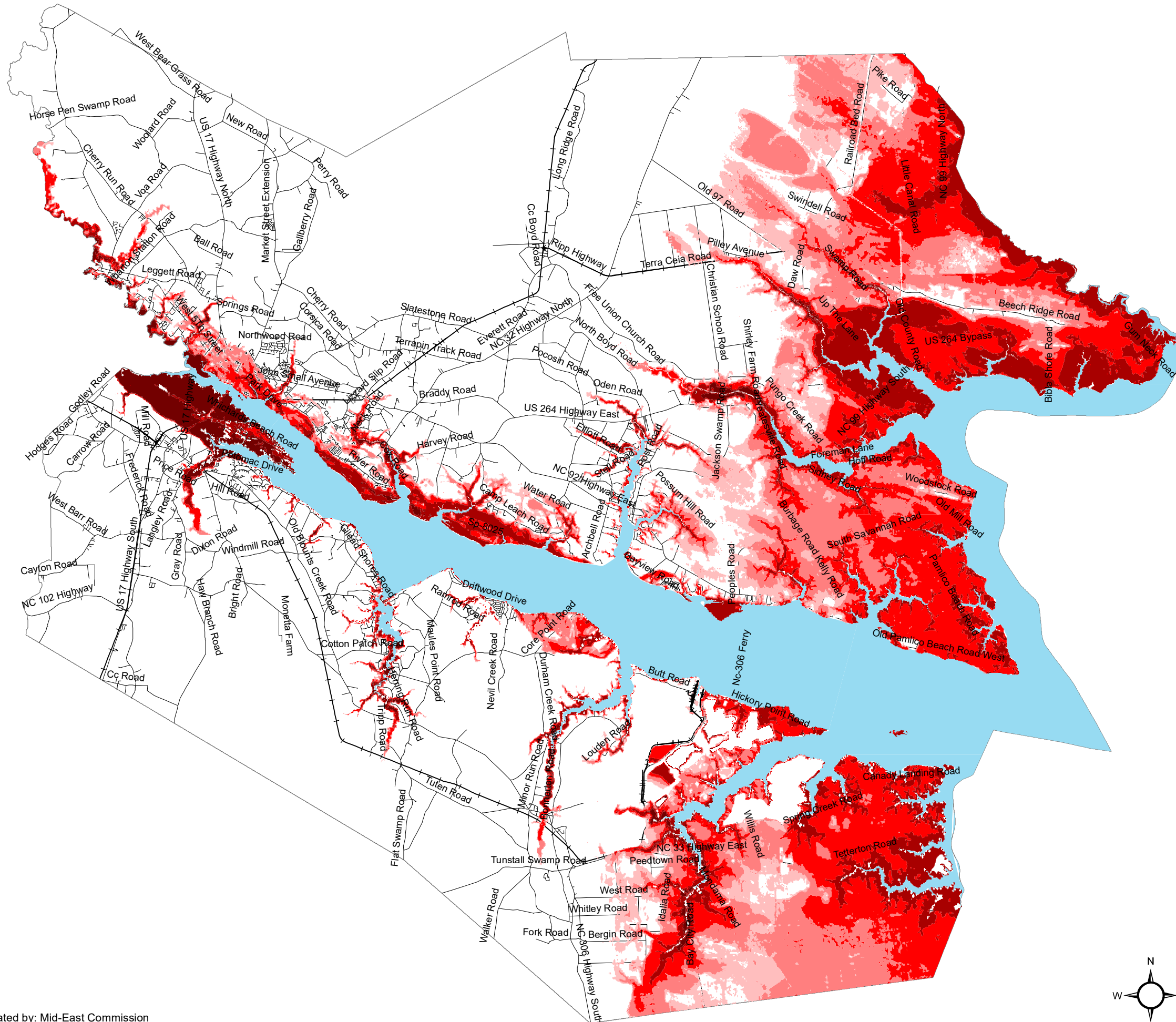


# NC Resilient Coastal Communities Program: Beaufort County Hurricane Florence Storm Surge, 2018

## Legend























### Hurricane Florence Storm Surge

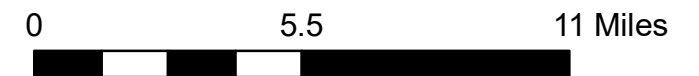
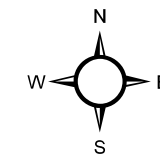
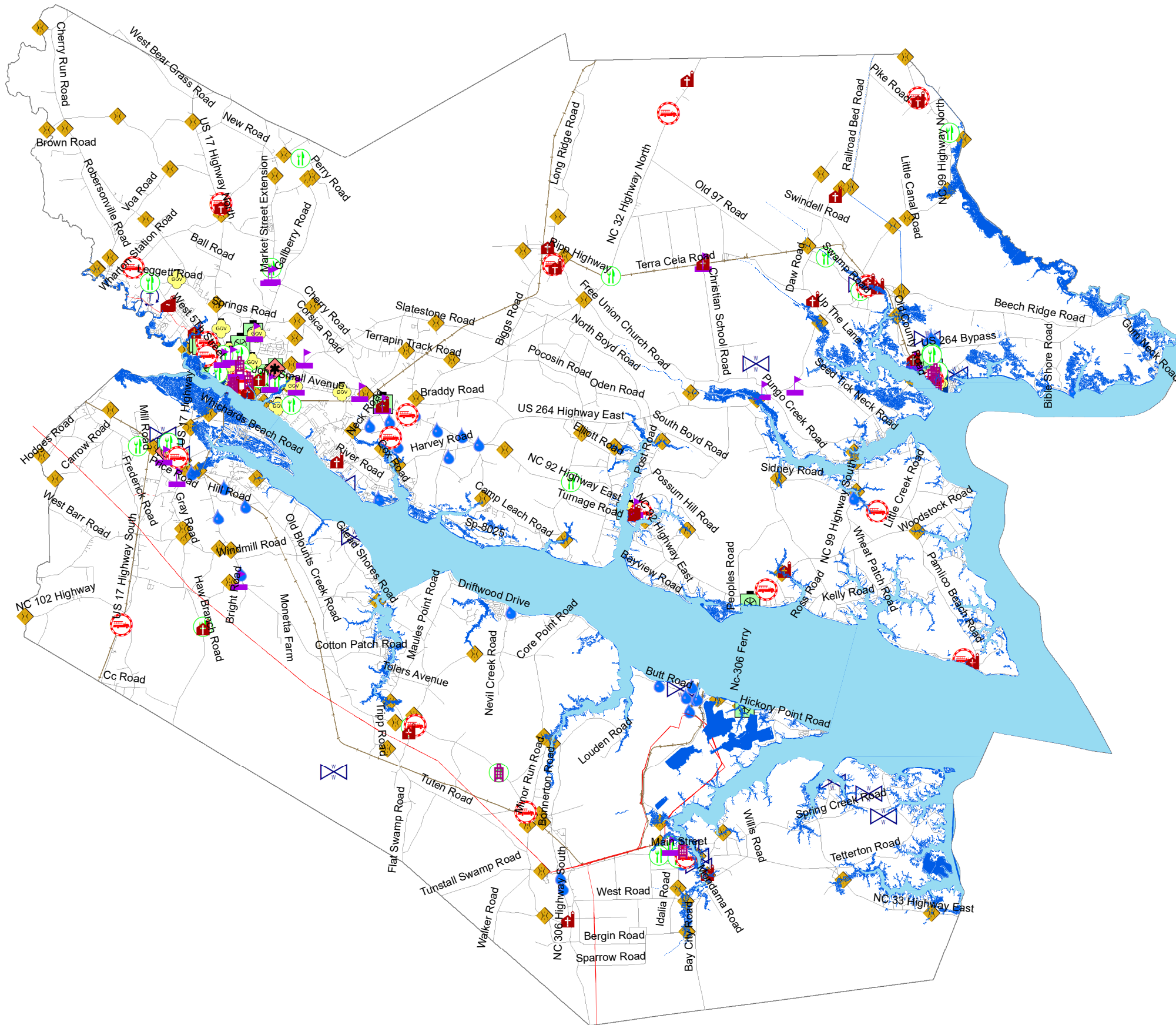
- Less than 1 ft. above ground
- Greater than 1 ft. above ground
- Greater than 3 ft. above ground
- Greater than 6 ft. above ground
- Greater than 9 ft. above ground
- Surface Water
- Rail
- Road Network
- Beaufort County



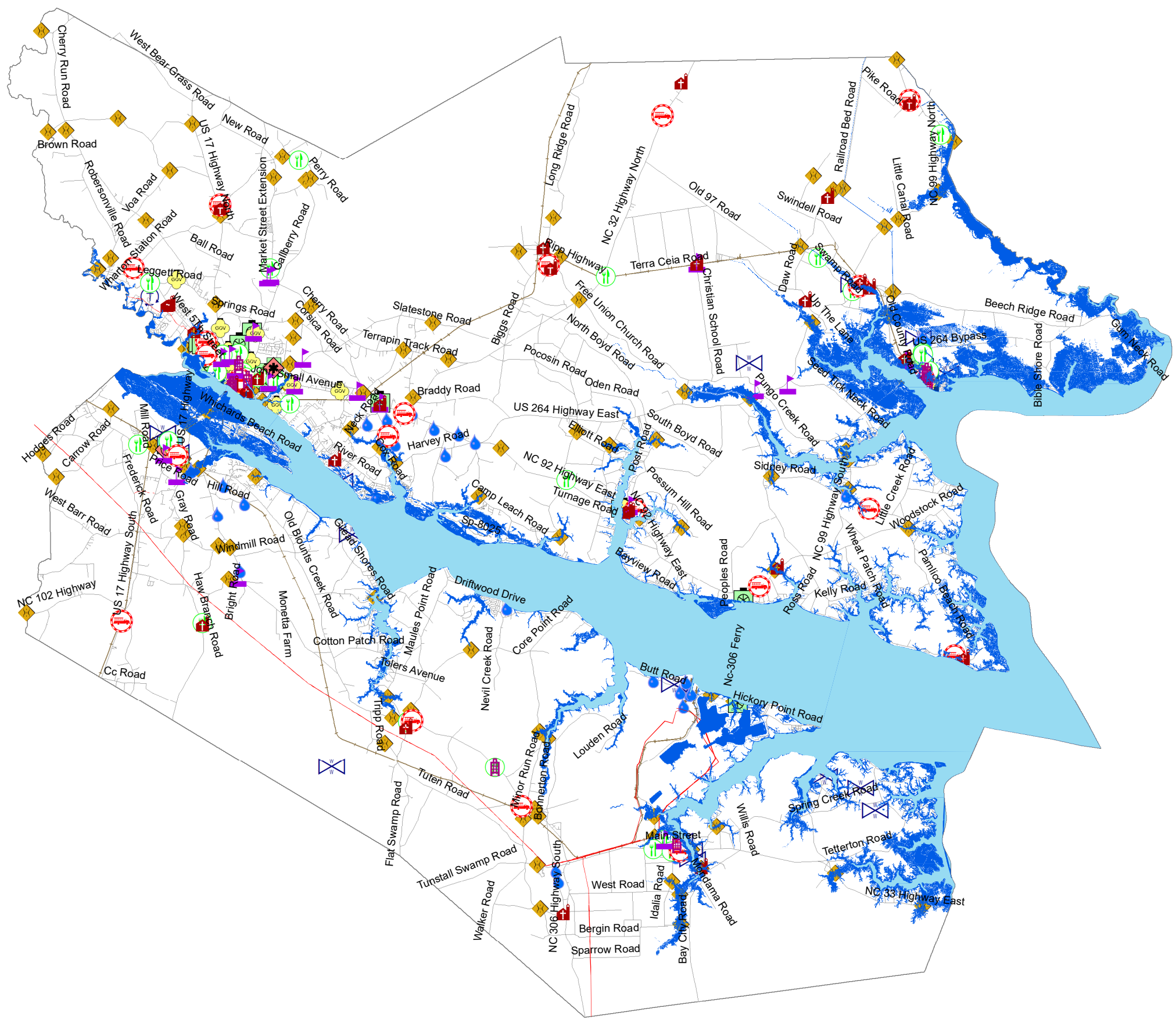
# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 1 ft. Sea Level Rise Scenario (30 year projection)

## Legend

-  Surface Water
-  1 ft. Sea Level Rise Scenario Area
-  Community Buildings and Facilities (None in potential SLR area)
-  Community Response Partners (None in potential SLR area)
-  Duke Transmission Easements (9.9% in potential SLR area)
-  Education (None in potential SLR area)
-  Emergency Management (None in potential SLR area)
-  Fire and EMS Stations (None in potential SLR area)
-  Food (None in potential SLR area)
-  Government Services (None in potential SLR area)
-  Law Enforcement/Security (None in potential SLR area)
-  Libraries (None in potential SLR area)
-  Medical (None in potential SLR area)
-  Public Water Supply Wells (5.7% in potential SLR area)
-  Public Works Offices (None in potential SLR area)
-  Solid Waste (None in potential SLR area)
-  Transportation Facilities (None in potential SLR area)
-  Wastewater Discharge Permits (35% in potential SLR area)
-  Bridges (42% in potential SLR area)
-  Rail
-  Road Network (2.3% in potential SLR area)
-  Beaufort County

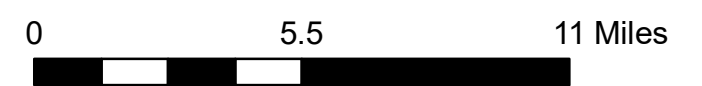
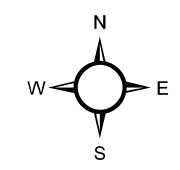


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & 2 ft. Sea Level Rise Scenario (60 year projection)

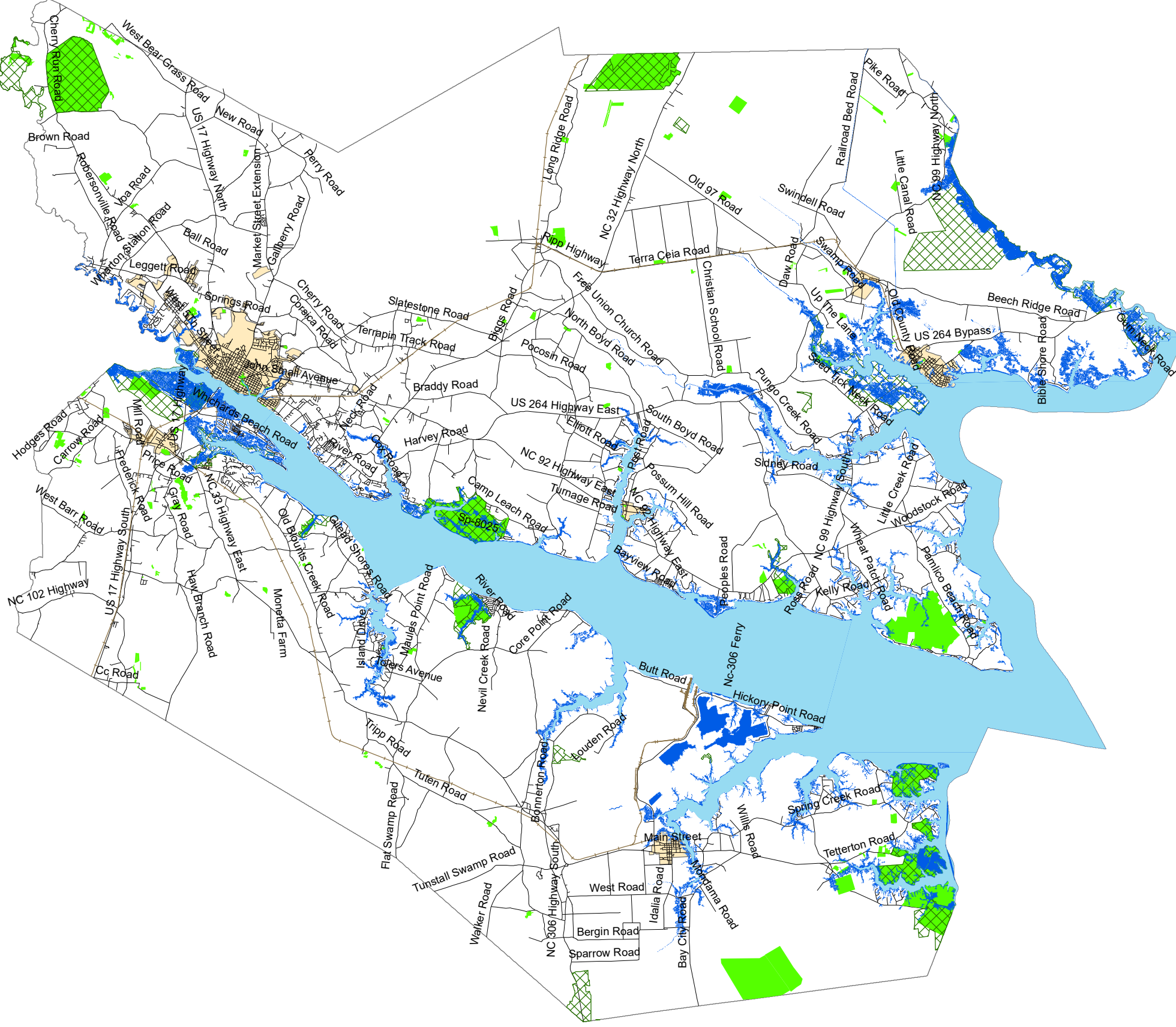


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Community Buildings and Facilities (11.1% in potential SLR area)
- Community Response Partners (None in potential SLR area)
- Duke Transmission Easements (11.6% in potential SLR area)
- Education (None in potential SLR area)
- Emergency Management (None in potential SLR area)
- Fire and EMS Stations (None in potential SLR area)
- Food (None in potential SLR area)
- Government Services (None in potential SLR area)
- Law Enforcement/Security (None in potential SLR area)
- Libraries (None in potential SLR area)
- Medical (None in potential SLR area)
- Public Water Supply Wells (8.6% potential SLR area)
- Public Works Offices (None in potential SLR area)
- Solid Waste (None in potential SLR area)
- Transportation Facilities (None in potential SLR area)
- Wastewater Discharge Permits (40% in potential SLR area)
- Bridges (47.1% in potential SLR area)
- Rail
- Road Network (8% in potential SLR area)
- Beaufort County

