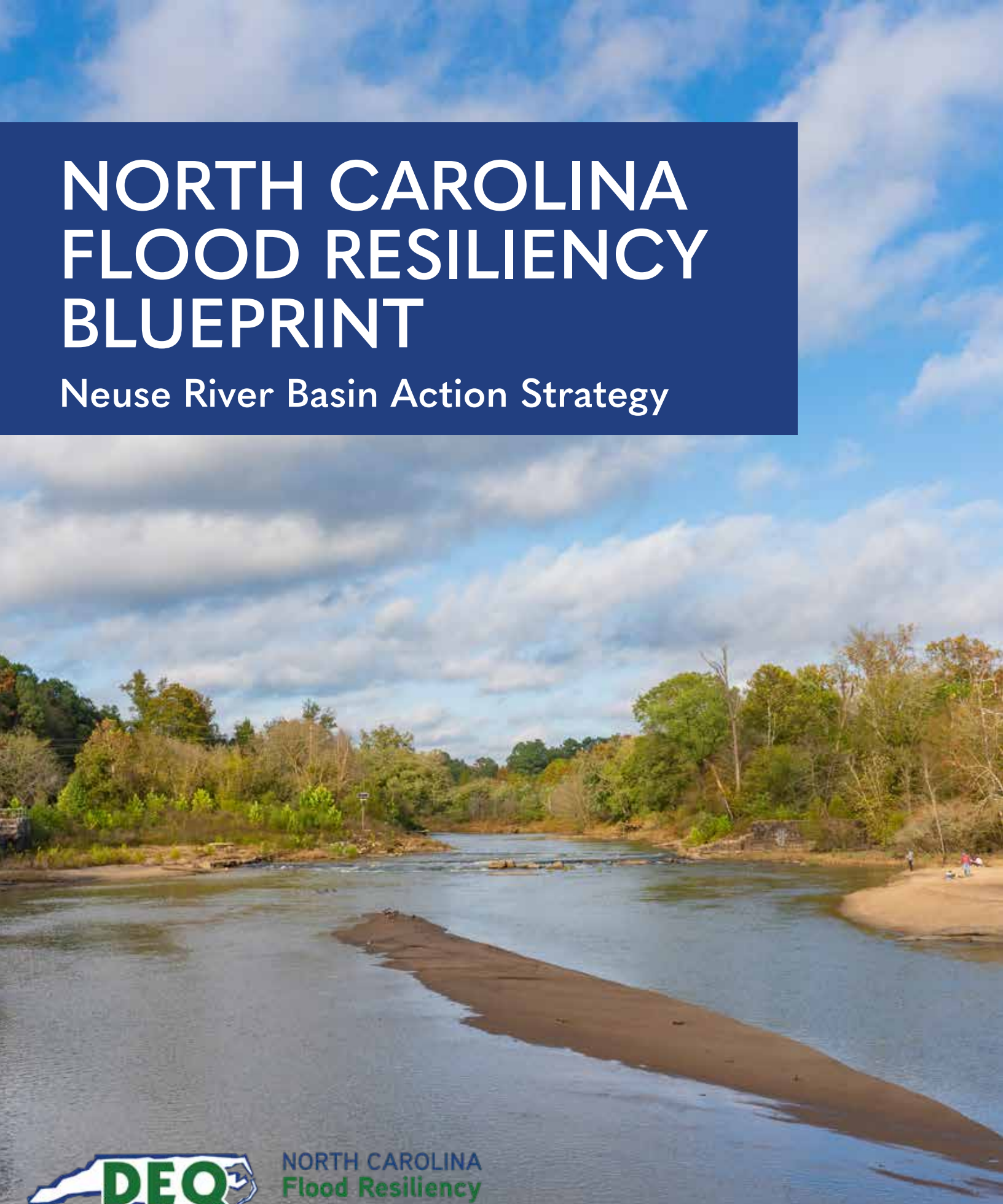
NORTH CAROLINA FLOOD RESILIENCY BLUEPRINT

