Belhaven
North Carolina

RESILIENCE STRATEGY

TOWN OF BELHAVEN

SPRING 2022

INTRODUCTION

The Resilient Coastal Communities Program (RCCP) is funded through the North Carolina General Assembly and the National Fish and Wildlife Foundation and administered by the North Carolina Department of Environmental Quality – Division of Coastal Management. The RCCP is a component of the statewide North Carolina Resilient Communities Program, called for in the North Carolina Climate Risk Assessment and Resilience Plan.

The RCCP was established with the objectives of providing financial grants and technical assistance to support a proactive, locally driven, and equitable approach to coastal resilience planning and project implementation. 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 RCCP consists of four phases:

- Phase 1 – Community Engagement/Risk and Vulnerability Assessment
- Phase 2 – Planning, Project Identification and Prioritization
- Phase 3 – Engineering and Design
- Phase 4 – Implementation

In Spring 2021, the Town of Belhaven was selected to participate in the first two phases of the RCCP. The first two phases of the RCCP were completed in Spring 2022 with the development of this Resiliency Strategy document, the main deliverable of the program's initial phases. This Resiliency Strategy consists of a combination of all the Phase 1 and 2 deliverables/materials including those for the defining of the community vision and goals, the Community Action Team Report, the Stakeholder Engagement Strategy, the inventory of existing local and regional plans, the Risk and Vulnerability Assessment Report, and the project profile portfolios. This plan provides a framework to:

- Document the resiliency planning process and outcomes and provide a clarity of purpose
- Identify opportunities for short-term and long-term resiliency actions based on community input
- Set project priorities for Phase 3 – Engineering and Design
- Identify and attract potential funding opportunities to facilitate a 'direct path' to project implementation

VISION & GOALS

A resiliency strategy vision, goals, and objectives were developed to guide the planning process. Existing relevant plans were summarized for the Community Action Team (CAT). Vision statements and goals from each of the local and regional plans were reviewed. Example goals from resiliency plans outside the area were also reviewed. Example vision statements, goals, and themes were identified following review of existing plans. These examples were used to guide the CAT's brainstorming process during the first CAT meeting.

The team was encouraged to consider the triple bottom line approach to resiliency, including environmental, economic, and social factors. Worksheets were provided to CAT members for use in identifying draft vision statements, goals, and objectives. The team worked together during the first CAT meeting to complete the worksheets. Team members also had an opportunity to complete the worksheets following the CAT meeting.

Input from the CAT was used to finalize the resilience vision, goals, and objectives listed below.

RESILIENCE VISION

Belhaven is a resilient community supporting sustainable growth of its population and economic base through strategic investments in flood mitigation projects, effective response and recovery, quality municipal infrastructure and services, and development of waterfront assets supporting public recreation and ecotourism. The town is able to rebound quickly following hazard events due to strong partnerships and frequent communication with residents.

RESILIENCE GOALS & OBJECTIVES

Economic

GOAL 1: Support sustainable population growth and economic growth.
Objectives:

- Manage risks to the economy when storms occur.
- Attract new businesses and new residents to town.
- Improve existing jobs and bring more employment opportunities to town.

GOAL 2: Develop tourism and ecotourism industries.
Objectives:

- Develop waterfront amenities such as canoe/kayak launches and fishing piers.
- Establish and/or promote tour boat trips on the Pamlico and Pungo Rivers.
- Grow the tax base by protecting and developing the town's waterfront assets.
- Develop the natural beauty of Belhaven.

- Bring more outdoor and nature-based activities to town. Attract businesses that support tourism such as a waterpark/amusement park and a golf course.
- Market Belhaven as a destination for ecotourism.

GOAL 3: Improve and maintain buildings to support resilience to hazards.

- Promote research and development of building construction and design standards to better withstand storm damage.
- Incentivize the construction of "flood resistant" homes.
- Elevate more homes.
- Floodproof more businesses and other non-residential buildings.
- Provide guidance on how future development can minimize additional damages and recovery costs from hazard events.