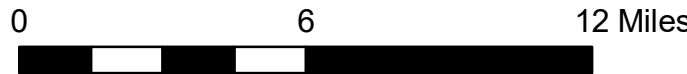
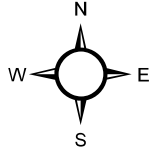


# NC Resilient Coastal Communities Program: Beaufort County Natural/Managed Areas & 1 ft. Sea Level Rise Scenario (30 year projection)











## Legend

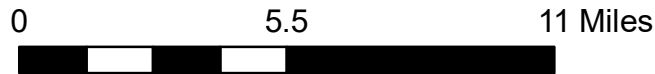
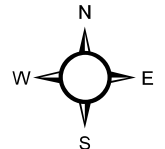
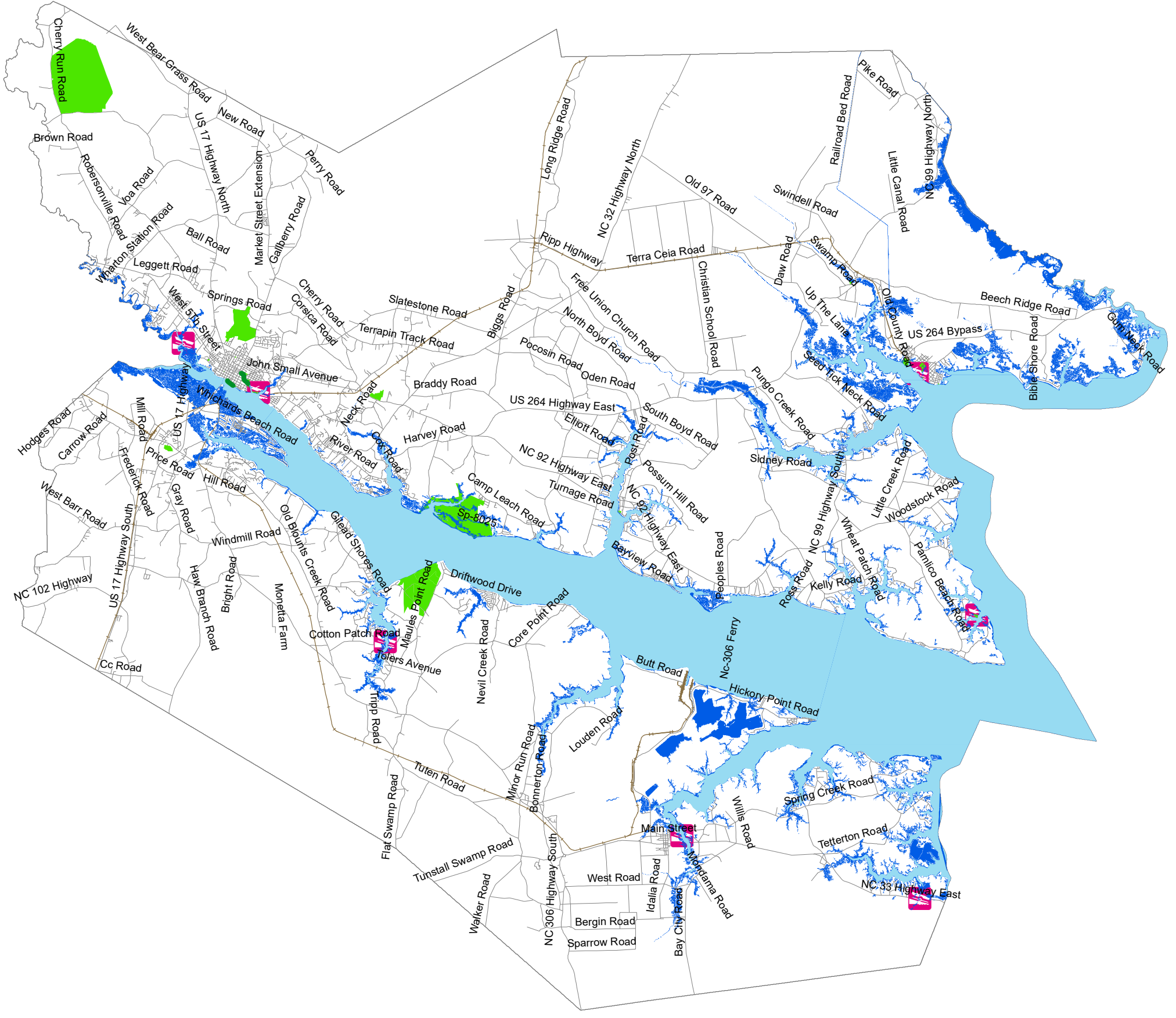
- Surface Water
- 1 ft. Sea Level Rise Scenario
- Natural Areas (69.6% in potential SLR area)
- Managed Areas (24.6% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County



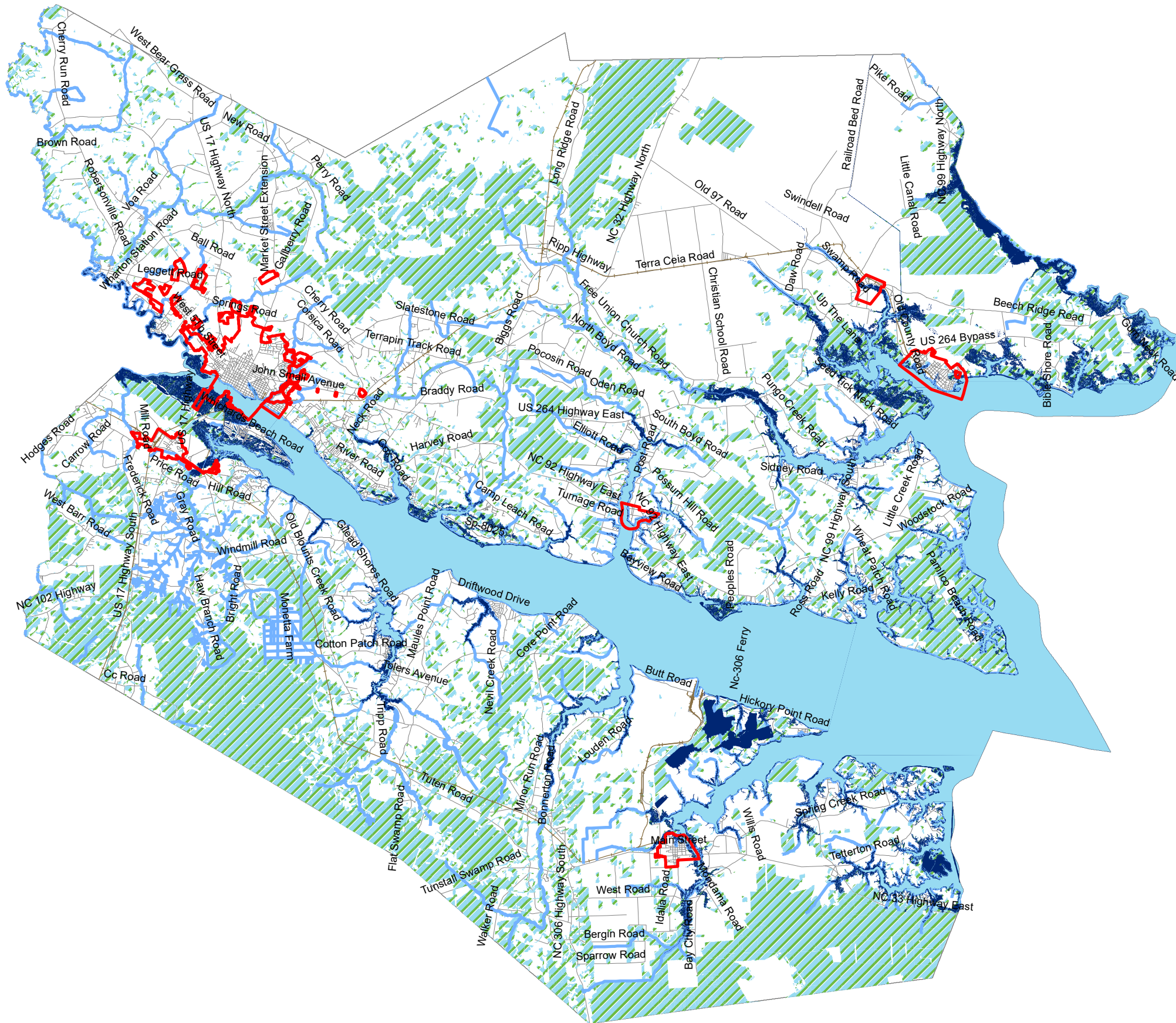
# NC Resilient Coastal Communities Program: Beaufort County Parks/Public Land & 1 ft. Sea Level Rise Scenario (30 year projection)

## Legend

-  1 ft. Sea Level Rise Scenario
-  Surface Water
-  Parks and Public Land (56.8% partially in potential SLR area, None completely in potential SLR area)
-  Greenways (50% in potential SLR area)
-  Public Boat Ramps (None in potential SLR area)
-  Rail
-  Road Network
-  Beaufort County

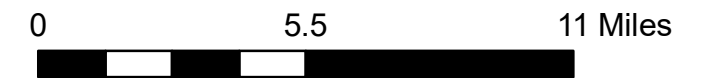
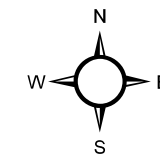


# NC Resilient Coastal Communities Program: Beaufort County Streams/Wetlands & 1 ft. Sea Level Rise Scenario (30 year projection)

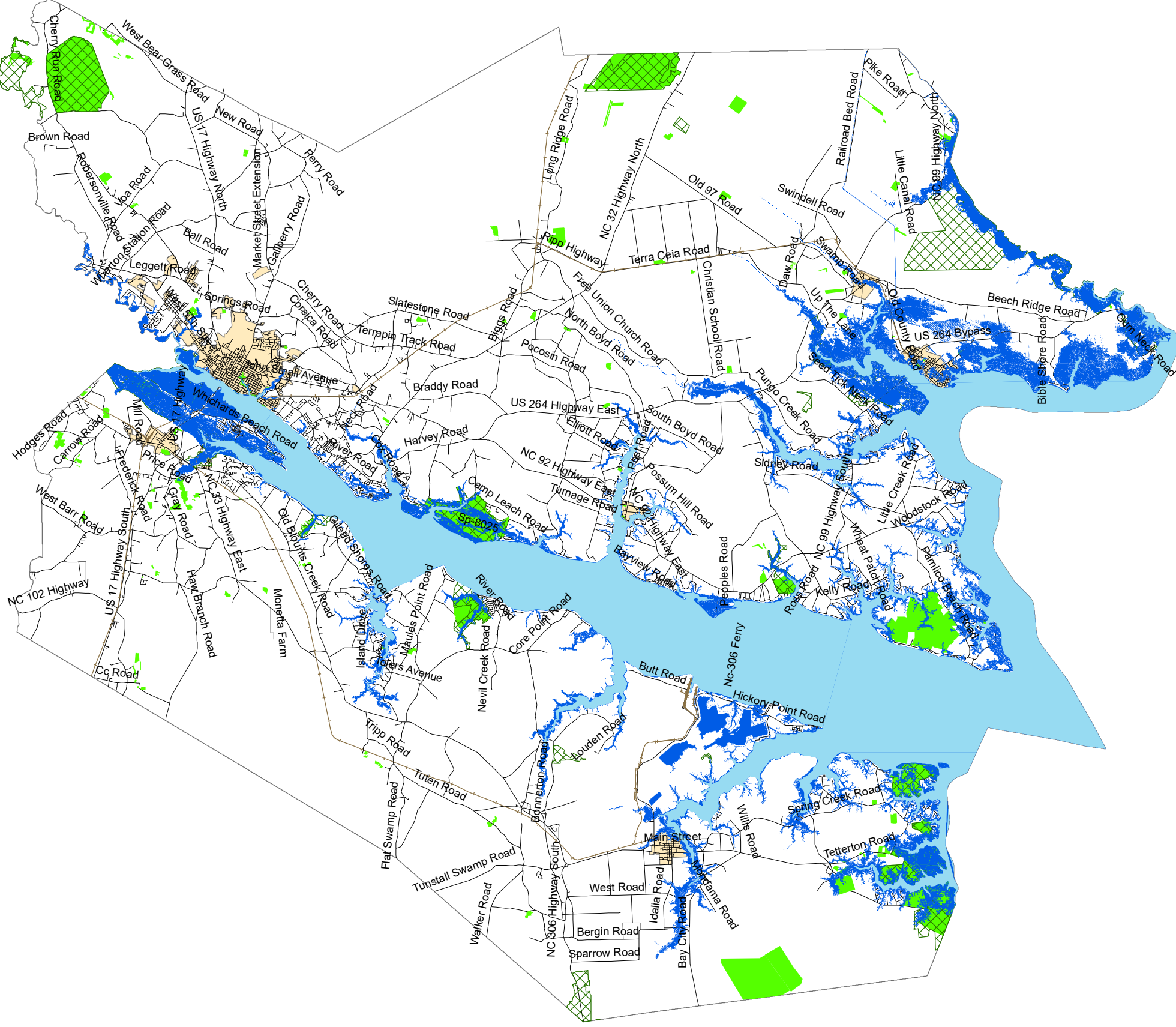


## Legend

- Surface Water
- 1 ft. Sea Level Rise Scenario
- Streams (79.9% in potential SLR area)
- Wetlands (30.4% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County

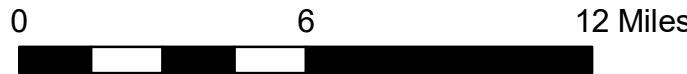
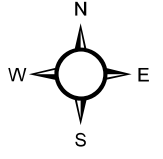


# NC Resilient Coastal Communities Program: Beaufort County Natural/Managed Areas & 2 ft. Sea Level Rise Scenario (60 year projection)

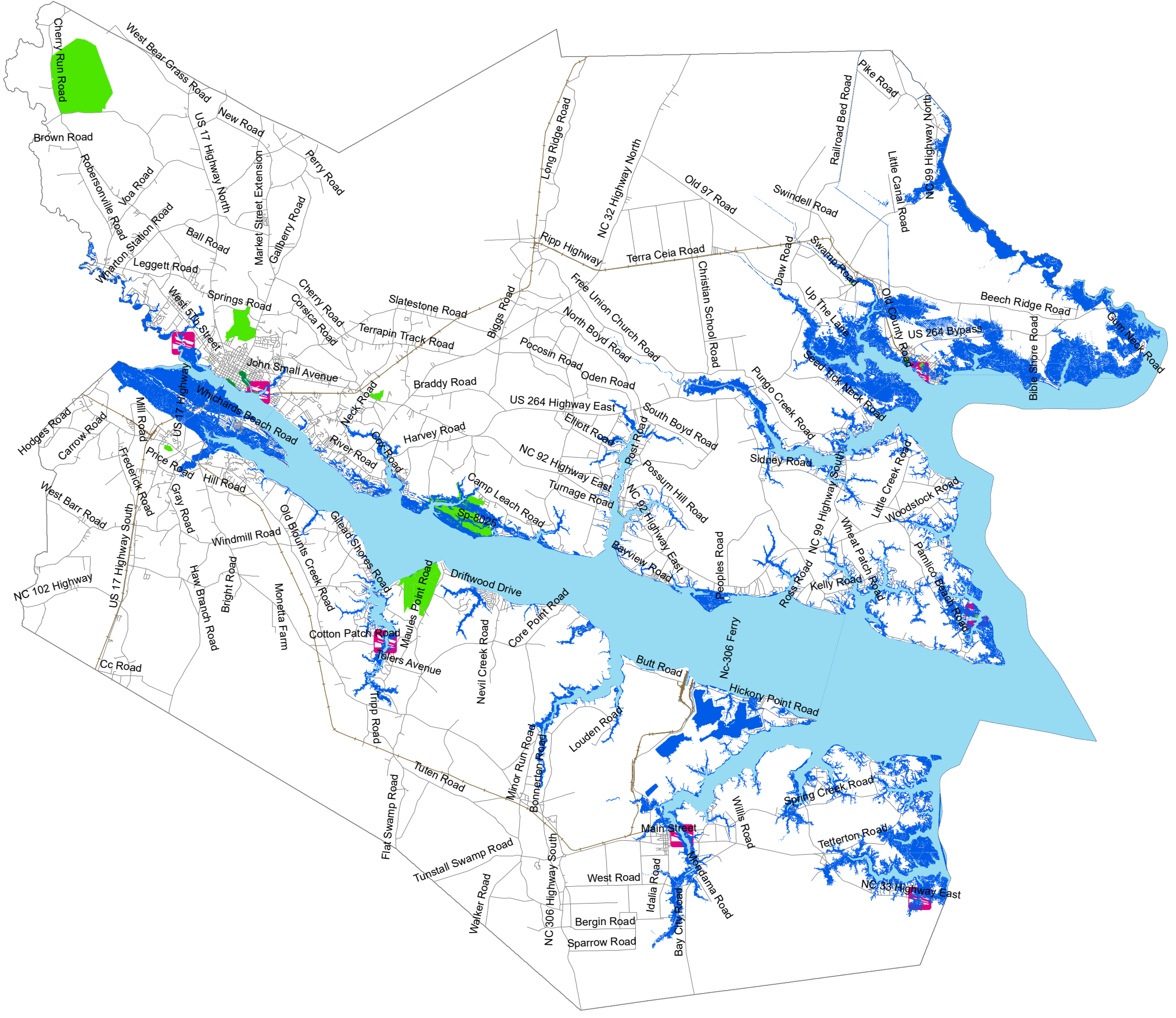


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Natural Areas (69.6% in potential SLR area)
- Managed Areas (28.7% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County