Neuse River Basin Action Strategy



NORTH CAROLINA
Flood Resiliency
BLUEPRINT

Neuse River by Milburnie Dam Bridge

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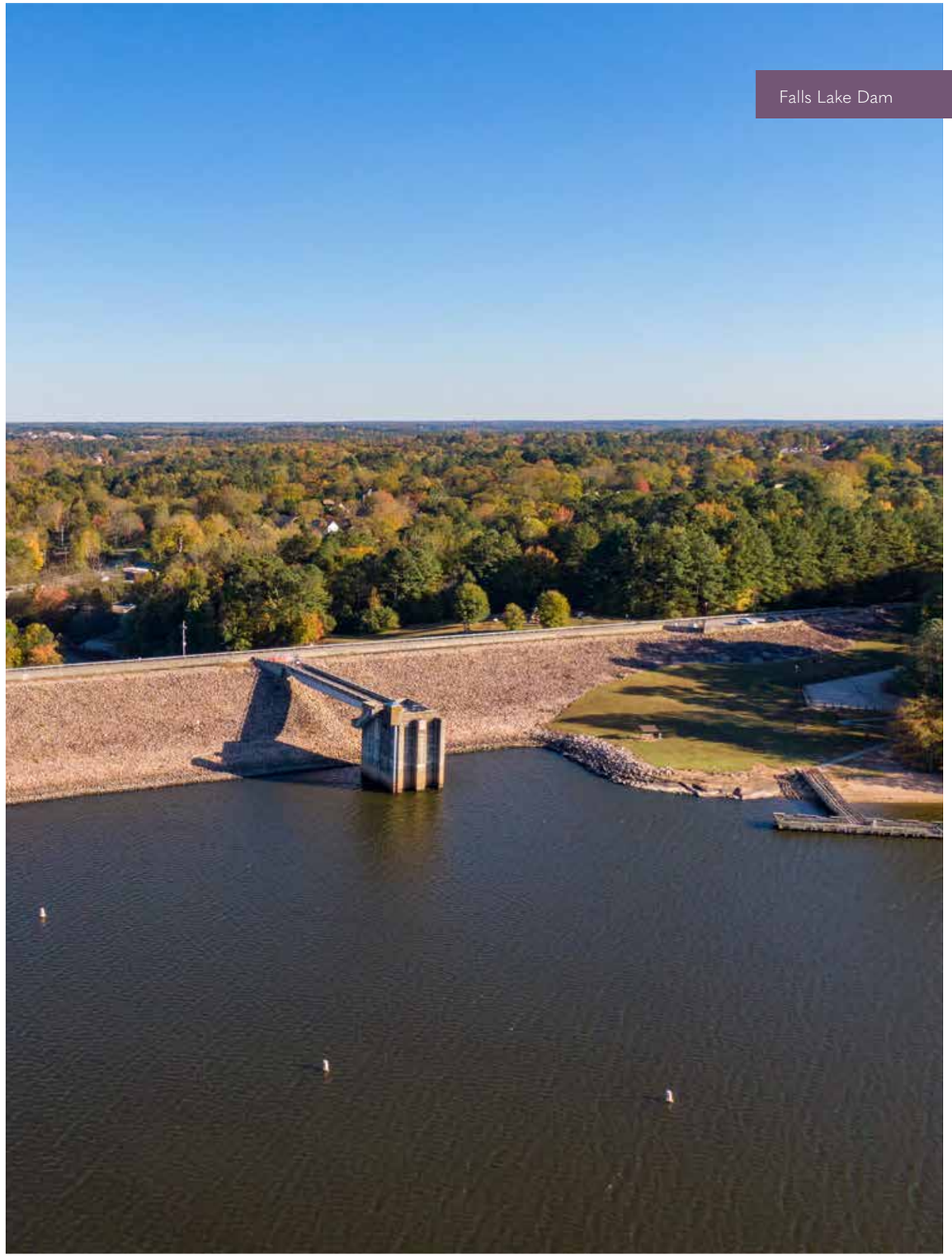
EXECUTIVE SUMMARY

Building on the work of the North Carolina Flood Resiliency Blueprint program and Draft Neuse River Basin Action Strategy (RBAS), the finalized Neuse River Basin Action Strategy (Action Strategy) provides a comprehensive summary of the flood risks and flood resilience needs and priorities across the Neuse River Basin. The Action Strategy serves as a practical roadmap that recommends a suite of flood resilience actions to implement across the river basin to reduce flood risk over time.

The North Carolina Flood Resiliency Blueprint (Blueprint) program is an initiative to strengthen flood resilience planning and implementation across the state. The Blueprint establishes a science-based framework for understanding and addressing flood risks throughout North Carolina, combining statewide guidance with basin-specific planning and engagement. Individual Action Strategies are being developed for a set of prioritized river basins across North Carolina to ensure that resilience planning reflects local needs and priorities, and to consider the specific flood risks that exist in each basin. During Phase I of the Blueprint effort (2022-2024), the Neuse River Basin was selected as the pilot basin to develop an Action Strategy.

The Neuse River Basin is vulnerable to multiple types of flooding and has endured significant impacts from recent catastrophic flood events, making it a suitable basin to pilot the Blueprint program. Over the past two decades, some cities and counties within the Neuse River Basin have experienced rapid population growth while others have faced population decline and reduced financial capacity, highlighting the varied challenges across the basin. The basin also contains important natural resources and assets that help mitigate flooding, and benefits from a wealth of data gained from years of studies and projects. In addition, strong existing stakeholder networks and ongoing collaborative efforts provide a valuable foundation for planning. These combined factors meant that a pilot in the Neuse River Basin had a high potential to implement changes and adapt to flooding.

During Phase II of the Blueprint program (2022-2025), the Flood Resiliency Blueprint Tool (Blueprint Tool) was developed. The Blueprint Tool is an online decision-support tool built to help North Carolina communities assess their flood risk vulnerability and identify, create, and prioritize flood resilience actions. Through the Blueprint Tool, users can identify areas of interest based on various flood risk impacts which can help support long-term flood resilience planning and funding decisions. Phase III (this current phase) focuses on completing the Neuse River Basin Action Strategy and leveraging the Blueprint Tool to further evaluate and prioritize proposed flood resilience actions. The goal of the Neuse River Basin Action Strategy is to advance effective and sustainable flood resilience solutions that will serve both the immediate and long-term needs of Neuse River Basin communities.