GOAL 4: Provide quality municipal infrastructure and services.

- Improve/replace aging water and sewer infrastructure.
- Protect critical infrastructure from flooding.
- Upgrade the communication system.
- Improve internet access.

GOAL 5: Identify and obtain funding for resilience projects.

- Develop a list of resilience projects suitable for funding.
- Identify funding and grant opportunities to implement resilience projects.

Environmental

GOAL 6: Reduce flooding.

Objectives:

- Reduce flooding in the downtown area including roads and sidewalks.
- Reduce flooding in other areas of town.
- Develop flood mitigation projects, including nature based and sustainable solutions.
- Reduce flooding from coastal storms, tidal flooding, and nuisance flooding from normal wind and rain events.
- Identify both structural and non-structural solutions to flooding.

GOAL 7: Improve stormwater management.

Objectives:

- Improve drainage issues in town.
- Clear overgrown ditches to improve drainage from rain events and reduce infiltration to the sewer system.
- Demolish dilapidated homes and remove impervious surfaces as practicable and feasible.
- Remove excess debris from streams to improve capacity.
- Prevent future debris in streams from accumulating.

- Improve construction and site design standards to reduce debris caused by flooding and storms.
- Encourage the construction of permeable surfaces to reduce flash flooding.

GOAL 8: Preserve natural resources.
Objectives:

- Provide guidance on sustainable growth practices that respect the natural functions of the ecosystem and allow for their natural adaptation as the ecosystem undergoes relatively rapid change in coming decades. (See NC Wildlife's Green Growth Toolbox as a resource.)
- Incentivize reliance on "natural" protective systems as much as possible (i.e., leaving wetlands, forests and marshes as intact as possible to absorb floodwaters and mitigate storm surge).
- Discourage excessive covering of land with impervious surfaces.

Social

GOAL 9: Develop effective hazard response and recovery.
Objectives:

- Minimize damage and loss of life from disasters.
- Restore services quickly and efficiently following a hazard event.
- Rebound from hazard events quickly.
- Manage risks to public health when hazard events occur.
- Develop both long-range and short-term maintenance and management plans.

GOAL 10: Educate the public about resiliency.
Objectives:

- Educate the public, including the most vulnerable populations, with the tools needed to protect themselves from natural hazards.
- Educate owners of repetitive loss properties on opportunities for building elevation/floodproofing, equitable buyouts, and other mitigation options.

GOAL 11: Foster strong partnerships with residents.
Objectives:

- Foster strong relationships and partnerships with residents to achieve success.
- Communicate with residents on a regular basis through multiple communication venues (websites and social media, newspaper, television, radio, newsletters, in person community events, etc.).
- Involve local community and faith based groups in resilience work and public outreach.
- Utilize social networks to be proactive in resilience efforts.

GOAL 12: Foster and sustain a healthy, thriving and resilient community.
Objectives:

- Support a high quality of life for all citizens.

- Create and maintain multiple public access points for natural resources.
- Provide access to recreational assets for all citizens.
- Ensure equitable access to services.
- Utilize town owned waterfront areas to benefit all citizens.
- Improve access to medical care and hospital.
- Support transportation improvements which limit impediments to transportation.
- Reduce the mosquito population in town.

COMMUNITY ACTION TEAM REPORT

Roles to fill on the Community Action Team (CAT) were based on guidance from the Resilient Coastal Communities Program Handbook. The goal was to build a multi-disciplinary Community Action Team with expertise in planning and community development, hazard mitigation, utility management, engineering, the community's economy, engaging with vulnerable and underrepresented populations, and nature-based solutions. Community Action Team members could include municipal/county managers, planners, elected officials, utility managers, community and economic developers, business community representatives, disaster recovery coalitions/groups, councils of governments (COGs), state and federal land managers, non-governmental organizations (NGOs), and others working with the community on resilience planning.