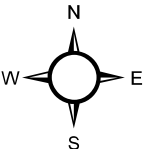


# NC Resilient Coastal Communities Program: Beaufort County Parks/Public Land & 2 ft. Sea Level Rise Scenario (60 year projection)

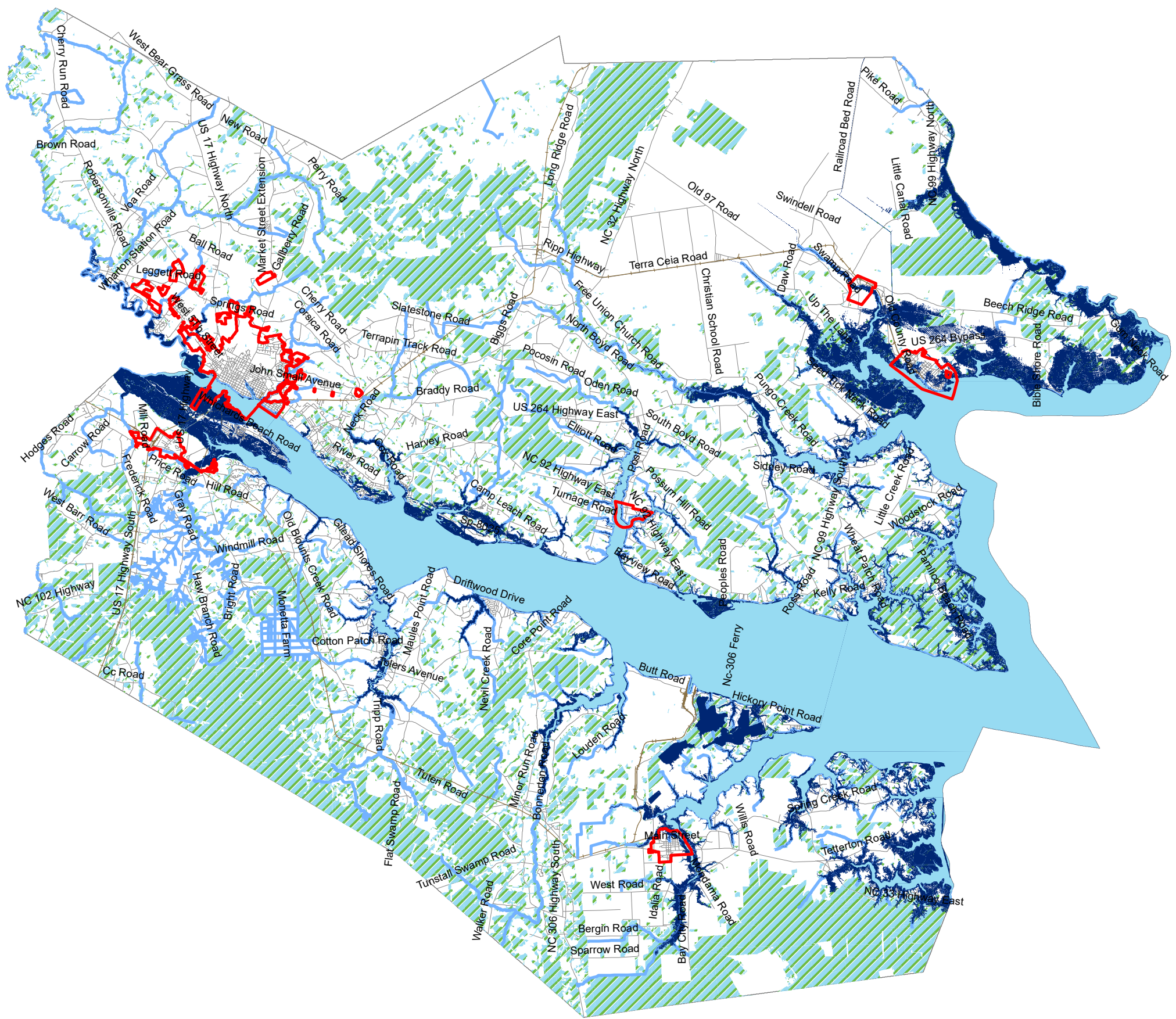


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Parks and Public Land (59.1% partially in potential SLR area, None completely in potential SLR area)
- Public Boat Ramps (42.9% in potential SLR area)
- Greenways (50% in potential SLR area)
- Rail
- Road Network
- Beaufort County

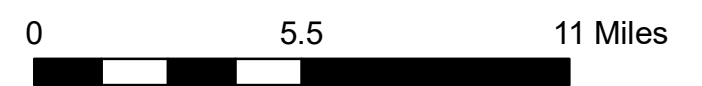
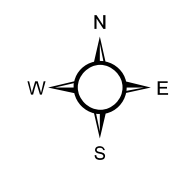


# NC Resilient Coastal Communities Program: Beaufort County Streams/Wetlands & 2 ft. Sea Level Rise Scenario (60 year projection)

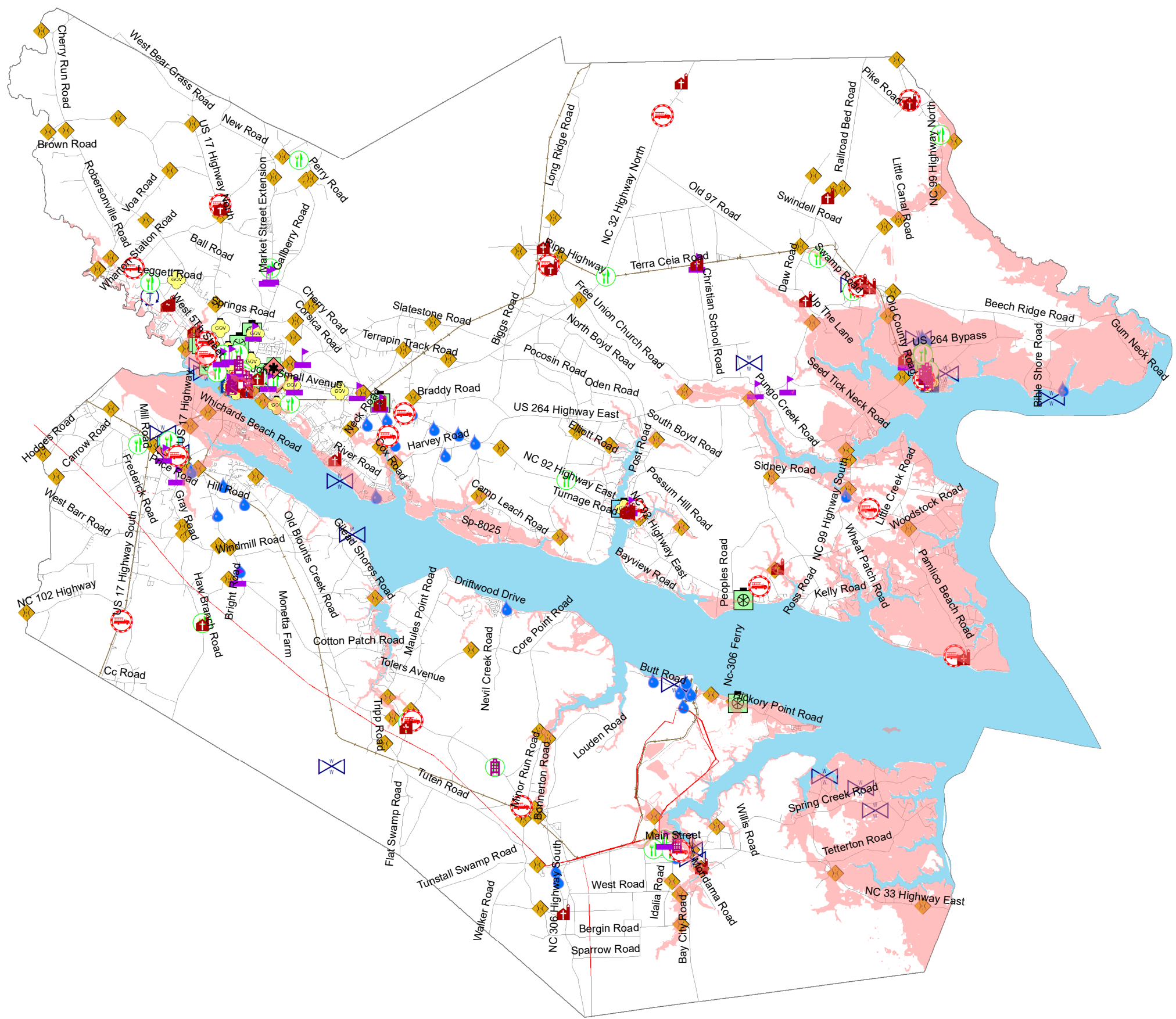


## Legend

- Surface Water
- 2 ft. Sea Level Rise Scenario
- Streams (81.2% in potential SLR area)
- Wetlands (34.8% in potential SLR area)
- Rail
- Road Network
- Municipal Boundaries
- Beaufort County

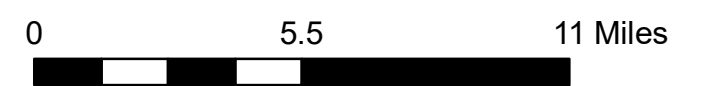
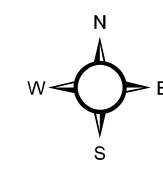


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 1 Event

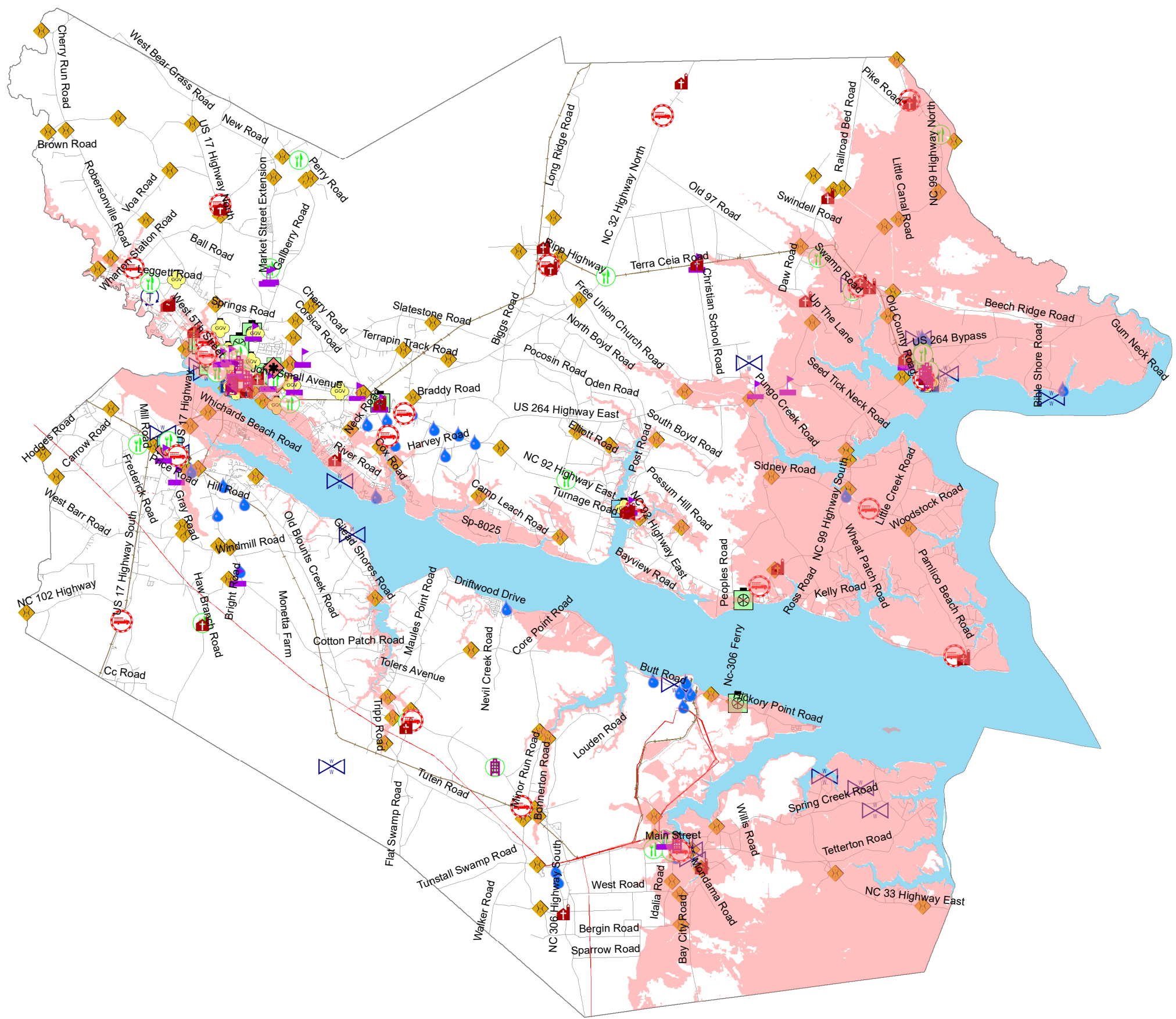


## Legend

- Cat. 1 Event Potential Storm Surge Area
- Community Buildings and Facilities (33.3% in potential SS area)
- Community Response Partners (17.9% in potential SS area)
- Duke Transmission Easements (11.2% in potential SS area)
- Education (5% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (12.5% in potential SS area)
- Food (13.8% in potential SS area)
- Government Services (14.3% in potential SS area)
- Law Enforcement/Security (16.7% in potential SS area)
- Libraries (50% in potential SS area)
- Medical (27.8% in potential SS area)
- Public Water Supply Wells (25.7% in potential SS area)
- Public Works Offices (16.7% in potential SS area)
- Solid Waste (None in potential SS area)
- Transportation Facilities (10% in potential SS area)
- Wastewater Discharge Permits (45% in potential SS area)
- Bridges (25.2% in potential SS area)
- Surface Water
- Rail
- Road Network (29.6% in potential SS area)
- Beaufort County

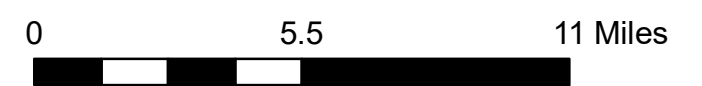
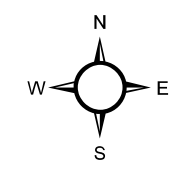


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 2 Event

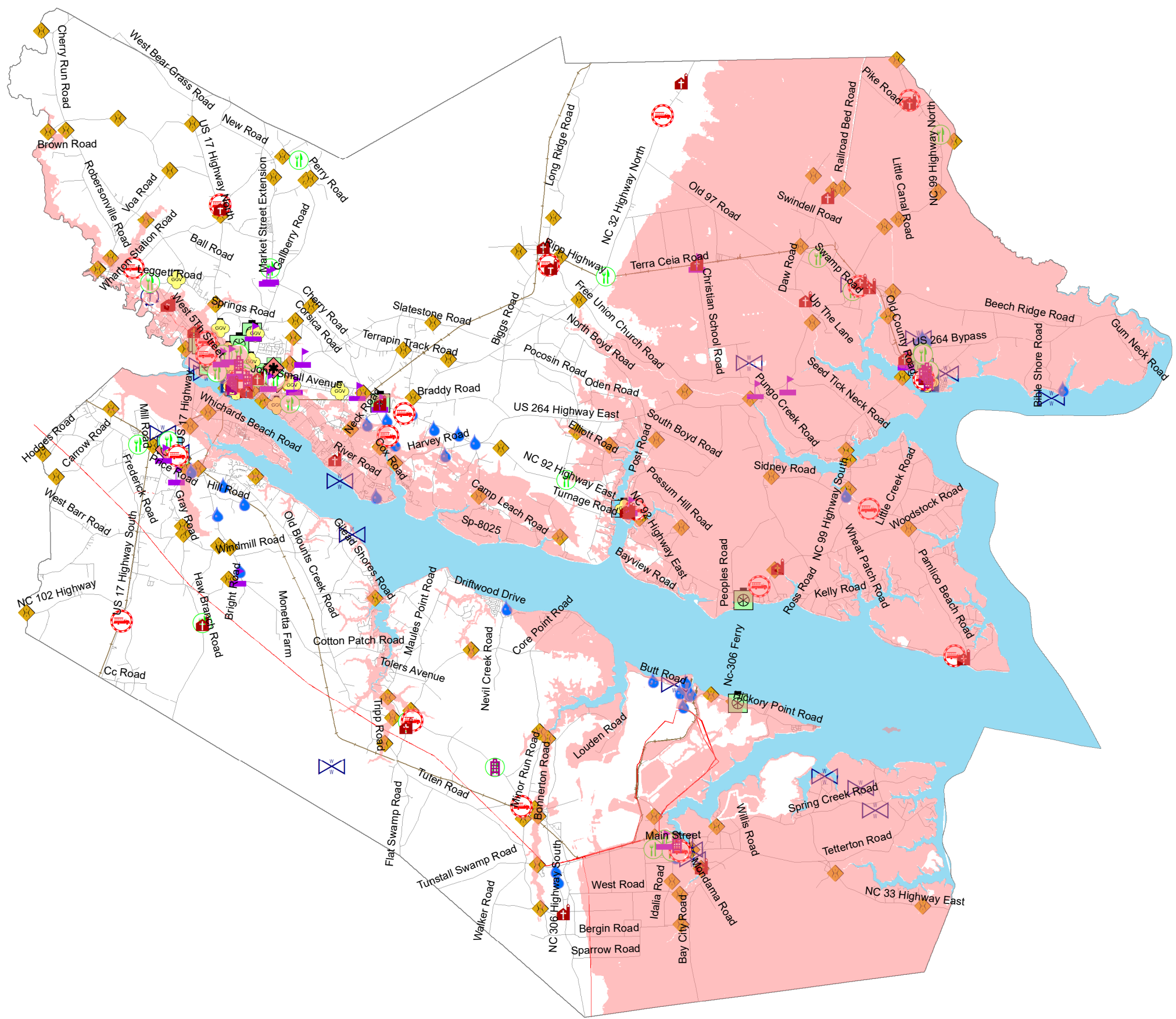


## Legend

- Cat. 2 Event Potential Storm Surge Area
- Community Buildings and Facilities (77.8% in potential SS area)
- Community Response Partners (46.4% in potential SS area)
- Duke Transmission Easements (24.1% in potential SS area)
- Education (5% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (41.7% in potential SS area)
- Food (41.4% in potential SS area)
- Government Services (53.6% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (75% in potential SS area)
- Medical (61.1% in potential SS area)
- Public Water Supply Wells (34.3% in potential SS area)
- Public Works Offices (66.7% in potential SS area)
- Solid Waste (None in potential SS area)
- Transportation Facilities (30% in potential SS area)
- Wastewater Discharge Permits (50% in potential SS area)
- Bridges (34.5% in potential SS area)
- Surface Water
- Rail
- Road Network (49.1% in potential SS area)
- Beaufort County