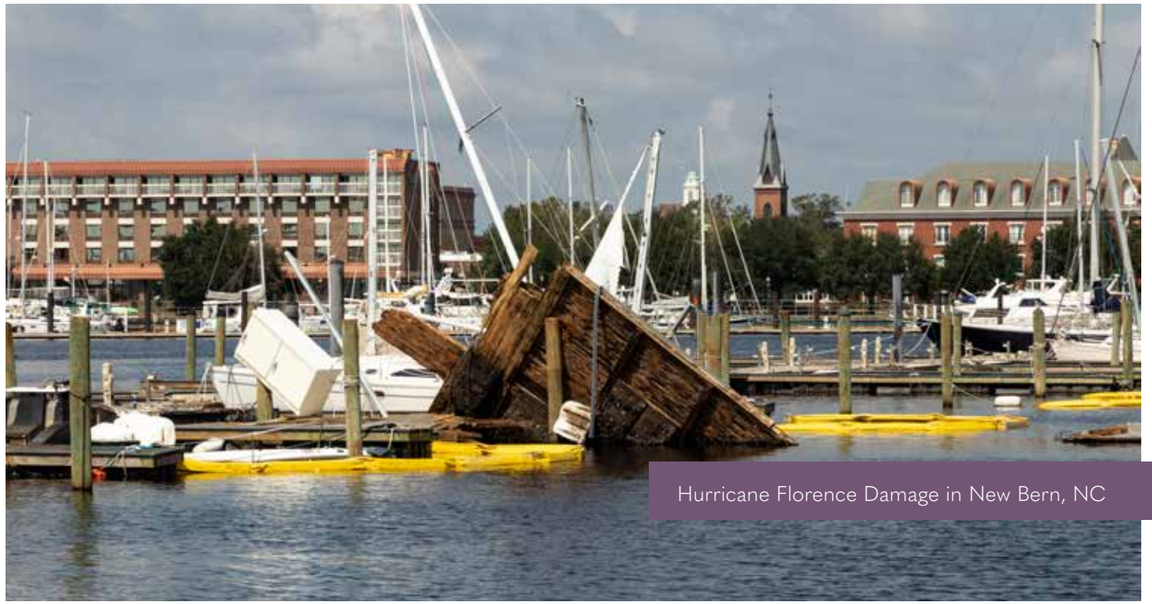


Falls Lake Dam

TERMS & ACRONYMS

AAL	Average annualized loss
AEP	Annual exceedance probability
Action	A flood mitigation or resilience measure that can be implemented by a local government or a set of partners; may be a capital project, policy/planning measure, or other defined effort that reduces flood risk; may be local, regional, or basin-wide and may require coordination across jurisdictions or sectors.
ACS	American Community Survey
Blueprint	North Carolina Flood Resiliency Blueprint program
BO2100	2100 Buildout
BPP	Blueprint Partners
BRIC	Building Resilient Infrastructure and Communities
CDBG DR	Community Development Block Grants Disaster Recovery
CDBG MIT	Community Development Block Grants Mitigation
COG	Council of Government
CPF	Community Project Funding
CWSRF	Clean Water State Revolving Fund
DCM	NCDEQ Division of Coastal Management
DOT	U.S. Department of Transportation
DWR	North Carolina Division of Water Resources
DWSRF	Drinking Water State Revolving Fund
EEG	Environmental Enhancement Grant
EPA	U.S. Environmental Protection Agency
EWP	Emergency Watershed Protection
Featured Actions	Actions that showcase a balanced, illustrative suite of flood resilience solutions across the river basin.
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
GIS	Geographic information system
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HMRRP	Hurricane Matthew Resilient Redevelopment Plan
HUD	U.S. Department of Housing and Urban Development
L-PDM	Legislative Pre-Disaster Mitigation
Locally Prioritized Actions	Actions where local governments know specific actions are needed; inductively collected from direct outreach with local government stakeholders; prioritized and vetted through community engagement and have greater public support.

MCH	Mid-century high
MPO	Metropolitan Planning Organization
NCDA&CS	North Carolina Department of Agriculture and Consumer Services
NCEM	North Carolina Emergency Management
NCGA	North Carolina General Assembly
NCLWF	North Carolina Land & Water Fund
NIFMP	Natural Infrastructure Flood Mitigation Program
NCDEQ	North Carolina Department of Environmental Quality
NCDMS	NCDEQ Division of Mitigation Services
NCDOT	North Carolina Department of Transportation
NFWF	National Fish and Wildlife Service
NGO	Nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
NRCS WFPO	Natural Resources Conservation Service Watershed and Flood Prevention Operations
O&E Plan	Outreach & Engagement Plan
Priority Actions	Actions that met defined standards for flood risk reduction and appropriateness.
PUBG	Potentially underserved block group
RCCP	Resilience Coastal Communities ProgramRedevelopment Plan
RBAG	River Basin Advisory Group Development
RBAS	River Basin Action Strategy
RPO	Rural Planning Organization
SRF	State Revolving Funds
USDA	U.S. Department of Agriculture
WRDG	Water Resources Development Grant ProgramAgriculture and Consumer Services
Vulnerability Assessment Based Actions	Actions compiled through a deductive process reflecting recommended actions to mitigate flood risks identified through the Action Strategy's Vulnerability Assessment results.