The first CAT member identified was the Town Manager. The Town Manager worked with the contractors to identify CAT members to fill the roles detailed above. Potential members were contacted by phone and/or email either by the contractors or the Town Manager. The need for CAT members was announced to the public at a Town Board of Alderman's meeting. An elected official was selected to serve from the Board of Alderman as well.

The selected Community Action Team members are listed below.

COMMUNITY ACTION TEAM MEMBERS

- Ed Labarge, Town of Belhaven, Water & Sewer
- Lynn Davis, Town of Belhaven, Town Manager
- Ricky Credle, Town of Belhaven, Mayor
- Steve Hall, Town of Belhaven, Water & Sewer
- Toby Tetterton, TJ's Marine Construction, Owner/Operator

Refer to Appendix A for Community Action Team Materials.

STAKEHOLDER ENGAGEMENT STRATEGY

Existing Conditions, Issues, and Opportunities

In fall 2021, a public survey was developed in partnership with the Community Action Team (CAT). Questions were based around resiliency to flooding and sea level rise. The survey was designed to be completed in 5 - 15 minutes depending on how much the respondent had to share. The public survey was available online and was also available in hard copy format.

The survey was advertised online via the town's website and Facebook page. Hard copies of the survey were available at Town Hall, the Belhaven Library, the Wilkinson Center, and the Belhaven Senior Center. Flyers advertising the survey were hung at these locations to draw attention from visitors. Flyers with the online survey link and phone number to call for a hard copy survey were also hung at Food Lion and at several local businesses in the downtown area. A total of six residents responded to the survey.

Public input from the survey was used to identify existing conditions, issues, needs, and opportunities to enhance resiliency. Information was gathered on how residents' home and business properties have been affected by flooding, flooding seen in the community, how the respondents' personal lives have been affected by flooding, and what measures they have taken to prevent or avoid flooding. This information was used to recommend strategies for flooding resilience. For example, contractors reviewed specific areas where people had noticed flooding issues in the community to recommend strategies for those areas as appropriate, and program recommendations such as public education campaigns were recommended based on survey responses.

Draft Resiliency Actions

In spring 2022, an online storymap was created using ArcGIS Online and was posted at BeaufortCountyResiliency.org. The storymap reviewed Resiliency 101, Belhaven's vision statement, CAT members, building upon previous plans, the public survey, the risk and vulnerability assessment, the top flood related hazards, the STAPLEE analysis, and draft actions, all in an interactive storymap format. There was a comment form at the end of the storymap that the participant could fill out if desired, allowing them to comment on the draft actions and other elements of the Town of Belhaven's Resilient Coastal Communities Program. The storymap was advertised in conjunction with the public open house, detailed below.

Two public open house events were held, one in person on Feb. 16, 2022 and one virtually on Feb. 21, 2022. These events, along with the storymap at BeaufortCountyResiliency.org, were advertised through a press release, an article in the Washington Daily News, on the town website and Facebook page, and through flyers hung at Town Hall and other public locations in town.

The virtual open house utilized the storymap to engage participants. For the in-person open house, posters were displayed which duplicated the information contained in the online storymap, including the following:

- What is resiliency?
- Flooding in Beaufort County
- What does resiliency mean to you? (interactive)
- North Carolina Resilient Coastal Communities Program
- A Community Plan – Resiliency Vision, Community Action Team, Building Upon Previous Plans
- Public Survey Results
- Risk and Vulnerability – Vulnerable Community Assets and Top Flood Related Hazards
- Map – Critical Assets overlaid with Category 1 Storm Surge
- Map – Critical Assets overlaid with 1 ft. Sea Level Rise
- Projects and Priorities – Suite of Potential Solutions
- Preliminary Strategies and their Feasibility
- Action Strategy Areas
- Provide input on your top (3) preferred actions (interactive)
- Provide input on your top (1) nature-based or hybrid action (interactive)

In addition to the interactive posters, there were comment forms available at the public open house to solicit feedback on preferred projects and other aspects of the community's resiliency program. There was also a resource table with handouts on topics such as flood readiness, stormwater education, creating home rain gardens, septic maintenance, mold remediation, etc. Some of these materials were made available in Spanish. Contractors and CAT members were available to interact with the public during the in person and virtual events.