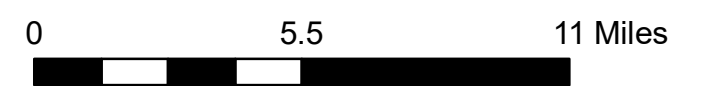
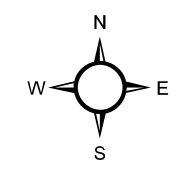


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 3 Event

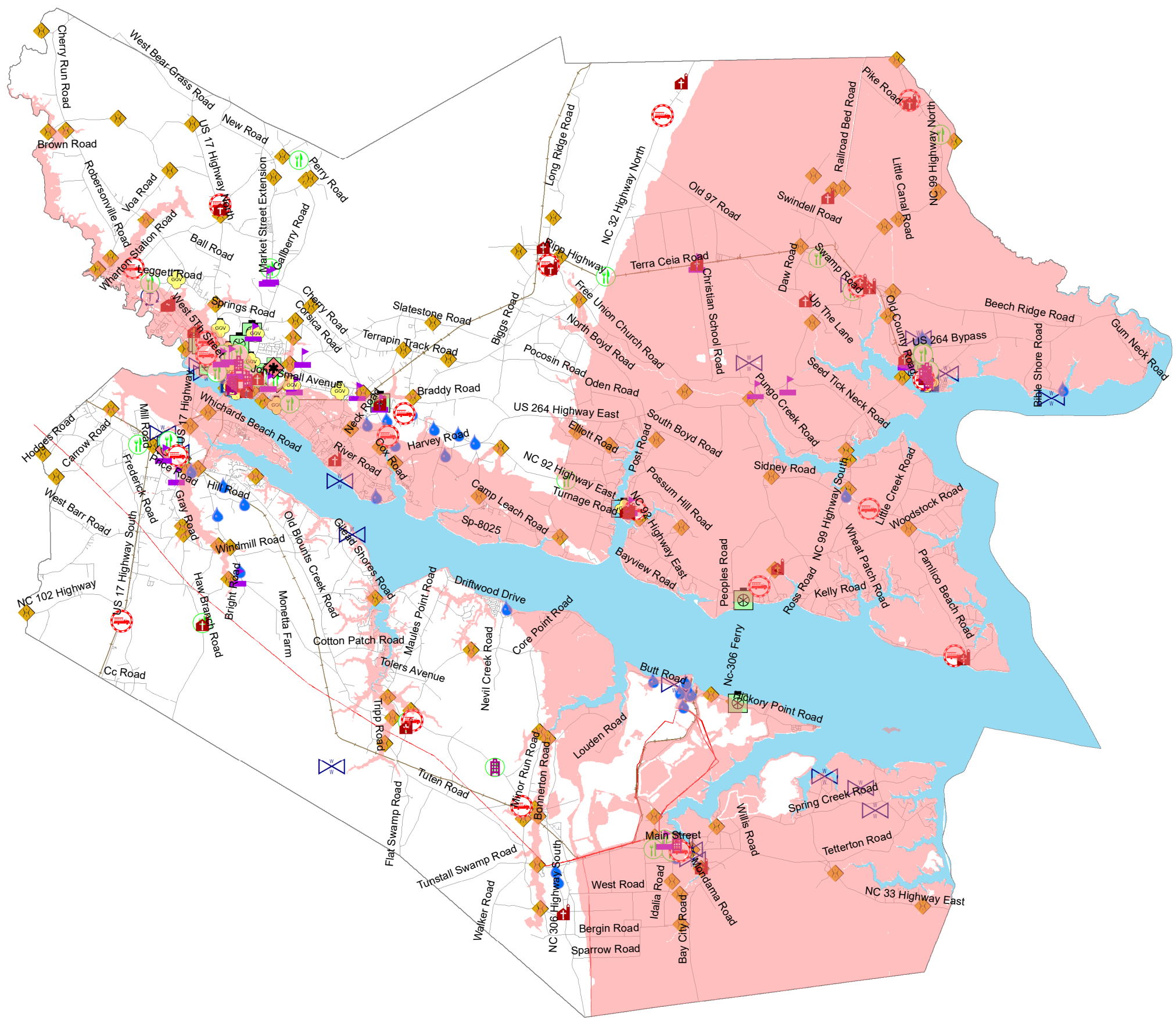


## Legend

- Cat. 3 Event Potential Storm Surge Area
- Community Buildings and Facilities (88.9% in potential SS area)
- Community Response Partners (71.4% in potential SS area)
- Duke Transmission Easements (56.5% in potential SS area)
- Education (45% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (50% in potential SS area)
- Food (65.5% in potential SS area)
- Government Services (71.4% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (100% in potential SS area)
- Medical (72.2% in potential SS area)
- Public Water Supply Wells (51.4% in potential SS area)
- Public Works Offices (83.3% in potential SS area)
- Solid Waste (100% in potential SS area)
- Transportation Facilities (50% in potential SS area)
- Wastewater Discharge Permits (60% in potential SS area)
- Bridges (43.7% in potential SS area)
- Surface Water
- Rail
- Road Network (62.4% in potential SS area)
- Beaufort County

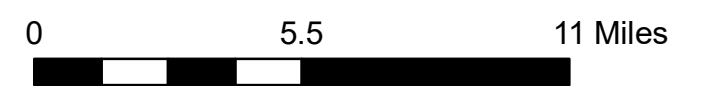
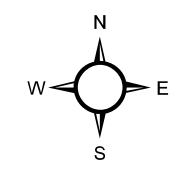


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 4 Event

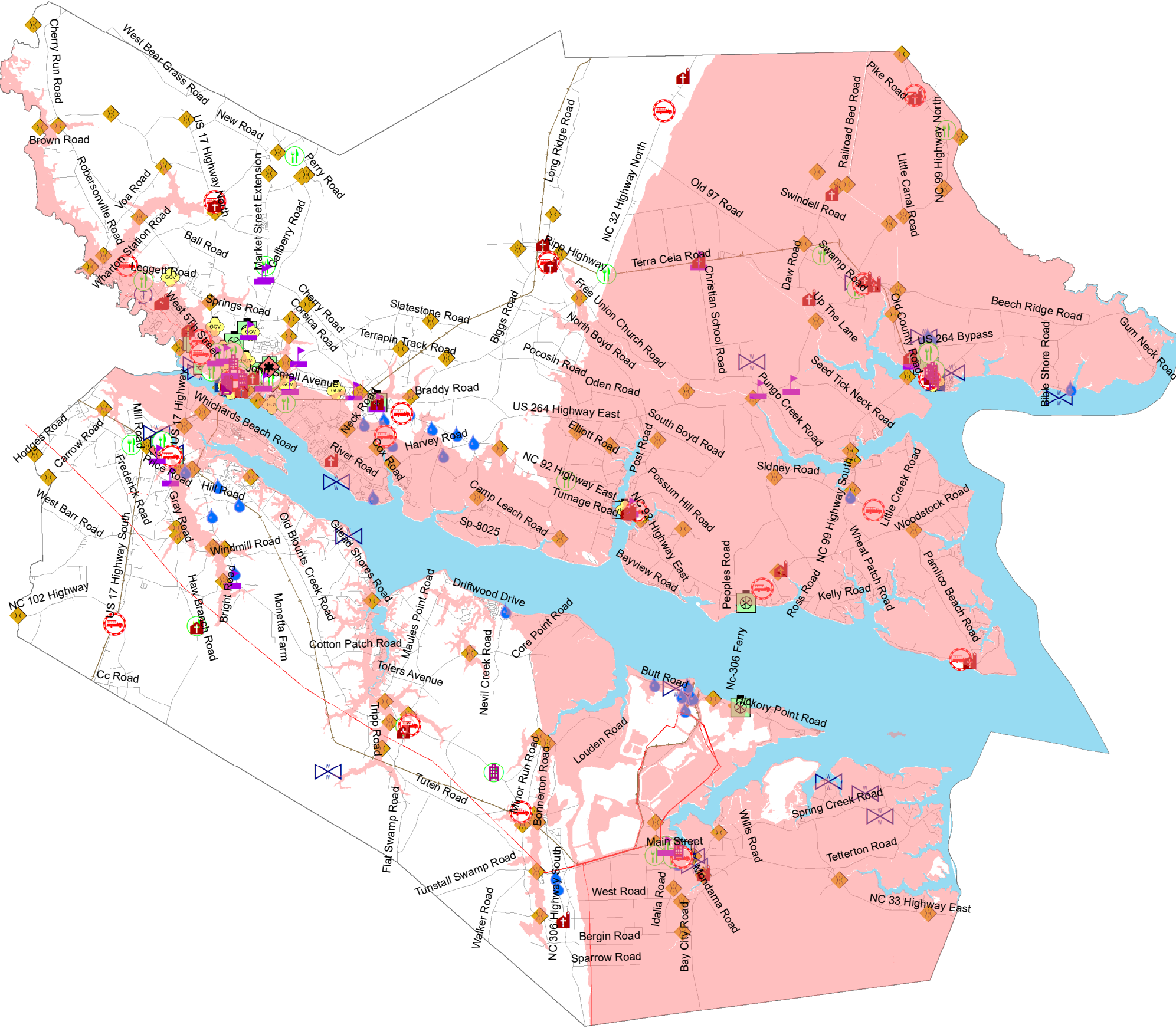


## Legend

- Cat. 4 Event Potential Storm Surge Area
- Community Buildings and Facilities (88.9% in potential SS area)
- Community Response Partners (71.4% in potential SS area)
- Duke Transmission Easements (63.3% in potential SS area)
- Education (45% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (54.2% in potential SS area)
- Food (72.4% in potential SS area)
- Government Services (71.4% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (100% in potential SS area)
- Medical (72.2% in potential SS area)
- Public Water Supply Wells (57.1% in potential SS area)
- Public Works Offices (83.3% in potential SS area)
- Solid Waste (100% in potential SS area)
- Transportation Facilities (60% in potential SS area)
- Wastewater Discharge Permits (60% in potential SS area)
- Bridges (49.6% in potential SS area)
- Surface Water
- Rail
- Road Network (66.8% in potential SS area)
- Beaufort County

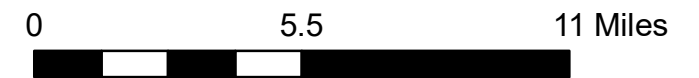
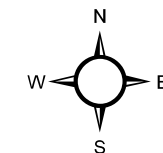


# NC Resilient Coastal Communities Program: Beaufort County Critical Assets & Potential Storm Surge for Cat. 5 Event



## Legend

- Cat. 5 Storm Surge Potential
- Community Buildings and Facilities (88.9% in potential SS area)
- Community Response Partners (71.4% in potential SS area)
- Duke Transmission Easements (67% in potential SS area)
- Education (45% in potential SS area)
- Emergency Management (None in potential SS area)
- Fire and EMS Stations (58.3% in potential SS area)
- Food (72.4% in potential SS area)
- Government Services (71.4% in potential SS area)
- Law Enforcement/Security (50% in potential SS area)
- Libraries (100% in potential SS area)
- Medical (72.2% in potential SS area)
- Public Water Supply Wells (60% in potential SS area)
- Public Works Offices (83.3% in potential SS area)
- Solid Waste (100% in potential SS area)
- Transportation Facilities (60% in potential SS area)
- Wastewater Discharge Permits (60% in potential SS area)
- Bridges (52.9% in potential SS area)
- Surface Water
- Rail
- Road Network (69.8% in potential SS area)
- Beaufort County



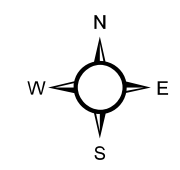
# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 1 Event



## Legend

### Cat. 1 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County



# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 2 Event

## Legend

### Cat. 2 Event Storm Surge Potential

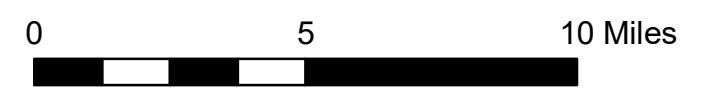
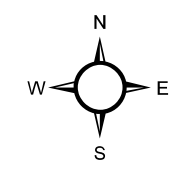
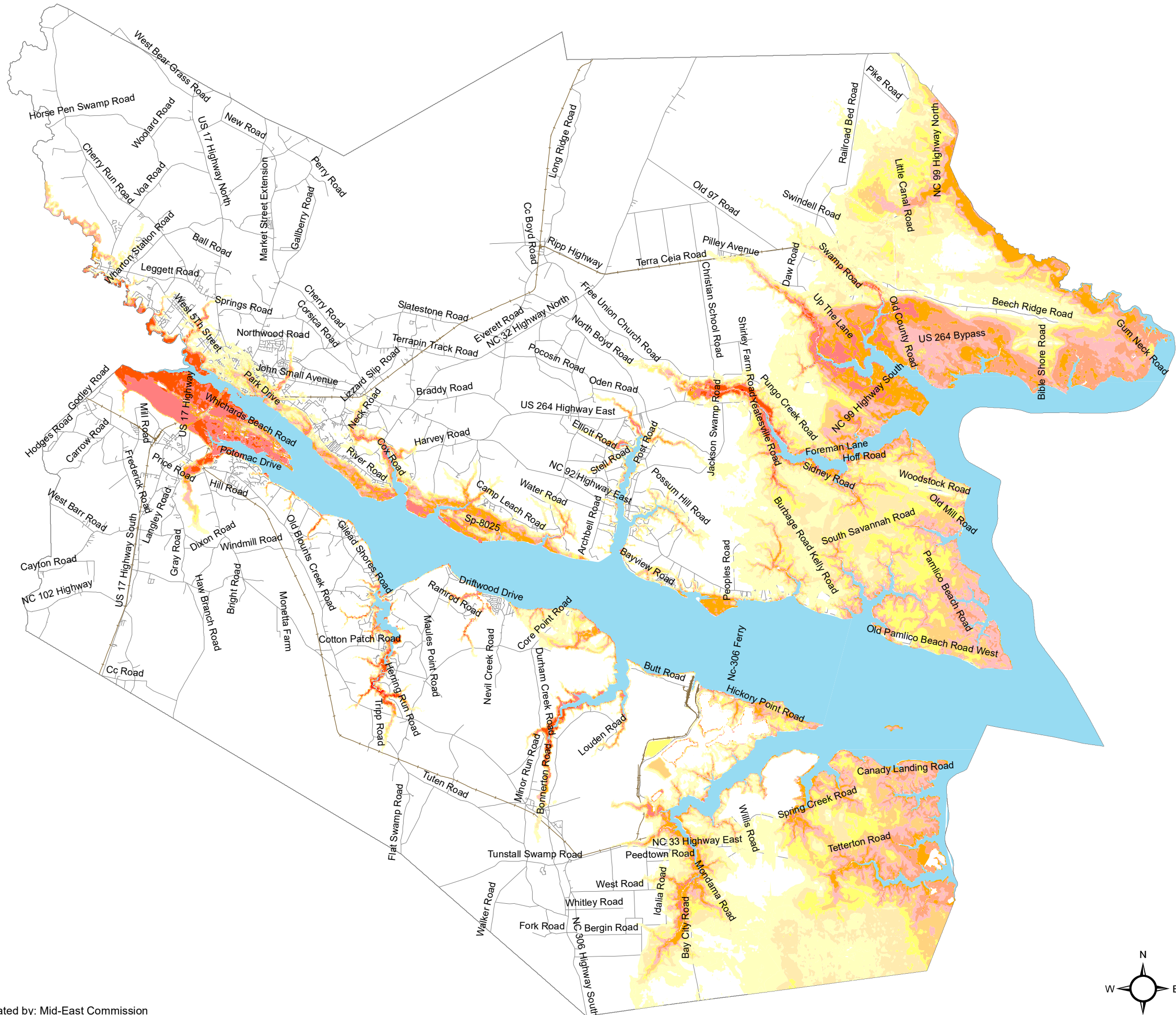
- 00 to 01 foot above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground

Surface Water

Rail

Road Network

Beaufort County

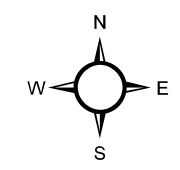
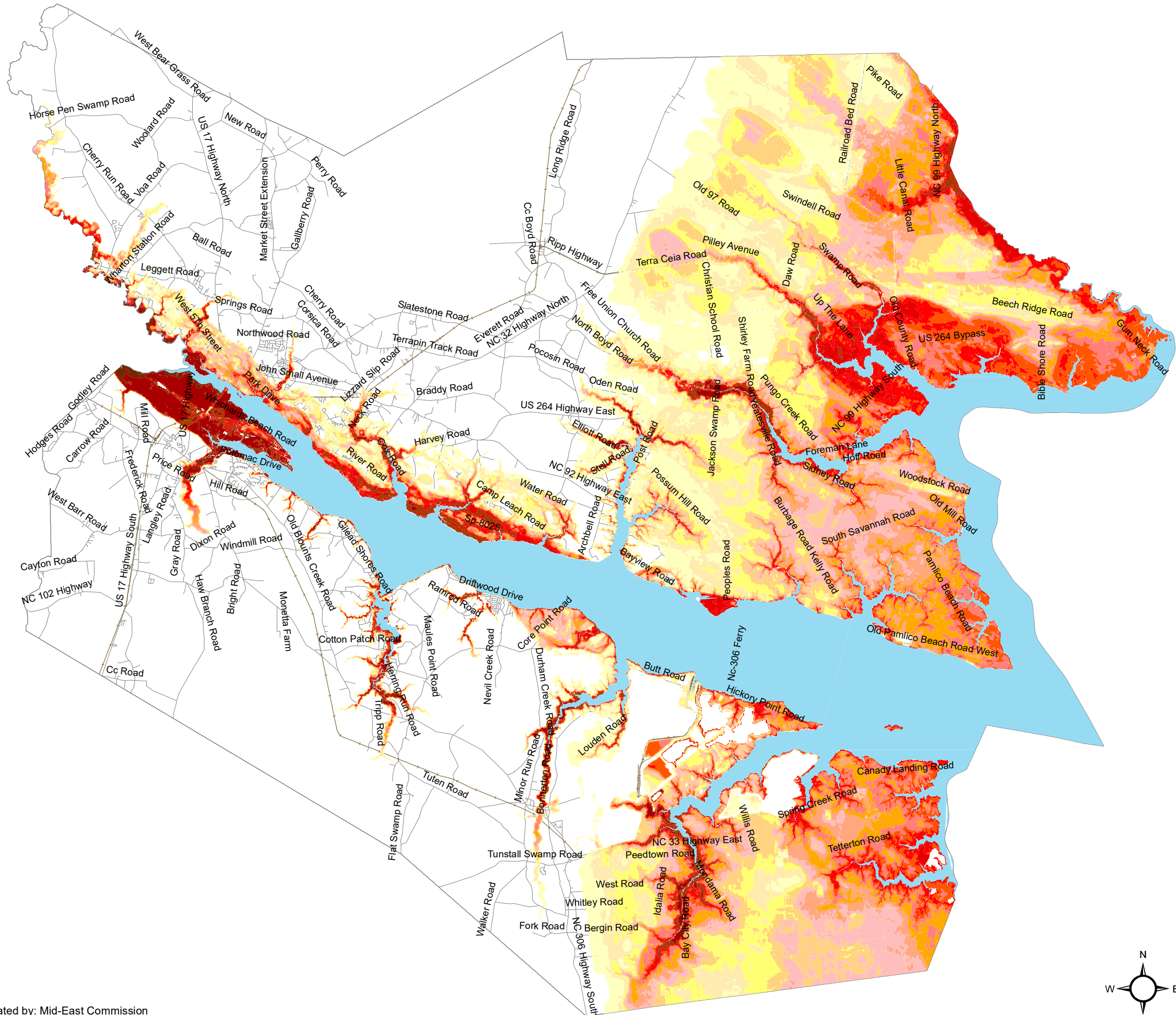


# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 3 Event

## Legend

### Cat. 3 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground
- 11 to 12 feet above ground
- 12 to 13 feet above ground
- 13 to 14 feet above ground
- 14 to 15 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County

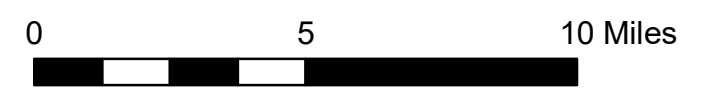
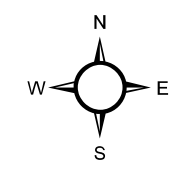
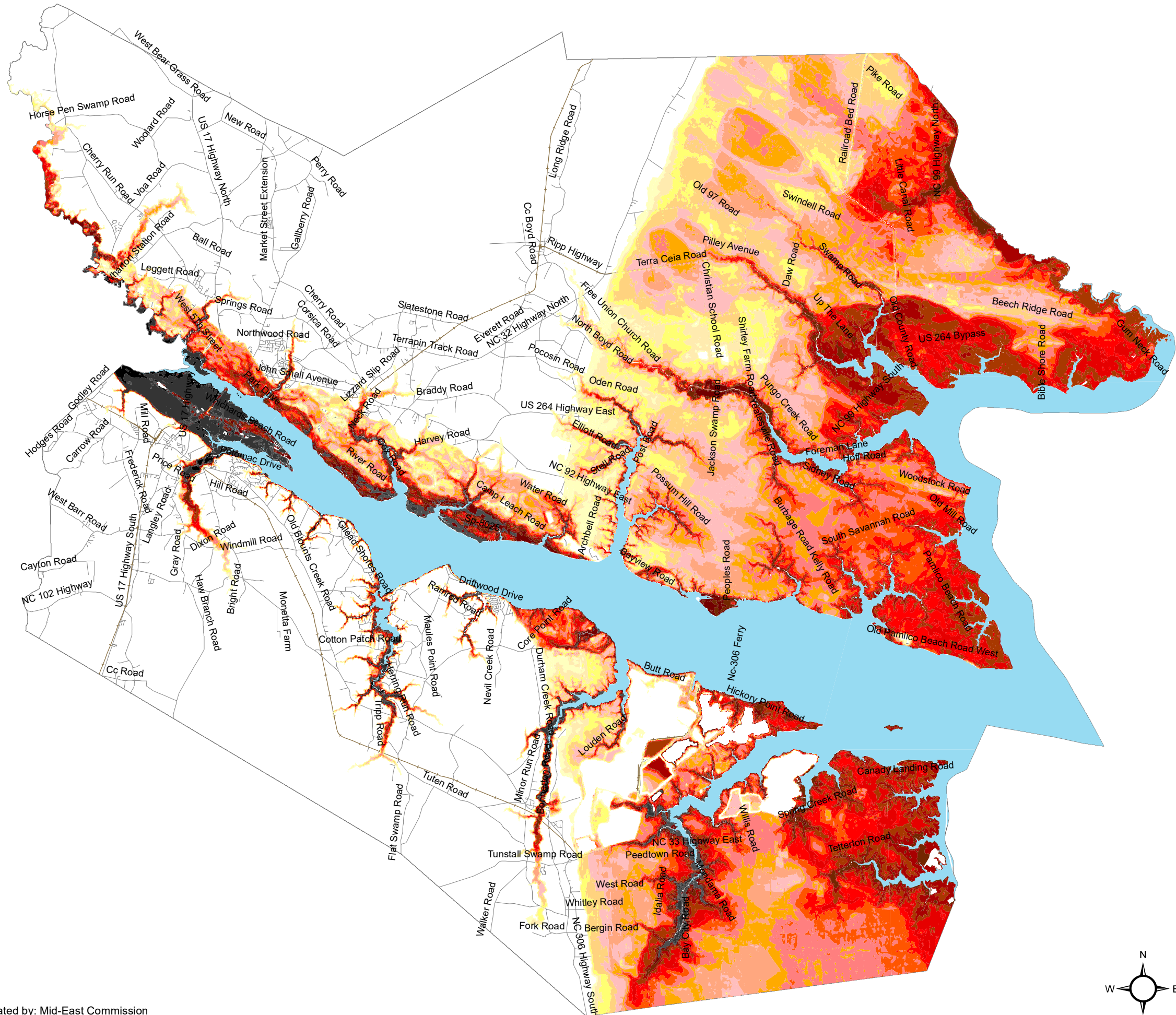


# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 4 Event

## Legend

### Cat. 4 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground
- 11 to 12 feet above ground
- 12 to 13 feet above ground
- 13 to 14 feet above ground
- 14 to 15 feet above ground
- 15 to 16 feet above ground
- 16 to 17 feet above ground
- 17 to 18 feet above ground
- 18 to 19 feet above ground
- 19 to 20 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County

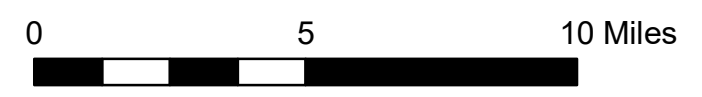
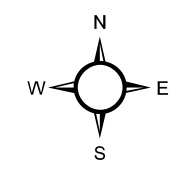
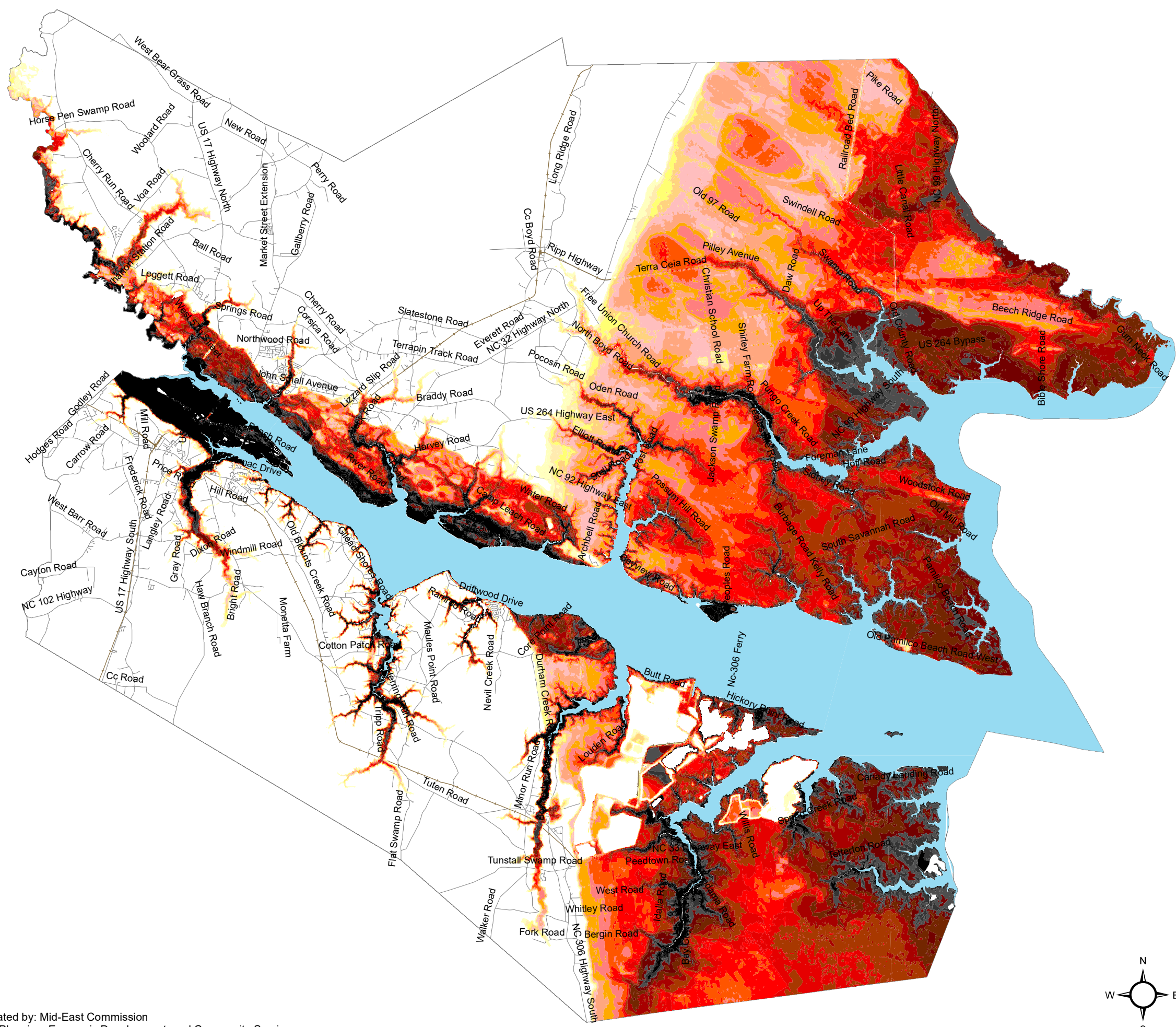


# NC Resilient Coastal Communities Program: Beaufort County Potential Storm Surge for Cat. 5 Event

## Legend

### Cat. 5 Event Storm Surge Potential

- 00 to 01 feet above ground
- 01 to 02 feet above ground
- 02 to 03 feet above ground
- 03 to 04 feet above ground
- 04 to 05 feet above ground
- 05 to 06 feet above ground
- 06 to 07 feet above ground
- 07 to 08 feet above ground
- 08 to 09 feet above ground
- 09 to 10 feet above ground
- 10 to 11 feet above ground
- 11 to 12 feet above ground
- 12 to 13 feet above ground
- 13 to 14 feet above ground
- 14 to 15 feet above ground
- 15 to 16 feet above ground
- 16 to 17 feet above ground
- 17 to 18 feet above ground
- 18 to 19 feet above ground
- 19 to 20 feet above ground
- Greater than 20 feet above ground
- Surface Water
- Rail
- Road Network
- Beaufort County





# BEAUFORT COUNTY

## RISK ESTIMATE

Sector	Number of Critical Assets at Risk	Asset Value
<i>E.g., government facilities, utilities, natural infrastructure</i>	<i>#</i>	<i>\$X,000,000</i>
Emergency Management	1	\$105,312
Law Enforcement/Security	3	\$10,060,261
Fire and EMS Stations	24	\$9,521,686
911 Dispatch	1	\$390,283
Government Services	11	\$15,005,494
Food	2	\$606,693
Water/Wastewater	17	\$60,381,278
Solid Waste	1	\$386,803
Electric Power Grid	5	\$87,863,517
Roads	1216 (919.78 Miles)	\$4,680,598,538.72
Bridges	119	\$93,234,120
Transportation Facilities	8	45,281,831
Medical	2	\$21,574,161
Schools	18	\$191,267,455
Libraries	0	-
Community Response Partners	28	\$57,684,576
Community Buildings and Facilities	2	\$6,066,720
Hazards	124	\$115,626,641
Wetland	5510 (192,225 ac.)	\$12,964,049,983.50
Streams	292 (948 Stream miles)	\$3,137,419,662.40
Parks/Public Land	5	\$5,889,902
Public Boat Ramps	4	\$1,306,815
Natural Areas	23	\$46,669,105
Managed Areas	167	\$49,847,592

### Estimate Risk

Determine what levels of risk call for actions to reduce that risk and increase resilience.

Hazard Mitigation Plans contain risk assessments that used NCEM's iRISK data for building footprints, building values, and other data on critical facilities. These data can be extracted, expanded to include additional critical assets and natural infrastructure, and updated with current economic data. It will be useful to have a good understanding of the locations of vulnerable populations that may need targeted assistance including where there may be clusters that allow for neighborhood-scale strategies.