Hurricane Florence Damage in New Bern, NC

INTRODUCTION

The Blueprint is a statewide flood planning framework and decision-support tool that enables state, tribal, regional, and local entities and their stakeholders to identify, prioritize, and direct resources to implement effective flood resilience strategies.

OBJECTIVES

Resilience Blueprint Overview

Over the past decade, North Carolina has experienced an increase in major flood events including Hurricanes Matthew (2016), Florence (2018), and Helene (2024). In the last two years alone Hurricanes Helene and Debby, Tropical Storm Chantal, and Potential Tropical Cyclone Eight have had devastating impacts in the mountains, piedmont, and coastal plain. These events have highlighted the need for proactive investments to increase flood resilience.

The Blueprint process utilizes best available data and incorporates future conditions modeling to better understand the long-term risks to each basin and will be a dynamic process to incorporate new information as it becomes available. Overall, the Blueprint will highlight areas where increased resilience is needed and better inform the application of resources to assist with projects and strategies. A successful Blueprint should ultimately lead to a prioritized set of projects and funding strategies that the State can implement.

The Blueprint has three overarching goals:

1. Increase community resilience to flooding
2. Serve as the backbone of State flood planning
3. Reduce the cost and complexity for local governments in the planning and implementation of flood risk reduction projects

The North Carolina Department of Environmental Quality (NCDEQ) was directed by the North Carolina General Assembly to develop a Statewide Flood Resiliency Blueprint (Blueprint) (NC Session Law 2021-180 SB105). Additional funds were also later received through NC Session Law 2022-75 HB911.

To achieve these goals, the Blueprint is being completed in three phases:

1. Develop the Blueprint Process
2. Develop the Blueprint Tool
3. Develop the Individual RBAS

Combined, these phases can be broken down into eight key steps (Figure 1).

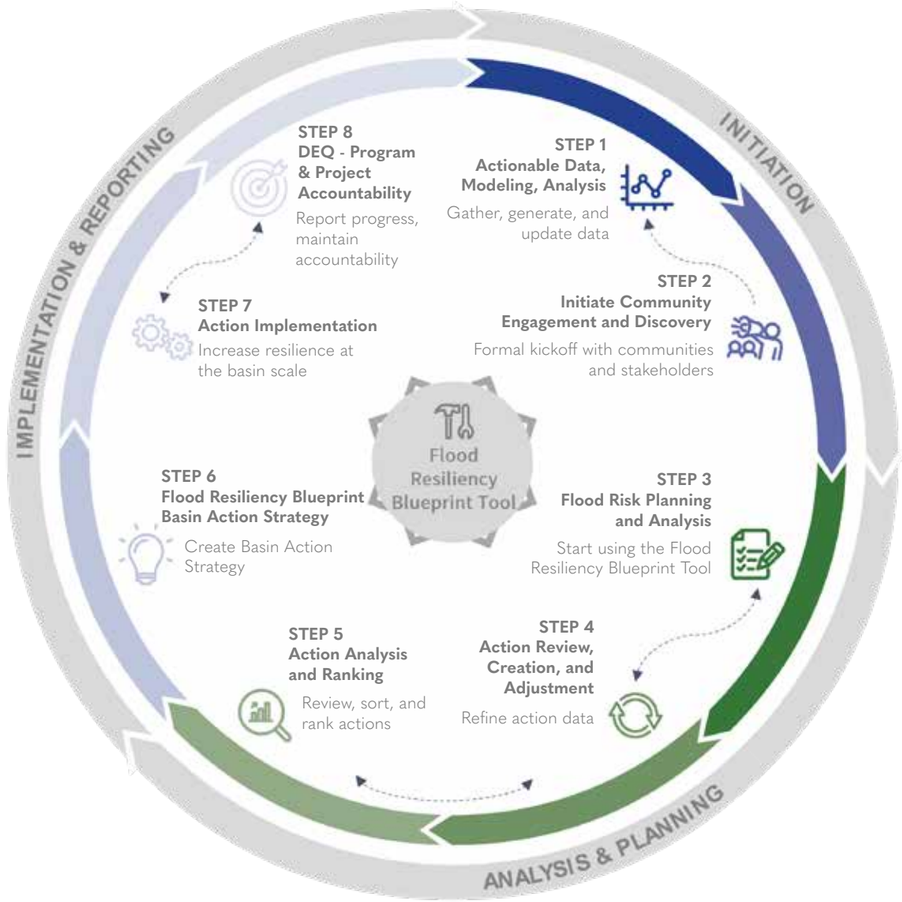


Figure 1. North Carolina Department of Environmental Quality (DEQ) Flood Resiliency Blueprint Tool and Planning Process (NCDEQ, 2024b).