Comment forms could be submitted at the open house event and could be submitted online or by postal mail until February 25, 2022.

Public input indicates that the most popular project for the community is the "Wynne's Gut Tidal Gates and Flood Attenuation" and the second most popular project for the community is the "Pantego Community Park". Both are hybrid projects with nature-based elements.

ENGAGEMENT TOOLS

- Public Survey
- Webpage/Online Storymap
- Notifications (news release, social media ads, flyers)
- Public Open Houses (In-person and Virtual)

Refer to Appendix B for Stakeholder Engagement Materials.

REVIEW OF EXISTING LOCAL & REGIONAL EFFORTS

To avoid the duplication of work and to build upon and remain consistent with previous resiliency efforts, existing resources/plans/policies/ordinances were reviewed, incorporated, and augmented as part of the community driven RCCP. The Pamlico Sound Hazard Mitigation Plan contains a baseline vulnerability and risk assessment and served as a reference point for conducting the RCCP Phase I and II assessment while considering additional factors and the local context.

RELEVANT PLANS, ORDINANCES, POLICIES, AND PROGRAMS

- **Albemarle-Pamlico Comprehensive Conservation and Management Plan (CCMP) (2012)**
  The CCMP considers and analyzes four basic questions: 1) What is a healthy Albemarle-Pamlico system, 2) What is the current condition of the system, 3) What are the most significant challenges facing the system over the next 10 years, and 4) What actions should be implemented to best achieve a healthy system?

- **Beaufort County Economic Development FY 21-22 Work Plan (2021)**
  The purpose of the Beaufort County Economic Development Work Plan is to provide tools, strategies, and guidance to increase economic development through collaboration, resources, knowledge, flexibility, and innovation.

- **Beaufort County CAMA Core Land Use Plan (2019)**
  The purpose of the plan is to help the county and towns to manage growth and development, ensure that new land uses are compatible with land use plans/visions, plan for the expansion of services, and protect and conserve essential coastal resources.

- **Hurricane Matthew Resilient Redevelopment Plan – Beaufort County and Northeast Region Plans (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.

- **Pamlico Peninsula – Building Resilient Regions Report (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. The IEDC provided specific advice on how to strengthen existing programs and develop new programs or strategies so that the county and region can be more resilient from an economic perspective to future crises.

- **Pamlico Sound Regional Hazard Mitigation Plan (HMP) (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.

RISK AND VULNERABILITY ASSESSMENT REPORT

To assess risk and vulnerability, contractors identified critical assets within Belhaven. These critical assets included community assets, natural infrastructure, and vulnerable populations within the communities. (See Appendix C for the list of identified critical assets.)

MAPPING ASSETS, NATURAL INFRASTRUCTURE, AND VULNERABLE POPULATIONS

Community Assets

Contractors worked with the Community Action Team (CAT) at the 2nd CAT meeting to identify community assets in list format, then researched what GIS data was available. In some cases, there was already a data layer available, while in some cases, the GIS data was created by the contractors based on CAT input on which assets to include. In sources below, "data created" is used to designate data that was developed by the contractor.