# BEAUFORT COUNTY

## CRITICAL ASSET & NATURAL INFRASTRUCTURE VULNERABILITY

Asset	Exposure Score 0-3	Sensitivity Score 0-3	Adaptive Capacity 0-3	Vulnerability Score 0-6
<i>Asset name</i>	<i>0 = no exposure 1 = low 2 = medium 3 = high</i>	<i>0 = no sensitivity 1 = low 2 = medium 3 = high</i>	<i>0 = no adaptive capacity 1 = low 2 = medium 3 = high</i>	<i>0-2 = low 3-4 = medium 5-6 = high</i>
<b>Emergency/Enforcement</b>				
Fire and EMS (Exposure: 1.88; Sensitivity: 54%)	2	3	1	Med
Beaufort County Courthouse and Jail	3	3	1	High
Beaufort County Sheriff's Office and 911 Communications Center	2	3	1	Med
<b>Government Services</b>				
Beaufort County Development Center (BCDC)	1	2	2	Low
Beaufort County Financial Services Center	3	2	2	Med
Beaufort County Inspections/Environmental Health	2	2	2	Low
Beaufort County Manager's Office	3	2	2	Med
Beaufort County Social Services	3	3	1	High
Mid-East Commission (Suite A) and NC Works Career Center (Suite B)	1	2	2	Low
NC DEQ Regional Office	1	2	2	Low
NC Division of Vocational Rehabilitation	1	2	1	Low
NC License Plate Agency	2	2	2	Low
Pantego Town Hall	3	2	2	Med
<b>Community</b>				
Bobby Andrews Recreation Center	3	2	1	Med
Grace Martin Harwell Senior Center	3	2	1	Med
<b>Churches</b>				
Church Buildings (Exposure: 2.36; Sensitivity: 88%)	3	3	2	Med

<b>Asset</b>	<b>Exposure Score 0-3</b>	<b>Sensitivity Score 0-3</b>	<b>Adaptive Capacity 0-3</b>	<b>Vulnerability Score 0-6</b>
<b><i>Food</i></b>				
Eagle's Wings Food Pantry	2	3	1	Med
Macedonia Church of Christ	3	3	1	High
Martha's Project	2	3	1	Med
Mobile Food Pantry EW Snowden	2	3	1	Med
Mobile Food Pantry First Church of Christ	2	3	1	Med
Mobile Food Pantry Pantego	3	3	1	High
Mt. Gilead Outreach Ministry	2	3	1	Med
Salvation Army (Beaufort)	2	3	1	Med
St. John's Missionary Baptist Church	2	3	1	Med
St. Vincent de Paul - Mother of Mercy	2	3	1	Med
Union Grove Church of Christ	2	3	1	Med
Washington Area Shelter and Soup Kitchen	3	3	1	High
<b><i>Education</i></b>				
Beaufort Hyde Partnership for Children	1	3	1	Med
JC Tayloe Elementary School	1	3	1	Med
Pungo Christian Academy	3	3	1	High
SW Snowden Elementary School	2	3	1	Med
<b><i>Medical (All in Municipalities)</i></b>				
XXXX				
<b><i>Water/Wastewater</i></b>				
Beaufort County Richland Water Treatment Plant	3	3	1	High
Beaufort County Water Dept. - Public Works Dept.	3	3	1	High
BJ's Convenience Store well (Well #1)	2	3	0	High
Dowry Creek Marina well (Well #1)	2	3	0	High
Dowry Creek Wastewater Treatment Plant	2	3	1	Med
New Hope Church of Christ Wastewater Treatment Plant	3	3	1	High
Carolina Fisheries Wastewater Discharge	2	2	1	Med
Castle Hayne Fisheries Wastewater Discharge	2	2	1	Med
Town of Chocowinity System Well (Well #2A)	3	3	0	High
Town of Chocowinity System Well (Well #3)	3	3	0	High

<b>Asset</b>	<b>Exposure Score 0-3</b>	<b>Sensitivity Score 0-3</b>	<b>Adaptive Capacity 0-3</b>	<b>Vulnerability Score 0-6</b>
Washington Mill Wastewater Discharge	3	2	1	Med
Nutrien well (PCS Central Maint Well)	1	3	0	Med
Washington Mill wastewater discharge	3	2	1	Med
Whitley's Mobile Home Park well (Well #2)	2	3	0	High
Whitley's Mobile Home Park well (Well #1)	2	3	0	High
<b>Library (All in Municipalities)</b>				
XXX				
<b>Public Land and Parks</b>				
Blounts Creek Boat Ramp and Fishing Pier	3	2	1	Med
Mason's Landing Boat Ramp	3	2	1	Med
Wright's Creek Boat Ramp	2	2	1	Med
Smith's Creek Boat Ramp	2	2	1	Med
Goose Creek State Park	1	2	1	Low
<b>Transportation</b>				
Roads (Exposure: 2.67; Sensitivity: 23%)	3	1	1	Med
Bridges (Exposure: 2.96; Sensitivity: 63%)	3	3	1	High
Rail Line	2	3	0	High
Bayview Ferry Terminal	2	3	1	Med
Beaufort Area Transit System (BATS)	2	3	1	Med
<b>Natural Resources</b>				
Wetlands (Exposure: 2.73; Sensitivity: 37%)	3	2	1	Med
Streams (Exposure: 2.97; Sensitivity: 63%)	3	3	1	High
Natural Areas (Exposure: 2.44; Sensitivity: 78%)	3	3	1	High
Managed Areas (Exposure: 2.87; Sensitivity)	3	1	1	Med
<b>Hazards</b>				
Underground Storage Tanks (Exposure: 2.33; Sensitivity: 59%)	3	3	1	High
Hazard Waste Sites (Exposure: 2.18; Sensitivity: 100%)	3	3	1	High

## Assess Vulnerability

This assessment explores the vulnerability of critical assets, natural infrastructure, and social systems. Use your team's judgement and any available data to estimate each asset's vulnerability to combined hazards.

### Critical Asset & Natural Infrastructure Vulnerability

Vulnerability of critical assets and natural infrastructure to a hazard is a function of the exposure, sensitivity, and adaptive capacity:

**Exposure** refers to the probability of physical contact between an asset and a hazard.

**Sensitivity** is the degree to which an asset is impacted by a hazard.

**Adaptive Capacity** is the ability of an asset to change its characteristics or behavior in response to a hazard.

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity} - \text{Adaptive Capacity}$$



# Beaufort County

## Benefit/Cost Ratings

Strategy	Benefit	Cost
1. Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done). <b>Comments:</b>	MEDIUM	HIGH
2. Develop easements to maintain drainage ditches and tributaries (for areas not located in current drainage districts, where this is already done). <b>Comments:</b>	MEDIUM	MEDIUM
3. Develop an open space/recreation plan for flood mitigation projects. <b>Comments:</b>	HIGH	MEDIUM
4. Install backflow valves on stormwater drains. <b>Comments:</b>	HIGH	MEDIUM
6. Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances. <b>Comments:</b>	MEDIUM	HIGH
7. Implement a bioswale policy. Consider implementing within current subdivision and mobile home park ordinances. <b>Comments:</b>	MEDIUM	MEDIUM
8. Improve building codes (higher electrical outlets, stilts). <b>Comments:</b>	N/A	N/A
9. Restore wetlands at the confluence of the Pamlico and Pungo Rivers. <b>Comments:</b>	HIGH	HIGH
10. Restore mudflat wetlands throughout Beaufort County. <b>Comments:</b>	HIGH	HIGH
11. Restore T.G Ponds (at Pamlico River and South Creek) to wetlands. <b>Comments:</b>	HIGH	HIGH
13. Remove culverts from bridges to increase water capacity. <b>Comments:</b>	HIGH	HIGH
14. Restore Pungo River headwaters to increase storm surge capacity. <b>Comments:</b>	MEDIUM	MEDIUM

Strategy	Benefit	Cost
15. Move critical assets out of the floodplain. <b>Comments:</b>	MEDIUM	MEDIUM
16. Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented. <b>Comments:</b>	MEDIUM	LOW
17. Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan). <b>Comments:</b>	MEDIUM	HIGH
18. Research flooding concerns for NC Hwy 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed. <b>Comments:</b>	LOW	MEDIUM
19. Increase frequency of powerline and ROW vegetation maintenance and establish a regular schedule for maintenance. <b>Comments:</b>	MEDIUM	MEDIUM
20. Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable. <b>Comments:</b>	MEDIUM	LOW
21. Allow coastal wetlands to migrate landward to provide habitat and natural buffer to coastal storms. <b>Comments:</b>	HIGH	HIGH
22. Set up processes for transfer of development rights, conservation easements, and/or setback requirements. <b>Comments:</b>	HIGH	MEDIUM
24. Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings. <b>Comments:</b>	MEDIUM	MEDIUM
25. Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more	MEDIUM	MEDIUM

Strategy	Benefit	Cost
disaster resistant to strong winds, lightning, heavy rains, and flooding. <b>Comments:</b>		
26. Create redundancy for at risk infrastructure and emergency services. <b>Comments:</b>	MEDIUM	MEDIUM
27. Evaluate the relocation or buy out potential of critical infrastructure in vulnerable areas. <b>Comments:</b>	HIGH	MEDIUM
28. Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas. <b>Comments:</b>	MEDIUM	LOW
29. Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement. <b>Comments:</b>	HIGH	MEDIUM
30. Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management. <b>Comments:</b>	HIGH	LOW
31. Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests. <b>Comments:</b>	HIGH	LOW
32. Develop a framework for decision making regarding land protection and restoration strategies based on wetland and habitat vulnerability that would include restoration, protection, and retreat strategies. <b>Comments:</b>	MEDIUM	MEDIUM
33. Develop a comprehensive outreach strategy to educate stakeholders about SLR and coastal vulnerability and provide continuing education to affected communities and citizens. <b>Comments:</b>	MEDIUM	MEDIUM
34. Identify data gaps and collect necessary data to plan for infrastructure investments that are part of implementation plan for adaptation. <b>Comments:</b>	MEDIUM	MEDIUM
35. Raise the bridge on Cherry Run Road above the base flood elevation (see Hurricane Matthew Resilient Redevelopment Plan). <b>Comments:</b>	MEDIUM	HIGH
36. Implement projects to address flooding on US Hwy 17 Business South. The Hwy 17 Business (Bridge St.) and US 264 (5th St.) intersection is a particular issue, but the whole corridor should be looked at (Hwy 17	MEDIUM	HIGH

Strategy	Benefit	Cost
Bypass is shut down for heavy wind and rain, so Hwy 17 Business becomes a vital evacuation route.) <b>Comments:</b>		
37. Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution. <b>Comments:</b>	MEDIUM	LOW
38. Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions. <b>Comments:</b>	MEDIUM	LOW
39. Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans). <b>Comments:</b>	MEDIUM	LOW
40. Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel. <b>Comments:</b>	HIGH	LOW
41. Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to pro-actively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative. <b>Comments:</b>	HIGH	LOW
42. Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation. <b>Comments:</b>	HIGH	MEDIUM

## Benefit-Cost Overview

The cost or the economic case for different strategies or actions must be considered when developing resilience strategies. An informal cost-benefit analysis should be used to review proposed adaptation actions. Ratings of high, medium, or low are assigned to the anticipated costs and the benefits associated with each action based on general criteria that are established by the community.

Make sure to explore and identify potential funding mechanisms for project or action item implementation.

<b>Benefit/cost ratings</b>	
	<b>Benefit</b>
<b>HIGH</b>	Action would have significant impact on risk reduction
<b>MEDIUM</b>	Action would have an impact on risk reduction
<b>LOW</b>	Long-term benefits are difficult to quantify in the short term
	<b>Cost</b>
<b>HIGH</b>	Existing funding is not adequate
<b>MEDIUM</b>	Requires budget reappropriation or amendment
<b>LOW</b>	Funding available under the existing budget

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
1. Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done). Comments:	1	1	1	1	1	1			1	1	1		1		1	1		1	1	0	0	1	1	16
2. Develop easements to maintain drainage ditches and tributaries (for areas not located in current drainage districts, where this is already done). Comments:	1	1	1	1	1	1			1				1		1	1		0	1	0	0	1	1	13
3. Develop an open space/recreation plan for flood mitigation projects. Comments:	1	1	1	1	0	1					1		1		1	1		0	1	0	0	1	0	11
4. Install backflow valves on stormwater drains. Comments:	1	1	1	1	0	1					1		1		1	1		1	1	0	0	1	0	12
6. Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances. Comments:	0	1	1	1	0	1							1		1	1	1	1	1	1	1			12
7. Implement a bioswale policy. Consider implementing within current subdivision and mobile home park ordinances. Comments:	0	1	1	1	0	1							1		1	1		1	1	1	1			11
8. Improve building codes (higher electrical outlets, stilts). Comments:	0	1	1	1	0	1							1		1	1		1	0	0	0	0	0	8
9. Restore wetlands at the confluence of the Pamlico and Pungo Rivers. Comments:	1	1	1	1	1	1							0		1	0		0	1	0	0		1	9
10. Restore mudflat wetlands throughout Beaufort County. Comments:	1	1	1	1	1	1							0		1	0		0	1	0	0		1	9
11. Restore T.G Ponds (at Pamlico River and South Creek) to wetlands. Comments:	1	1	1	1	1	1							0		1	0		0	1	0	0		1	9

RCCP STAPLEE Criteria Worksheet  
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<b>Considerations for Alternative Actions</b>																									
13. Remove culverts from bridges to increase water capacity. Comments:	1	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1			1	1	1		0		1	0		0	1	0	0		1	9	
14. Restore Pungo River headwaters to increase storm surge capacity. Comments:	1	1	1	0	1	1							0		1	0		0	1	0	1		1	9	
15. Move critical assets out of the floodplain. Comments:	1	1	1	1	0	0			1	1	1		1		1	0		0	1	0	0	1	1	12	
16. Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented. Comments:	1	1	1	1	0	1				1			1		1	1		1	1	1	1	1	1	15	
17. Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan). Comments:	1	1	1	1	0	0			1	1	1		0		1	0		0	1	1	1	1	1	13	
18. Research flooding concerns for NC Highway 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed. Comments:	1	1	1	1	0	1			1	1	1		0		1	1		1	0	0	0	0	0	11	
19. Increase frequency of powerline and ROW vegetation maintenance and establish a regular schedule for maintenance. Comments:	1	1	1	1	0	0			1	1	1		0		1	1		1	1	0	0	1	1	13	
20. Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable. Comments:	1	1	1	1	0	1				1			1		1	1		1	1	1	0		1	13	
21. Allow coastal wetlands to migrate landward to provide habitat and natural buffer to coastal storms. Comments:	1	1	1	1	1	1				1			0		1	1		1	1	1	1		1	14	
22. Set up processes for transfer of development rights, conservation easements, and/or setback requirements. Comments:	1	1	1	1	0	1				1			1		1	1		1	0	0	0	0	0	10	

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	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws		
<b>Considerations for Alternative Actions</b>																									
24. Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings. <b>Comments:</b>	1	1	1	1	1	0				1			1		1	1		1	0	0	0	1	1	12	
25. Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, heavy rains, and flooding. <b>Comments:</b>	1	1	1	1	1	0				1	1		1		1	1		0	0	0	0	0	0	10	
26. Create redundancy for at risk infrastructure and emergency services. <b>Comments:</b>	1	1	1	1	1	0			1	1	1		1		1	1		1	0	0	0	0	0	12	
27. Evaluate the relocation or buy out potential of critical infrastructure in vulnerable areas. <b>Comments:</b>	1	1	1	1	0	0			1	1	1		1		1	1		1	0	0	0	0	0	11	
28. Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas. <b>Comments:</b>	1	1	1	1	0	1				1			1		1	1		1	0	0	0	0	0	10	
29. Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement. <b>Comments:</b>	1	1	1	1	1	0				1			0		1	1		0	1	1	1		1	12	
30. Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management. <b>Comments:</b>	1	1	1	1	0	1				1			1		1	1			0	0	0	0	0	9	
31. Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests. <b>Comments:</b>	1	1	1	1	0	1				1			1		1	1		1	0	0	0	0	0	10	
32. Develop a framework for decision making regarding land protection and restoration strategies based on wetland and habitat vulnerability that would include restoration, protection, and retreat strategies. <b>Comments:</b>	1	1	1	1	0	1				1			1		1	1			0	1	1		1	12	
33. Develop a comprehensive outreach strategy to educate stakeholders about SLR and coastal vulnerability and provide continuing education to affected communities and citizens. <b>Comments:</b>	1	1	1	1	0	0				1			1		1	1			0	0	0	1	1	10	

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<b>Considerations for Alternative Actions</b>																								
34. Identify data gaps and collect necessary data to plan for infrastructure investments that are part of implementation plan for adaptation. <b>Comments:</b>	1	1	1	1	0	1				1		1		1	1		1	0	1	1	1	1	1	14
35. Raise the bridge on Cherry Run Road above the base flood elevation (see Hurricane Matthew Resilient Redevelopment Plan). <b>Comments:</b>	1	1	1	1	0	1			1	1	1		0	1	0		0	1	0	0	1	1	1	12
36. Implement projects to address flooding on US Hwy 17 Business South. The Hwy 17 Business (Bridge St.) and US 264 (5th St.) intersection is a particular issue, but the whole corridor should be looked at (Hwy 17 Bypass is shut down for heavy wind and rain, so Hwy 17 Business becomes a vital evacuation route.) <b>Comments:</b>	1	1	1	1	0	1			1	1	1		0	1	0		0	1	0	0	1	1	1	12
37. Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution. <b>Comments:</b>	1	1	1	1	0	1			1	1	1		1	1	1			0	0	0	0	0	0	11
38. Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions. <b>Comments:</b>	1	1	1	1	0	1				1			1	0	1		1	0	1	1	1	1	1	13
39. Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans). <b>Comments:</b>	1	1	1	0	1	1				1			1	1	1			1	0	0	1	0	0	11
40. Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel. <b>Comments:</b>	1	1	1	0	1	1				1			1	1	1			1	0	0	0	0	0	10
41. Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative. <b>Comments:</b>	1	1	1	1	0	1			1	1	1		1	1	1			1	1	1	1	1	1	17
42. Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation. <b>Comments:</b>	1	1	1	1	0	1			1	1	1		1	1	1			1	1	1	1	1	1	17
<b>Pamlico Sound Hazard Mitigation Plan</b>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																			