Rationale for River Basin Action Strategies and Context within the Blueprint

The RBAS is a strategic plan specific to an individual river basin developed with the assistance of the Blueprint Process and Tool. The strategy will be informed by community and stakeholder input and will prioritize specific flood resilience actions and potential funding sources.

Objectives of the RBAS

The Blueprint process includes a unified approach to identifying resiliency actions across the state, but each basin has its unique needs. NCDEQ's objective for the RBAS is to identify priority regions and mitigation actions within each basin. Additionally, any data needs or limitations are presented to highlight the growth and continued efforts needed within the basin. Development of an RBAS will utilize the latest detailed flood modeling datasets for both current and future conditions, ensuring that long-term planning is incorporated. Stakeholder engagement is also a large component of the RBAS process to ensure that decisions and recommendations are made in conjunction with local and regional entities and the specific needs of the basin. Overall, the RBAS will result in a list of prioritized actions, providing a starting point to making the basin more resilient to flooding.

Sailboat Stranded by Hurricane Florence in Oriental, NC

BASIN OVERVIEW

About the Basin

Location

The Neuse River Basin is one of the largest river basins in North Carolina. It spans over 6,200 square miles of land and water across 23 North Carolina counties. The Neuse River flows from the headwaters in the Piedmont (Person and Orange Counties), through the coastal plain, and empties into the Pamlico Sound and Atlantic Ocean (Pamlico and Carteret Counties) at one of the widest river mouths in the Americas (North Carolina Office of Environmental Education and Public Affairs, 2018).[1]

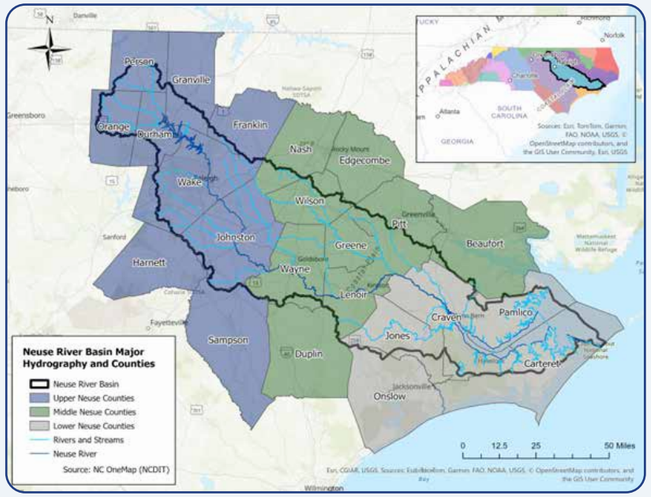
The Neuse River Basin encompasses diverse ecosystems, supports local economies, and serves as a source of water for communities across the basin. The basin has a long history of flooding, and these events have repeatedly affected infrastructure, natural resources, and public safety.

Falls Lake is a major reservoir in the upper Neuse River Basin, spanning portions of Durham, Wake, and Granville counties. The reservoir covers more than 12,400 acres and extends approximately 28 miles along the Neuse River system, making it a significant hydrologic feature within the basin for holding back and releasing water strategically. Studies have shown that USACE operations at Falls Lake have been effective in reducing peak flood stages downstream However, while these operations help mitigate some flooding impacts, the limitations of storage capacity, operational protocols, and the lake's location within the basin mean that significant flood hazards persist for many communities in the Neuse River Basin. Flooding remains a major concern, and ongoing management efforts are needed to address these risks.

For the purposes of developing the Neuse River Basin Action Strategy, both for the vulnerability analysis and in community engagement, the basin was divided into three sub-basins (see map below) — the Upper Neuse, Middle Neuse, and Lower Neuse. This allowed for more detailed analysis and identification of the needs and priorities of the communities within each sub-basin.

Demographics

The Neuse River Basin is home to approximately 2.12 million people. Nearly 75% of the basin population lives in the Upper Neuse around Raleigh, Durham, and Hillsborough. NCDEQ has identified approximately 506,004 people living in potentially underserved block groups (PUBG) within the basin. Twenty-four percent of the residents in the Neuse River Basin are considered potentially underserved, with the Middle Neuse sub-basin having the highest percentage at 39%. For more about PUBGs, see the call out box on the next page.



Neuse Sub-basins

- **Upper Neuse:** Durham, Franklin, Granville, Harnett, Johnston, Orange, Person, Sampson, and Wake Counties
- **Middle Neuse:** Beaufort, Duplin, Edgecombe, Greene, Lenoir, Nash, Pitt, Wayne, and Wilson Counties
- **Lower Neuse:** Carteret, Craven, Jones, Onslow, and Pamlico Counties

Flood Risk

The Neuse River Basin has experienced repeated, high impact flood events, most often associated with hurricanes and tropical systems. The social, environmental, and economic impacts of these events have been experienced by communities across the Neuse River Basin.