Sources:

- Fire and EMS Stations – NC Office of State Fire Marshall
- Government Services – data created
- Food – data created
- Water and Wastewater – NC Department of Environmental Quality, Division of Water Resources
- Transportation – NC Dept. of Transportation, Beaufort County, some data for local transportation assets created
- Medical – data created
- Schools – data created
- Libraries – data created
- Community Resource Partners – Beaufort County Emergency Management
- Community Buildings and Facilities – data created
- Hazardous, Leaking Underground Storage Tanks – NC Department of Environmental Quality
- Hazardous, Toxic Release Inventory – US Environmental Protection Agency
- Hazardous, Hazardous Waste Sites – NC Department of Environmental Quality

Natural Infrastructure

Contractors researched existing natural infrastructure data and shared an initial list with the CAT. The team helped to add additional natural assets to the list. Contractors also worked with the team to identify local public land and private land used for public recreational purposes.

Sources:

- Wetlands – US Fish and Wildlife Service
- Working Forest Lands – NC Natural Heritage Program
- Rural Forest Landscape – NC Natural Heritage Program
- Urban Forest Landscape – NC Natural Heritage Program
- 100-year Floodplain – FEMA
- 500-year Floodplain – FEMA
- Rivers and Streams – NC Department of Environmental Quality
- High Quality Waters – NC Department of Environmental Quality
- Primary and Secondary Fishery Nursery Areas – NC Dept. of Environmental Quality
- 303(d) Listed Waters – US Environmental Protection Agency
- Parks and Public Land – data created
- Public Boat Ramps – NC Wildlife Resources Commission
- Managed Areas – NC Natural Heritage Program
- Natural Areas – NC Natural Heritage Program

Vulnerable Populations

Maps of vulnerable populations were downloaded from the Center for Disease Control including the overall Social Vulnerability Index, Socioeconomic Status, Household Composition/Disability, Race/Ethnicity/Language, and Housing Type/Transportation. The CAT reviewed the series of vulnerable populations maps. The team felt that the Social Vulnerability Index maps were accurate for the Belhaven area. There are definite pockets of poverty, but the wealth in the waterfront areas skews the numbers.

Sources:

- Social Vulnerability Index – US Center for Disease Control

Identifying and Mapping Hazards

The Community Action Team chose to evaluate flooding, storm surge and sea level rise as community hazards to assess risk and vulnerability within the community.

Floodplains

Being that Belhaven is completely inundated by the FEMA 100-year floodplain, 10-year, 25-year, and 50-year storm events were used to identify potential flooding scenarios within the community. This allowed for a degree of importance when calculating the vulnerability of the assets within the community. By selecting three flooding scenarios, the contractors were able to assign each scenario a high, medium, and low threshold to evaluate vulnerability to critical assets.

Sources:

- North Carolina Emergency Management Floodplain Mapping program
- North Carolina Spatial Data Download
- NC Flood Risk Information System

Storm Surge

The potential storm surge flooding data from the National Oceanic and Atmospheric Administration (NOAA) was used to identify potential storm surge scenarios within the community. The contractors evaluated storm surge data from Hurricane Florence, which is known to be one of the most devasting storms that impacted the Town of Belhaven in decades. This data was broken down to three scenarios; greater than 9ft, 9-3ft, and less than 3ft to evaluate storm surge vulnerability within a high, medium, and low threshold.

Sources:

- NOAA Hurricane Center and Central Pacific Hurricane Center – National Hurricane Center Data in GIS Formats

Sea level rise

Sea level rise (SLR) data from the National Oceanic and Atmospheric Administration (NOAA) was used to identify and map potential 1ft, 2ft, and 3ft SLR scenarios within the community. By selecting three scenarios we were able to assign each scenario a high, medium, and low threshold to evaluate vulnerability to critical assets.

Sources:

- NOAA Sea Level Rise Data Download

ASSESSING VULNERABILITY

Vulnerability = Exposure + Sensitivity - 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.

To assess vulnerability, contractors developed multiple vulnerability indexes which combined exposure, sensitivity, and adaptive capacity to estimate cumulative vulnerability of critical assets within four categories: Building Infrastructure, Natural Resources, Transportation Infrastructure, and Utility System Infrastructure.

Exposure and sensitivity were objective factors within the vulnerability equation.