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STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL	
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<b>Considerations for Alternative Actions</b>																									
B1. Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B2. Maintain reciprocal mutual aid agreements with surrounding communities for fire protection and emergency response.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B3. Annually evaluate adequacy of existing local early warning and emergency response communications equipment and prepare annual capital improvements plans to improve early warning and communication effectiveness before, during, and following disaster events.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B4. Develop standard protocols for training/ certification of volunteer staff for shelter management, traffic control, first aid, etc., to improve volunteer response capability during and following disaster events, including coordination with American Red Cross personnel on an annual basis.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B5. Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B6. Provide citizens and visitors with maps of evacuation routes which will facilitate the evacuation of the county in case of a hazardous event. This effort will involve the production of hard copy maps for distribution.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B7. Continue to monitor and establish programs to maintain continuity of government operations through annual review and update of the Continuity of Operations Plan (COOP).			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B8. Continue to support and participate in the directives of the County Emergency Operations Plan (EOP). The EOP includes evacuation procedures and response to hazards not addressed in this plan such as hazardous materials, petroleum products, hazardous waste, nuclear threat/attack, and civil disorder. The County will review and update the EOP annually to ensure that it coordinates with the most recent NCEM and NCOEMS directives.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B9. Continue to apply for grant funds, allocate local funding, and work with local electric service providers to procure and maintain backup generators/transfer switches for all critical public facilities, with an emphasis on emergency services facilities, critical water/sewer facilities, and shelter facilities. Evaluate the equipment on a regular basis to assure it continues to meet the needs of the operations occurring at each facility. Backup generators are still needed at the following facilities: Southside High School, S.W. Snowden Elementary School, and John Cotten Tayloe Elementary School.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B10. Hold an annual public hazard mitigation meeting, attended by the HMPC and participating jurisdictions, to educate the public and elected officials and receive comments about the location of high risk facilities/development, the jurisdictions' overall vulnerability to natural and manmade hazards, and the jurisdictions' hazards mitigation efforts.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws		
<b>Considerations for Alternative Actions</b>																									
B11. Maintain the Hazard Mitigation Planning Committee (HMPC) and hold annual HMPC meetings to continue relationship building and communicate about mitigation measures taking place throughout the community.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B12. Maintain continual contact/working relationship with electric service providers in the county to address the following: 1) Disaster preparedness techniques (e.g., tree trimming, vegetation planting requirements, pole replacement); 2) Identification of critical electrical facilities needing retrofit or upgrade and map with elevation reference marks; 3) Identification of problem areas and potential solutions; and 4) Communication with county officials during and immediately after a natural hazard event that results in loss of electrical power			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B13. Monitor trees and vegetation on publicly owned property to assure that no property or utility damage will occur as a result of diseased or dying trees or other vegetation. This strategy only applies to the municipal jurisdictions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B14. Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B15. Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans).			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B16. Annually review local floodplain ordinances to provide improved flood protection standards and require freeboard for retrofitting and new construction as required by NC State Building Code. The County will consider establishing a freeboard requirement.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B17. Maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B18. Encourage County Commissioners and elected officials of non-CRS communities to participate in the Community Rating System			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B19. Continue to work with local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within an SFHA. The county will provide these agencies with brochures documenting the concerns relating to development located within the flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, and heavy rains.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0
B20. Make information regarding hazards and development regulations within floodplains available through the following: 1) Ensure that local libraries maintain information relating to flooding and flood protection, 2) Provide a link on the municipal website to FEMA resources addressing flooding and flood protection, evacuation procedures, disaster preparedness, and post-disaster recovery, and 3) Provide website links to relevant hazard mitigation measures.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				0



RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
<b>ACTION: Drainage Ditches and Tributaries Maintenance Plan</b> Develop a maintenance plan to clean out drainage ditches and tributaries (for areas not located in current drainage districts, where this is already being done).	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0	0	1	1	17	
<b>ACTION: Open Space / Recreation Plan for Flood Mitigation</b> Develop an open space/recreation plan for flood mitigation projects.	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	1	0	0	1	1	17	
Implement a pervious surface policy. Consider implementing within current subdivision and mobile home park ordinances.	0	1	1	1	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	16	
<b>ACTION: Pamlico and Pungo River Wetland Restoration</b> Restore wetlands at the confluence of the Pamlico and Pungo Rivers.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	0	1	0	0	1	1	17	
Restore mudflat wetlands throughout Beaufort County.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	16	
Restore T.G Ponds (at Pamlico River and South Creek) to wetlands.	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	16	
Move critical assets out of the floodplain.	1	1	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	0	1	0	0	1	1	16
<b>ACTION: Living Shorelines Funding Program</b> Coordinate with the Coastal Federation to determine funding availability for living shorelines. See the Nature Conservancy for examples of living shorelines that could be implemented.	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	20	
Raise US 264 in certain locations in collaboration with NCDOT or implement other projects to control flooding in problem areas as appropriate (see Hurricane Matthew Resilient Redevelopment Plan).	1	1	1	1	0	0	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0	1	1	12
Research flooding concerns for NC Highway 33 (evacuation route for southside of county) and develop projects to improve corridor, if needed.	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	16

RCCP STAPLEE Criteria Worksheet  
Beaufort County



STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL	
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws		
<b>Considerations for Alternative Actions</b>																									
Create elevated County review procedures for future projects in vulnerable areas, limiting or prohibiting new development or infrastructure in areas that are particularly vulnerable.	1	1	1	1	0	1	0	0	0	1	0	1	1	0	1	1	1	1	1	0	0	1	1	15	
Encourage development standards that improve resiliency to flooding and sea level rise, such as additional freeboard. Incorporate public education into the building permit process using brochures and other educational materials that explain the benefits and insurance savings.	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	0	1	0	0	0	1	1	16	
<b>ACTION: Special Flood Hazard Areas Educational Materials</b> Develop brochures and other educational materials for distribution to local real estate agencies and manufactured home vendors to ensure that agents are informing clients when property for sale is located within a special flood hazard area (SFHA). The materials should document the concerns related to development located within flood prone areas and ways that homeowners may make their home more disaster resistant to strong winds, lightning, heavy rains, and flooding.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	17	
<b>ACTION: Essential / Emergency Services Operations Redundancies</b> Create redundancy for at risk infrastructure and emergency services.	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	17	
Connect residents to resources and encourage elevation of structures and infrastructure located in vulnerable areas.	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16	
<b>ACTION: Natural Shoreline Migration</b> Allow for natural shoreline migration through land conservation and removal of structures that prevent shoreline movement.	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	17	
Evaluate the feasibility of land acquisition by government, communities, businesses, or non-profit organizations of vulnerable parcels for permanent protection and management.	1	1	1	1	0	1	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	14	
Consider cost-sharing projects with state and federal agencies that are mutually beneficial in increasing resiliency for resources with common interests.	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16	

RCCP STAPLEE Criteria Worksheet  
Beaufort County



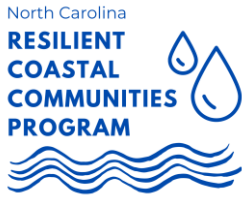
STAPLEE Criteria >>	Social		Technical			Administrative			Political			Legal			Economic				Environmental					TOTAL
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT Waste Sites	Consistent w/ Community Environmental Goals	Consistent w/ Federal Laws	
<b>Considerations for Alternative Actions</b>																								
Update the Beaufort County Emergency Operations Plan (EOP) with a partnership policy to acquire more assets and have a plan in place for who does what where. Include maps of evacuation routes within the plan, digital maps for posting on websites and social media, and hard copies for public distribution.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	15
<b>ACTION: CAMA Land Use Plan Coordination</b> Continue to coordinate all development/planning decisions with review of appropriate CAMA LUP's including stated redevelopment policies and actions.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	18
<b>ACTION: Greenway and Public Park Improvements</b> Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA Land Use Plans).	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	17
Complete an annual evaluation of each designated emergency shelter, including structural inspection, resource inventory, staffing plan, and vulnerability assessment, including coordination with American Red Cross personnel.	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	15
<b>ACTION: Open Space Program</b> Continue to maintain all property acquired with public mitigation funds within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to proactively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20
<b>ACTION: Repetitive Loss Property Acquisition</b> Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to encourage homeowners to participate in FEMA sponsored residential acquisition and elevation programs; continue to apply for HMGP/HMA funding for residential acquisition and elevation.	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20



## **APPENDIX D**

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### **Project Portfolios**



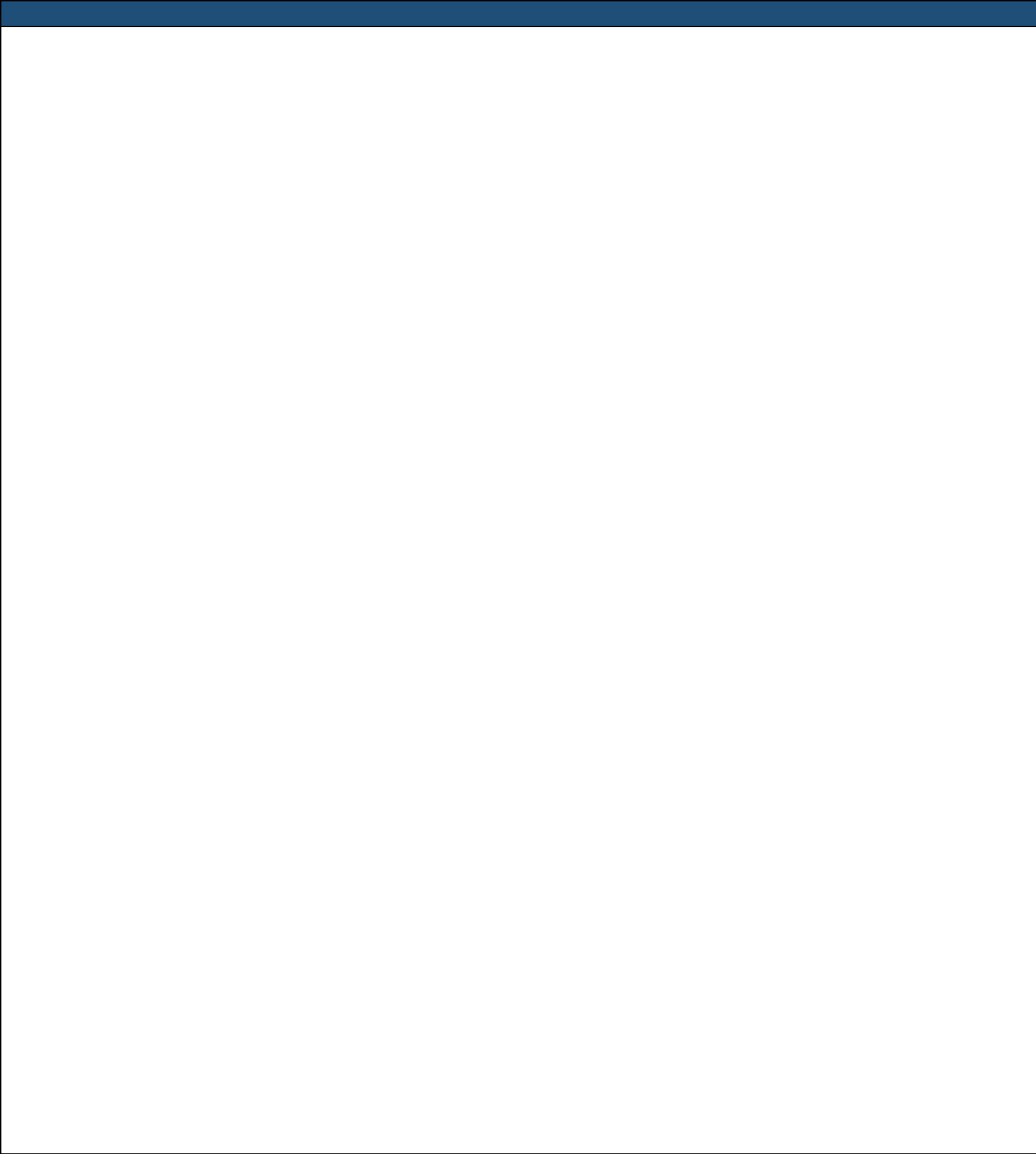
# BEAUFORT COUNTY

## Drainage Ditches and Tributaries Maintenance Plan

### Project Summary

Project Name	Drainage Ditches and Tributaries Maintenance Plan				
Project Description	Develop a maintenance plan to clean out drainage ditches and tributaries to decrease flooding by improving flow. This plan would focus on areas located outside of existing drainage districts.				
Hazard(s) Addressed by Project	List Hazards Specific to the Community Which Impact the Project Location (Refer to Hazard Mapping) <ul style="list-style-type: none"> <li>▪ Flooding/Flood Zones</li> <li>▪ Storm Surge</li> <li>▪ Sea Level Rise</li> </ul>				
Type of Solution/Strategy Area	List Strategy Area Column(s) from Matrix (e.g., Policy/Regulatory, Staffing, Funding & Resources, Emergency Services, Infrastructure, Nature-Based, Hybrid) <ul style="list-style-type: none"> <li>▪ Nature-based</li> </ul>				
Type of Strategy Approach	List Strategy Approach from Matrix (e.g., Avoid, Accommodate, Protect, Retreat, Build Adaptive Capacity) <ul style="list-style-type: none"> <li>▪ Accommodate / Protect</li> </ul>				
Project Estimated Cost	\$150,000 - \$250,000				
Potential Implementation Funding Sources	Potential Sources for Project/Action Implementation <ul style="list-style-type: none"> <li>▪ Golden Leaf Foundation</li> <li>▪ BRIC</li> <li>▪ American Rescue Plan Act (ARPA)</li> </ul>				
Project Estimated Timeline	2-4 years				
Priority Rating	Medium				
Potential Submission for RCCP Phase 3		Yes	◆	No	<i>Project must be a nature-based solution or hybrid solution to be considered for RCCP Phase 3.</i>

### Project Map





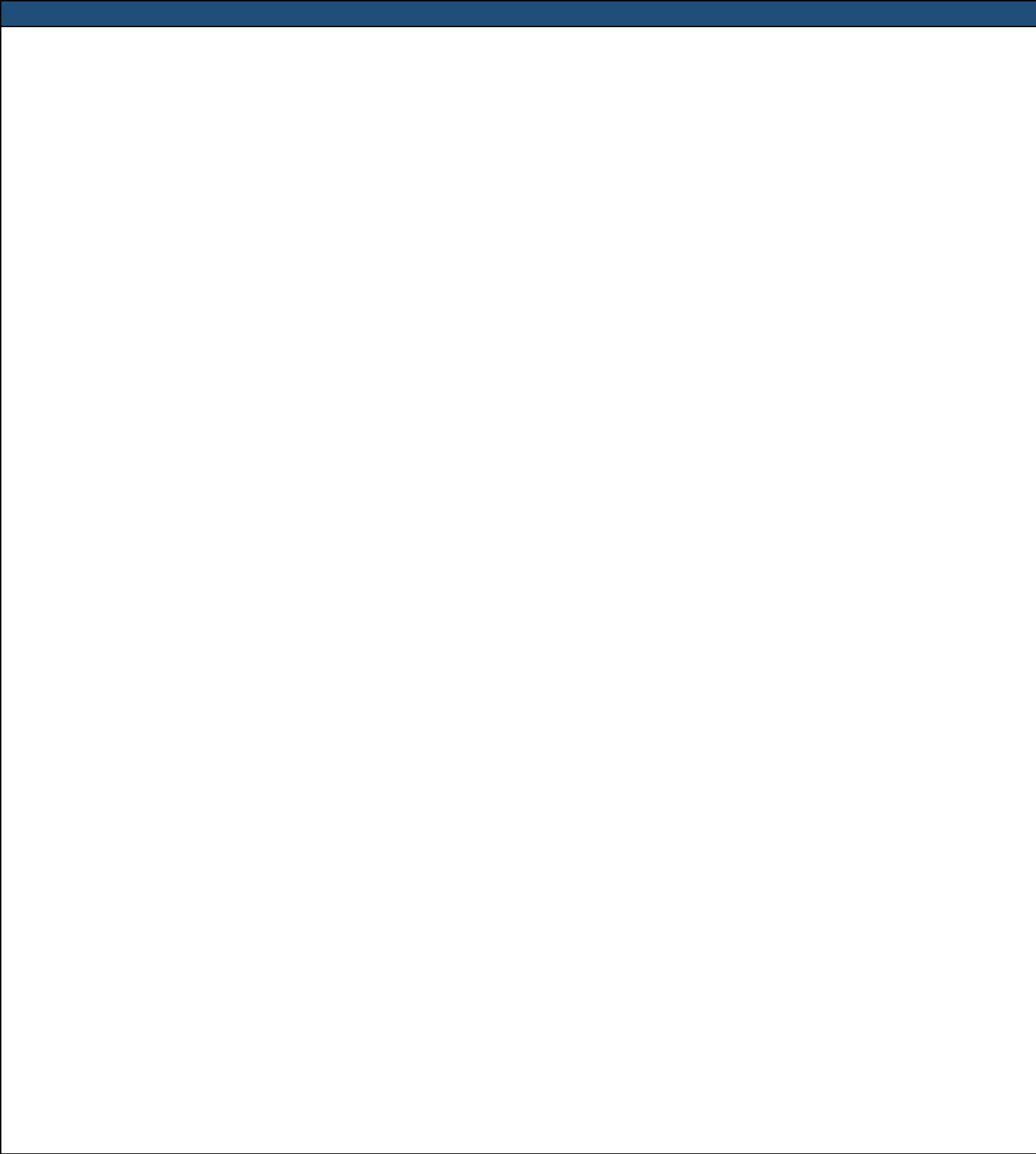
# BEAUFORT COUNTY

## Essential / Emergency Services Operations Redundancies

### Project Summary

Project Name	Essential / Emergency Services Operations Redundancies			
Project Description	Create redundancy for government employees located within high-risk infrastructures and emergency services buildings to decrease the potential for lack of services directly after severe weather events. This would include establishing backup office space and equipment at other facilities in order to return to operational status as quickly as possible.			
Hazard(s) Addressed by Project	List Hazards Specific to the Community Which Impact the Project Location (Refer to Hazard Mapping) <ul style="list-style-type: none"> <li>▪ Flooding/Flood Zones</li> <li>▪ Storm Surge</li> <li>▪ Sea Level Rise</li> </ul>			
Type of Solution/Strategy Area	List Strategy Area Column(s) from Matrix (e.g., Policy/Regulatory, Staffing, Funding & Resources, Emergency Services, Infrastructure, Nature-Based, Hybrid) <ul style="list-style-type: none"> <li>▪ Emergency Services</li> </ul>			
Type of Strategy Approach	List Strategy Approach from Matrix (e.g., Avoid, Accommodate, Protect, Retreat, Build Adaptive Capacity) <ul style="list-style-type: none"> <li>▪ Accommodate / Build Adaptive Capacity</li> </ul>			
Project Estimated Cost	\$150,000 - \$300,000 per service			
Potential Implementation Funding Sources	Potential Sources for Project/Action Implementation <ul style="list-style-type: none"> <li>▪ BRIC</li> <li>▪ American Rescue Plan Act (ARPA)</li> <li>▪ FEMA Flood Mitigation Assistance (FMA)</li> </ul>			
Project Estimated Timeline	2-4 years			
Priority Rating	Medium			
Potential Submission for RCCP Phase 3		Yes	◆ No	<i>Project must be a nature-based solution or hybrid solution to be considered for RCCP Phase 3.</i>