Long-term flood risk in the Neuse River Basin is influenced by changes in climate, population, and land use. Flood mitigation strategies developed using historical conditions alone may not fully account for future precipitation patterns, coastal influences, or development trends. Considering historic, current, and future flood conditions can help support more durable and adaptable mitigation investments. For more information on flood risk and vulnerability in the Neuse River Basin, see the *Flood Risk Analysis and Planning* section of this document.

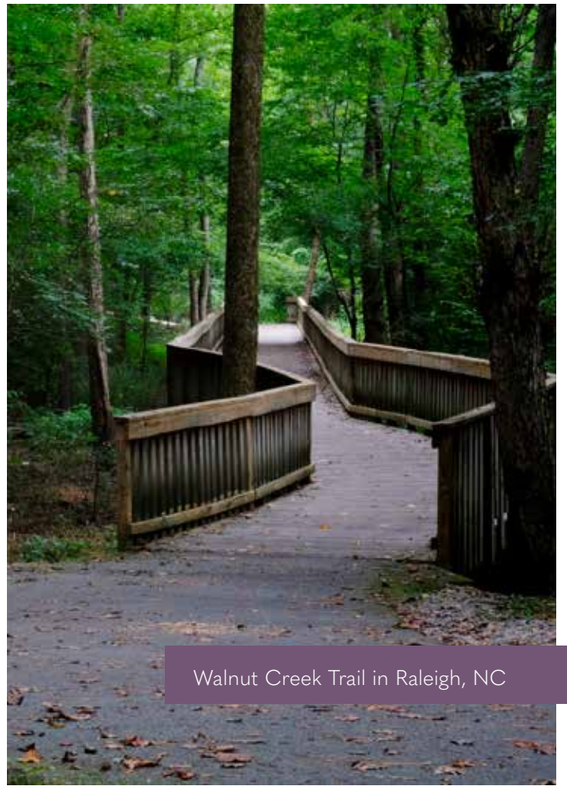
History of Flooding

Over the past several decades, storms such as Hurricanes Fran (1996), Floyd (1999), Matthew (2016), and Florence (2018) caused extensive flooding, loss of life, and significant economic damage across eastern North Carolina, including within the Neuse River Basin. More recent events, including Hurricane Dorian (2019), further demonstrate the basin's continued exposure to flood hazards. Tropical Storm Chantal (2025) brought significant rainfall and flash flooding to North Carolina. The storm caused widespread road closures, water rescues and substantial damage to local infrastructure across Neuse River Basin communities such as Raleigh, Durham and surrounding counties. Flooding associated with Hurricanes Fran and Floyd highlighted limitations in existing floodplain management, hazard mitigation planning, and preparedness efforts. Flooding from Hurricanes Matthew and Florence reinforced the need for approaches that better account for future conditions and changing flood behavior. More recent hurricanes have highlighted the need for continued improvements in forecasting, planning assumptions, and flood resilience strategies (Davis, 2024).

Potentially Underserved Block Groups

A census block group is considered potentially underserved by NCDEQ if the following criteria are met:

- Share of nonwhites and Hispanic or Latino (of any race) is over 50% **OR**
- Share of nonwhites and Hispanic or Latino (of any race) is at least 10% higher than County or State share. **AND**
- Share of population experiencing poverty is over 20% **AND**
- Share of households in poverty is at least 5% higher than the County or State share.



Walnut Creek Trail in Raleigh, NC

[1] North Carolina Office of Environmental Education and Public Affairs. (2018). Neuse River Basin [PDF]. Retrieved from https://www.eenorthcarolina.org/documents/files/neuse-river-basin

Basin Dynamics

Population Shifts

The Neuse River Basin has experienced significant population growth over the past two decades and now represents a large share of North Carolina's total population. Growth has been uneven across the basin, with some counties experiencing rapid expansion and others remaining stable or declining. Population growth and associated development have increased impervious surfaces in parts of the basin, contributing to higher stormwater runoff and altered hydrologic conditions. At the same time, communities with limited growth or population decline may face capacity constraints that affect flood risk management.

Figure 2 shows projected population change across the Neuse Basin between 2024 and 2060. When population shifts, land use and development changes can follow that may impact flood risk.