For exposure, contractors analyzed direct effects of different coastal hazards (flooding, storm surge and sea level rise) on the community critical assets by categorizing each hazard exposure as high, medium, or low. For example, if a critical asset was exposed to a 1ft sea level rise (SLR) it would fall under the highly vulnerable category, while a 2ft. and 3 ft. SLR would indicate medium and low exposure, respectively.

For sensitivity, contractors analyzed the cumulative effects of the critical assets within each category by assigning a percent threshold or indicating a high/low need for that asset within the community. For example, high sensitivity for building infrastructure indicates that greater than 66% of the community asset building – within a certain subcategory (i.e., police stations) - were affected by the coastal hazard or that a particular building was highly sensitive to the function of the community.

Adaptive capacity was a subjective factor within our assessment that used objective data and community input to evaluate. Factors such as: Social vulnerability, feasibility of relocation, feasibility of retrofit, and possible alternatives were evaluated to give each critical asset an adaptive capacity score. Contractors relied on input from the Community Action Team to evaluate the adaptive capacity of each critical asset.

Asset	Exposure score 0-3	Sensitivity score 0-3	Adaptive Capacity 0-3	Vulnerability Score 0-6
Asset name	*0 = no exposure* *1 = low* *2 = medium* *3 = high*	*0 = no sensitivity* *1 = low* *2 = medium* *3 = high*	*0 = no adaptive capacity* *1 = low* *2 = medium* *3 = high*	*0 - 2 = Low* *3 - 4 = Medium* *5 - 6 = High*

Critical assets were given a score based on the average exposure, sensitivity, and adaptive capacity scores. These scores were then used in the vulnerability equation to calculate cumulative vulnerability. The thresholds for each category are listed below:

Building Infrastructure

- Exposure
  - High: 10-Year Storm Flood / 9+ft Surge / 1ft SLR
  - Medium: 25-Year Storm Flood/ 3-9 ft Surge/ 2ft SLR
  - Low: 50-Year Storm Flood / >3ft Surge / 3ft SLR
- Sensitivity
  - High: >66%+ Facilities affected / Highly sensitive to community operations
  - Medium: 33%-66% Facilities affected / Alternative facilities available
  - Low: <33% Facilities affected / Facility not needed for community operations
- Adaptive Capacity
  - Social vulnerability index
  - Ability to relocate building infrastructure (Ex. From 50yr to 500yr floodplain)
  - The ability to raise structure
  - Accessibility to residents once moved
  - 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
  - High: 10-Year Storm Flood / 9+ft Surge / 1ft SLR
  - Medium: 25-Year Storm Flood / 3-9 ft Surge/ 2ft SLR
  - Low: 50-Year Storm Flood />3ft Surge / 3ft SLR
- Sensitivity (Inundation from SLR with no ability to migrate of 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
  - High: 10-Year Storm Flood / 9+ft Surge / 1ft SLR
  - Medium: 25-Year Storm Flood / 3-9 ft Surge/ 2ft SLR
  - Low: 50-Year Storm Flood / >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
  - Social vulnerability index
  - Ability to relocate transportation infrastructure (Ex. From 50yr to 500yr floodplain)
  - The ability to raise structure (Bridge)
  - Ability to retrofit the infrastructure to be more resilient to flooding

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

- Exposure
  - High: 10-Year Storm Flood / 9+ft Surge / 1ft SLR
  - Medium: 25-Year Storm Flood / 3-9 ft Surge / 2ft SLR
  - Low: 50-Year Storm Flood / >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
  - Social vulnerability index
  - Ability to relocate utility system infrastructure (Ex. From 50yr to 500yr floodplain)
  - The ability to increase capacity
  - Ability to retrofit the infrastructure to be more resilient to flooding