### Project Map





# BEAUFORT COUNTY


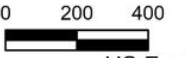
## Low Impact Development Demonstration Site - Beaufort County CC

### Project Summary

Project Name	Low Impact Development Demonstration Site – Beaufort County CC			
Project Description	This project proposes to construct a Low Impact Development Demonstration Site on the Beaufort County Community College campus. This hybrid solution will be combined with the development of educational materials for developers and homeowners.			
Hazard(s) Addressed by Project	List Hazards Specific to the Community Which Impact the Project Location (Refer to Hazard Mapping) <ul style="list-style-type: none"> <li>▪ Flooding/Flood zones</li> <li>▪ Storm Surge</li> <li>▪ Sea Level Rise</li> </ul>			
Type of Solution/Strategy Area	List Strategy Area Column(s) from Matrix (e.g., Policy/Regulatory, Staffing, Funding & Resources, Emergency Services, Infrastructure, Nature-Based, Hybrid) <ul style="list-style-type: none"> <li>▪ Hybrid / Funding &amp; Resources</li> </ul>			
Type of Strategy Approach	List Strategy Approach from Matrix (e.g., Avoid, Accommodate, Protect, Retreat, Build Adaptive Capacity) <ul style="list-style-type: none"> <li>▪ Strategy Approach Column A</li> </ul>			
Project Estimated Cost	\$150,000 – \$225,000 per acre			
Potential Implementation Funding Sources	Potential Sources for Project/Action Implementation <ul style="list-style-type: none"> <li>▪ Resilient Coastal Communities Program (RCCP)</li> <li>▪ American Rescue plan Act (ARPA)</li> <li>▪ FEMA Hazard Mitigation Grant Program (HMGP)</li> </ul>			
Project Estimated Timeline	1-3 years			
Priority Rating	High			
Potential Submission for RCCP Phase 3	◆	Yes	No	<i>Project must be a nature-based solution or hybrid solution to be considered for RCCP Phase 3.</i>

### Project Map



<p><b>Legend</b></p>  <p>Project Area</p>	<p align="center"><b>Low Impact Development Demonstration Site Vicinity Map</b></p> <p>This project proposes to construct a Low Impact Development Demonstration Site on the Beaufort County Community College campus. This hybrid solution will be combined with the development of educational materials for developers and homeowners. Beaufort County , NC</p>	<p>Scale:</p>  <p>0 200 400 US Feet</p>
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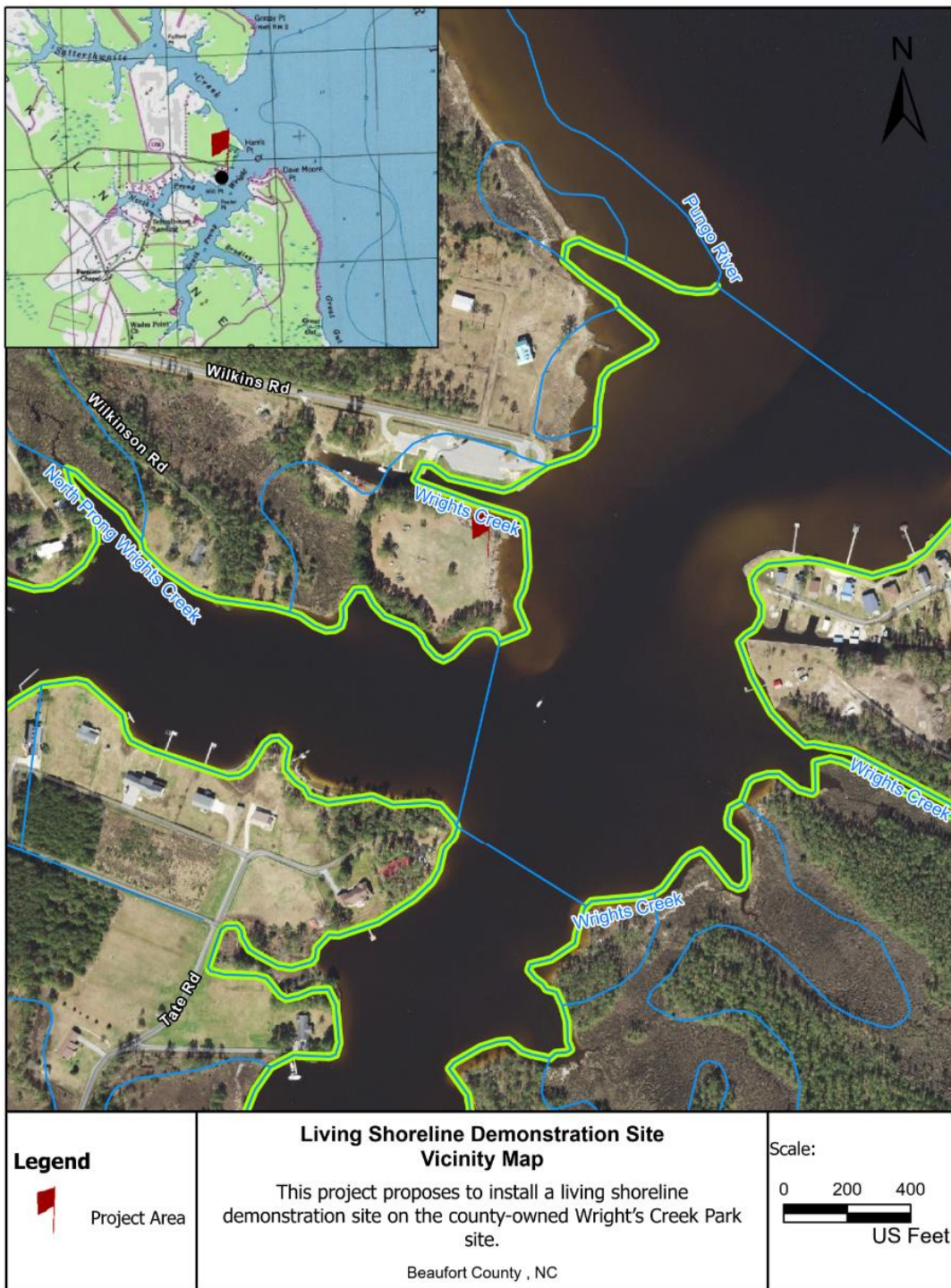
# BEAUFORT COUNTY

Living Shoreline Demonstration Site - Wrights Creek Park  
 Living Shoreline Planning and Funding Program

## Project Summary

Project Name	Living Shoreline Demonstration Site – Wrights Creek Park Living Shoreline Planning and Funding Program			
Project Description	This project proposes to install a living shoreline demonstration site on the county-owned Wright’s Creek Park site. This nature-based solution will be combined with a Living Shorelines Planning and Funding Program in coordination with the Coastal Federation and other non-profit organizations to determine funding availability for living shorelines. Living shorelines are a relatively new approach that incorporate natural elements to create a more effective buffer to absorb wave energy and protect against shoreline erosion.			
Hazard(s) Addressed by Project	List Hazards Specific to the Community Which Impact the Project Location (Refer to Hazard Mapping) <ul style="list-style-type: none"> <li>▪ Flooding / Flood zones</li> <li>▪ Storm Surge</li> <li>▪ Sea Level Rise</li> </ul>			
Type of Solution/Strategy Area	List Strategy Area Column(s) from Matrix (e.g., Policy/Regulatory, Staffing, Funding & Resources, Emergency Services, Infrastructure, Nature-Based, Hybrid) <ul style="list-style-type: none"> <li>▪ Hybrid/Funding &amp; Resources</li> </ul>			
Type of Strategy Approach	List Strategy Approach from Matrix (e.g., Avoid, Accommodate, Protect, Retreat, Build Adaptive Capacity) <ul style="list-style-type: none"> <li>▪ Strategy Approach Column A</li> </ul>			
Project Estimated Cost	\$150 - \$350 per foot			
Potential Implementation Funding Sources	Potential Sources for Project/Action Implementation <ul style="list-style-type: none"> <li>▪ Golden Leaf Foundation</li> <li>▪ BRIC</li> <li>▪ American Rescue Plan Act (ARPA)</li> </ul>			
Project Estimated Timeline	2-3 years			
Priority Rating	High			
Potential Submission for RCCP Phase 3	◆	Yes	No	<i>Project must be a nature-based solution or hybrid solution to be considered for RCCP Phase 3.</i>

## Project Map



Living Shoreline Demonstration Site – Wrights Creek Park  
Living Shoreline Planning and Funding Program





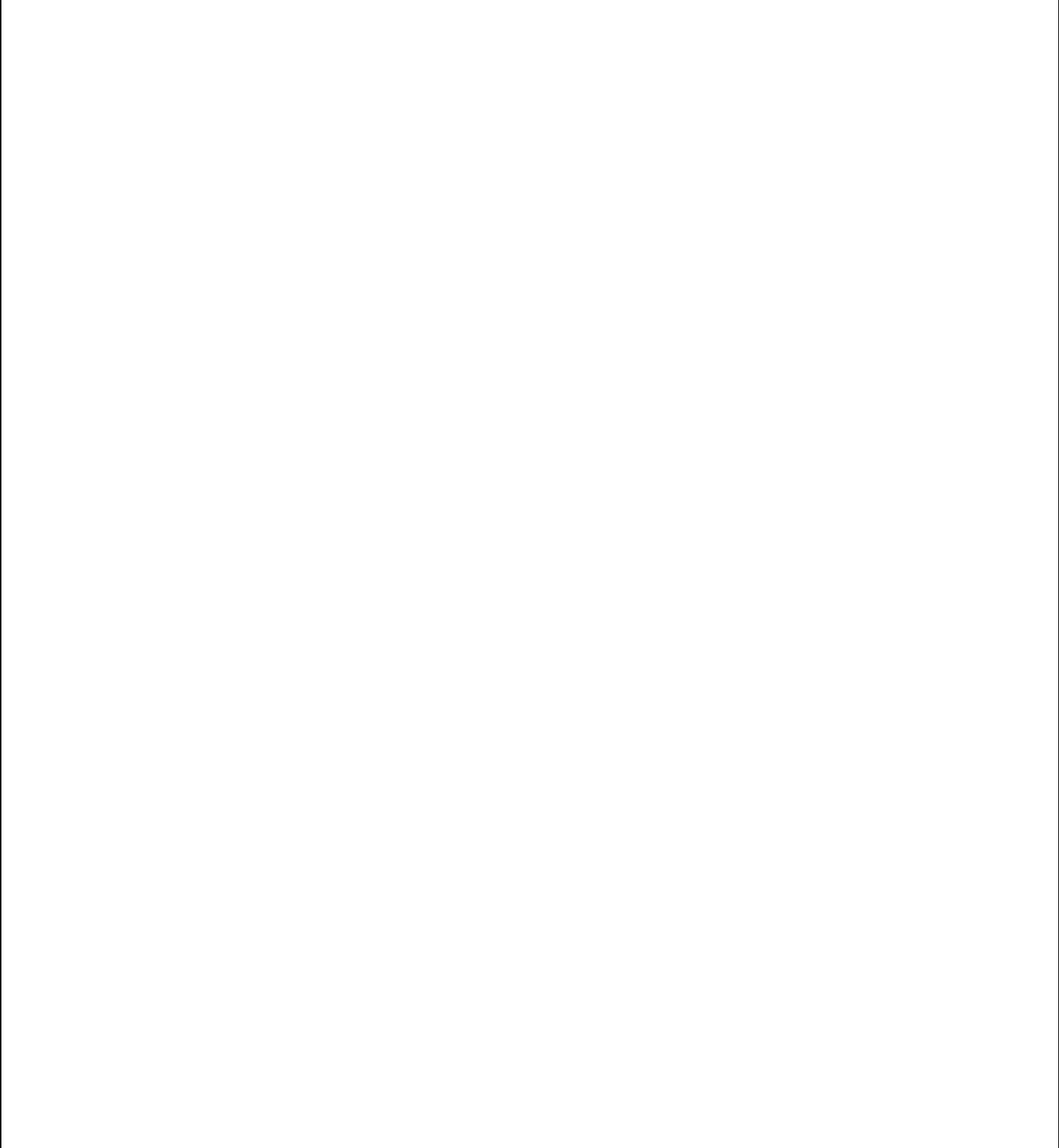
# BEAUFORT COUNTY

## Open Space Program

### Project Summary

Project Name	Open Space, Greenway, and Public Park Improvement Program			
Project Description	Develop a program to identify and establish open space areas within the floodplain and floodway to as well as needed improvements on greenways and in public parks. This program should also identify and maintain all property acquired with public mitigation funds within the Special Flood Hazard Areas as undisturbed open space in perpetuity. This program will help the county stay proactive against flooding.			
Hazard(s) Addressed by Project	List Hazards Specific to the Community Which Impact the Project Location (Refer to Hazard Mapping) <ul style="list-style-type: none"> <li>▪ Flooding/Flood Zones</li> <li>▪ Storm Surge</li> <li>▪ Sea Level Rise</li> </ul>			
Type of Solution/Strategy Area	List Strategy Area Column(s) from Matrix (e.g., Policy/Regulatory, Staffing, Funding & Resources, Emergency Services, Infrastructure, Nature-Based, Hybrid) <ul style="list-style-type: none"> <li>▪ Funding &amp; Resources / Nature-based</li> </ul>			
Type of Strategy Approach	List Strategy Approach from Matrix (e.g., Avoid, Accommodate, Protect, Retreat, Build Adaptive Capacity) <ul style="list-style-type: none"> <li>▪ Retreat</li> </ul>			
Project Estimated Cost	\$100,000 - \$150,000			
Potential Implementation Funding Sources	Potential Sources for Project/Action Implementation <ul style="list-style-type: none"> <li>▪ Golden Leaf Foundation</li> <li>▪ BRIC</li> <li>▪ American Rescue Plan Act (ARPA)</li> </ul>			
Project Estimated Timeline	1-3 years			
Priority Rating	High			
Potential Submission for RCCP Phase 3		Yes	◆	No <i>Project must be a nature-based solution or hybrid solution to be considered for RCCP Phase 3.</i>

### Project Map





# BEAUFORT COUNTY

## Repetitive Loss Property Acquisition and/or Elevation

Project Summary					
Project Name	Special Flood Hazard Education and Repetitive Loss Property Elevation/Acquisition Program				
Project Description	Develop Special Flood Hazard educational material that encourages homeowners to participate in FEMA-sponsored residential acquisition and elevation programs. Continue to maintain current listings of Severe Repetitive Loss properties and conduct annual outreach activities to apply for hazard mitigation grant and hazard mitigation assistance funding for residential acquisition and elevation.				
Hazard(s) Addressed by Project	List Hazards Specific to the Community Which Impact the Project Location (Refer to Hazard Mapping) <ul style="list-style-type: none"> <li>▪ Flooding/Flood Zones</li> <li>▪ Storm Surge</li> <li>▪ Sea Level Rise</li> </ul>				
Type of Solution/Strategy Area	List Strategy Area Column(s) from Matrix (e.g., Policy/Regulatory, Staffing, Funding & Resources, Emergency Services, Infrastructure, Nature-Based, Hybrid) <ul style="list-style-type: none"> <li>▪ Staffing, Funding &amp; Resources / Education &amp; Public Information</li> </ul>				
Type of Strategy Approach	List Strategy Approach from Matrix (e.g., Avoid, Accommodate, Protect, Retreat, Build Adaptive Capacity) <ul style="list-style-type: none"> <li>▪ Strategy Approach Column A</li> </ul>				
Project Estimated Cost	\$50,000 - \$75,000				
Potential Implementation Funding Sources	Potential Sources for Project/Action Implementation <ul style="list-style-type: none"> <li>▪ Golden Leaf Foundation</li> <li>▪ American Rescue Plan Act (ARPA)</li> <li>▪ FEMA Flood Mitigation Assistance (FMA)</li> </ul>				
Project Estimated Timeline	1-2 years				
Priority Rating	High				
Potential Submission for RCCP Phase 3		Yes	◆	No	<i>Project must be a nature-based solution or hybrid solution to be considered for RCCP Phase 3.</i>

**Project Map**