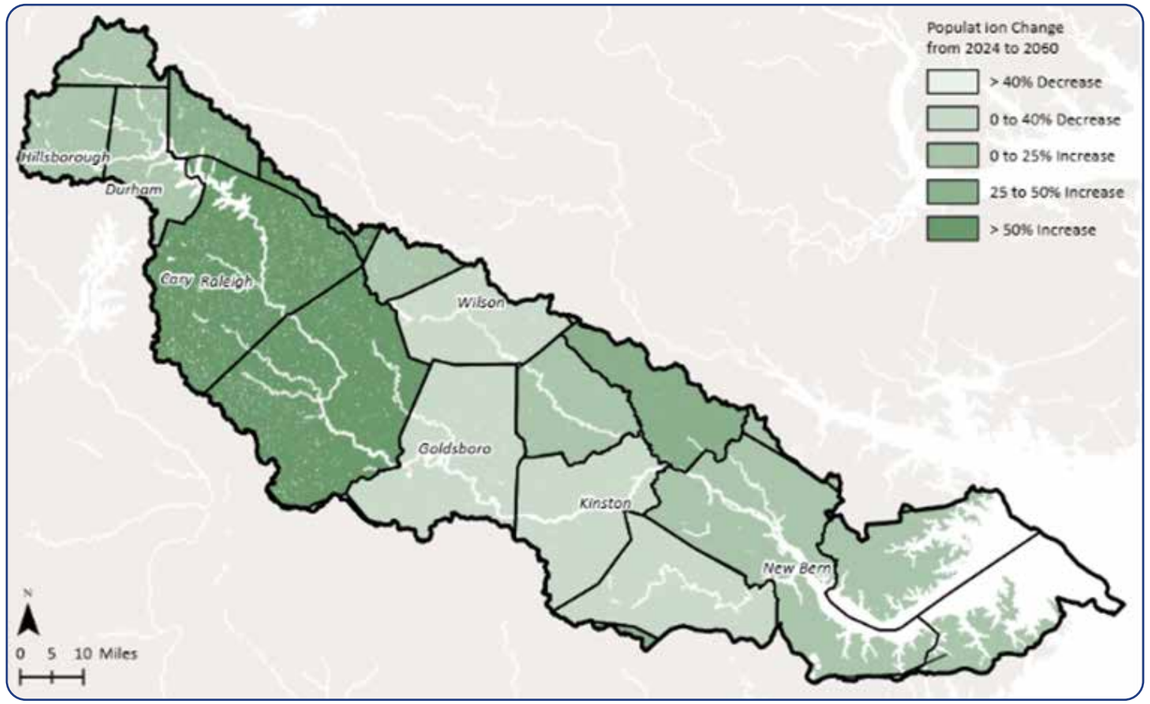


Figure 2: Percent Change in County Population, 2024 to 2060

Umstead State Park in Raleigh, NC

Climate

Climate projections indicate increasing frequency and intensity of heavy rainfall, greater coastal and tidal influences, and higher potential for compound flooding events. These drivers interact with development patterns, infrastructure conditions, and land modifications, increasing flood risk in some areas of the basin.

Smaller, unnamed storm events may also be impacted by climate change, altering local weather patterns and increasing the likelihood of severe conditions and significant impacts. The 2023 North Carolina Enhanced State Hazard Mitigation Plan anticipates increased flood hazards due to climate trends, including more extreme precipitation, storm intensity, sea level rise, and atmospheric moisture. In parts of the Neuse River Basin, these hazards coincide with ongoing population growth and development and have implications for the exposure of people, property, and infrastructure to flooding.

Land Use Changes and Development

Land use changes, combined with expanding flood hazards under mid-century (2050) conditions, lead to increased exposure across all land use types, demonstrating that future flood risk affects developed, agricultural, and natural areas. Wetlands in the Upper Neuse are already roughly 75% inundated under baseline conditions, limiting natural buffering. In the Middle Neuse, cultivated cropland exposure increases by roughly two-thirds. In the Lower Neuse, exposure grows by more than 70% across grassland, herbaceous, forested, and cultivated classes. Taken together, these patterns indicate that potential flood impacts may extend across residential development, economic assets, and natural systems under future conditions. Changes in land use and land cover can also impact flooding by altering surface runoff, soil permeability, water storage capacity, and the availability of natural flood mitigation features. More specifically, the increase in impervious surfaces associated with population growth can prevent water from infiltrating the soil and lead to increased surface runoff during rainfall events. These factors have collectively influenced the frequency, intensity, and spatial distribution of flooding events within the Neuse River Basin.

RIVER BASIN ACTION STRATEGY DEVELOPMENT PROCESS

The Neuse River Basin Action Strategy was developed through a multi-step process. First, existing plans, data, and programs in the Neuse River Basin were reviewed to capture previous and current flood resilience efforts in the basin. A flood risk vulnerability assessment was then conducted to produce a comprehensive understanding of current and potential future flood risk across the basin. Stakeholders and the public were engaged throughout the Action Strategy development process to gather key insight and perspectives on flood resilience needs and community priorities. These assessments and engagement efforts informed the identification, refinement, and prioritization of flood resilience actions intended to reduce flood risk across the basin, as well as potential funding sources to support implementation.

ACTIONABLE DATA, MODELING, & ANALYSIS

Inventory of Existing Data, Programs, & Studies

Historical and ongoing flood hazard challenges in the Neuse River Basin have resulted in an array of resilience efforts and investments at the state and local level. A review of existing data, programs, and studies produced a comprehensive inventory of up-to-date and credible flood resilience efforts with resources covering basin-wide or smaller geographic scopes (for state scale resources, refer to the Draft Neuse River Basin Action Strategy). Resources included in this review include local and regional plans and strategies, technical reports and memos, research projects, and studies, as well as programs or initiatives.