ESTIMATING RISK

Asset Values

Infrastructure assets were valued based on the total tax evaluation (structure and land). This methodology helped alleviate concerns voiced by the Community Action Team related to data used in the evaluation. Hazardous assets were also based on the total tax value of the property which acted as a mitigation proxy value. Transmission easement values were based on the property tax values of which the easement intersected. Natural and Managed areas were valued based on the total tax value of the properties within these areas. Roads and bridges were valued based on their average replacement rates of $5,088,824/mile and $783,480/bridge, respectively. These values are based on the Federal Highway Administration's average replacement cost per mile of roadway and the North Carolina Department of Transportation's (NCDOT) average replacement cost per bridge. Wetlands and streams were valued based on the mitigation rate set by the NC. Division of Mitigation Services at $67,442.06/ac. and $603.87/ft., respectively.

Call to Action

A call to action was determined based on risk value and vulnerability to the critical asset. From the evaluation of the critical action team these assets called for action:

- Belhaven Senior Center
- Pungo Christian Academy
- Town of Belhaven Wastewater Treatment Plant
- Well Systems (#1, #2, #3)
- Roads
- Streams

Sources:

- Beaufort County 2021 tax values (GIS / Land Records | Beaufort County, NC)
- Division of Mitigation Services rate schedule (Current Rate Schedules | North Carolina Department of Environmental Quality)
- Federal Highway Administration
- Improving Replacement Cost Data for NCDOT Highway Bridges (Microsoft Word - FinalReportRP2017-09 (ncdot.gov)

Refer to Appendix C for Risk and Vulnerability Assessment Materials.

PROJECT PORTFOLIO

The assembled project portfolio details 5 shovel-ready priority projects, addressing hazards, type of strategy area and approach, priority rating, potential sources of funding, cost and project duration estimates, and action items. These projects were developed to coincide with the top priority solution that would help make the community more resilient to the hazards identified: sea level rise, storm surge, riverine flooding, tidal flooding, and nuisance flooding. One nature-based or hybrid solution project is eligible to move forward into phase three of the Resilient Coastal Communities Program, Engineering and Design. The Town of Belhaven chose to move forward with "Wynne's Gut Tidal Gates and Flood Attenuation". Below we show the steps taken to assemble the project portfolio that led to the communities and the Community Action Team choosing this project.

Identify a Suite of Potential Solution

The first step to assembling the project portfolio was to identify a suite of potential solutions. The contractors helped the Community Action Team identify 33 potential solutions. The Pamlico Sound Hazard Mitigation Strategies identified an additional 27 potential solutions that could also be carried forward. These solutions were categorized by the 'related asset,' 'strategy area,' and 'strategy approach' and presented to the Community Action Team at the 4th CAT meeting. Each Community Action Team member then identified their top 10 solutions and 14 solutions moved forward to the consolidation and prioritization phase.

Consolidate and Prioritize Projects

The second step in assembling the project portfolio was to consolidate and prioritize the project solutions. The Community Action Team identified 14 solutions from the suite of potential solution that could move forward. The contractor then used the STAPLEE Method and a simple cost/benefit rating system to help consolidate and prioritize all the potential project solutions. The STAPLEE Method takes into consideration the Social, Technical, Administration, Political, Legal, Economic, and Environmental impacts of each project solution. While the cost/benefit rating system used a high/medium/low scoring system to predict benefits and costs of each project solution. Many of the project solutions, identified by the community action team, scored well in both metrics. An additional 5 projects scored well on both metrics and 19 potential priority projects were presented to the community action team during the 5th meeting where the STAPLEE and cost/benefit rating metrics were reviewed and finalized. These projects were then brought to the community for additional feedback. Input from city residents along with the Community Action Team identified 5 priority projects to be presented in the project portfolio.

Priority Projects

- Wynne's Gut Tidal Gates and Flood Attenuation
- Pantego Community Park
- Shoemaker Creek Restoration
- Easement Acquisition Plan combined with Draining Ditch and Tributary Maintenance Plan
- Public Information Plan (PIP)

Refer to Appendix D for the Project Portfolios.