The inclusion criteria for resources within this literature review and data inventory were developed following review of pilot resources and are listed below.

- **Basin-wide or smaller geographic scope:** The geographic scope for the literature review was Neuse River Basin-wide or a smaller scale within the basin. The basin-wide geographic area spans all or part of 23 counties and 73 municipalities.
- **Credible and vetted:** Resources have state or agency support and/or have been reviewed by subject matter experts.
- **Up-to-date, latest version:** Generally, state resources were published in 2019 or later, in response to Governor Roy Cooper's 2018 Executive Order 80. For resources updated annually, the latest version was reviewed.

The resource inventory is compiled in the Appendix X: Data Collection, Modeling, and Analysis Update. The following table summarizes the number of items in each document or data inventory type.

Table 1. Count of Neuse River Basin Document/Data Inventory Resources

Plans	33
(16) Hurricane Matthew Resilient Redevelopment Plan (HMRRP)	
(6) Regional Resilience Portfolio Program	
(7) Regional Hazard Mitigation Plans (HMP)	
New Bern Resiliency and Hazard Mitigation Plan	
Raleigh 2030 Comprehensive Plan Update	
Raleigh Community Climate Action Plan Implementation Report	
2023 Community Health Assessment Durham	
Research Programs	6
Flood Resilience and NC Water and Wastewater Utilities	
Financial Risk of Flood Events in Eastern North Carolina	
Flood Abatement Assessment for Neuse River Basin	
Improving North Carolina's Resilience to Coastal Riverine Flooding	
Supporting Environmental Justice in Connected Coastal Communities Through a Regional Approach to Collaborative Community Science	
Sunny Day Flooding Project	
Programs	4
Resilient Coastal Communities Program	
Natural Infrastructure Flood Mitigation Program	
North Carolina Floodplain Mapping Program	
Central Pines Regional Council Water Resources Program	
Technical Reports and Memos	2
Neuse River Basin Flood Analysis and Mitigation Strategies Study	
Neuse River Basin Flood Risk Management, North Carolina Technical Report	
Data Sets	132
(62) Hazards and Engineering Datasets	
(11) Foundational Datasets	
(22) Natural Environment Datasets	
(15) Built Environment	
(10) Demographic Datasets	
(12) Mitigation Support Datasets	

Plans and Strategies

Primary plan and strategy types with Neuse River Basin relevant flood resiliency efforts include Hurricane Matthew Resilient Redevelopment Plans (HMRRP), Regional Resilience Portfolios, and Hazard Mitigation Plans (HMP). Some local municipal plans, such as the Raleigh 2030 Comprehensive Plan Update, were included in the literature review as well.

Research Projects

Taking an inventory of university and research institutions in the Neuse River Basin, four major research projects were identified within the Neuse River Basin. The Flood Resilience and NC Water and Wastewater Utilities study evaluates flood vulnerability and resilience of water and wastewater utilities by comparing infrastructure locations to floodplains and assessing flood impacts across multiple North Carolina river basins, including the Neuse. The Financial Risk of Flood Events in Eastern North Carolina study examines how flood-related financial risk from Hurricane Florence is distributed among property owners, local governments, mortgage lenders, and the federal government across the Neuse River Basin. The Flood Abatement Assessment for Neuse River Basin study assesses sources and drivers of riverine flooding in the Middle and Upper Neuse River Basin and evaluates transportation, infrastructure, and policy-based flood mitigation and early warning strategies. The Improving North Carolina's Resilience to Coastal Riverine Flooding study evaluates the potential of natural infrastructure measures to reduce riverine flooding in the Middle Neuse River Basin through hydrologic, economic, and landowner feasibility analyses.

Programs

Four state and local programs were identified within the Neuse River Basin. NCDEQ Division of Coastal Management (DCM) administers the Resilience Coastal Communities Program (RCCP) providing technical and financial assistance to coastal resilience efforts. NCDEQ Division of Mitigation Services (NCDMS) was authorized by the NC General Assembly to incorporate flood storage capacity enhancement under the Natural Infrastructure Flood Mitigation Program (NIFMP). Several projects within the Neuse River Basin are underway under both programs. The North Carolina Flood Mapping Program and Central Pines Regional Council Water Resources Program also provide or develop projects within the basin.

Data Sets

Data sets inventoried for the Neuse River Basin Action Strategy are classified in six distinct groups: Hazards and Engineering, Foundational, Natural Environmental, Built Environment, Demographic, and Mitigation Support Datasets. The data is sourced from different federal, state, and local agencies and is used to support modeling and action development.

Raleigh, NC Trash and Brush Piled Under Neuse River Bridge

Local & Regional Capacity

A Local and Regional Government Capacity Assessment (Appendix X) was completed as part of the Neuse River Basin Action Strategy development process to supplement capacity scores provided in the Blueprint Tool in support of communities involved with the Blueprint. The assessment establishes a baseline of relative capacity to plan, fund, and deliver flood resilience actions across the Neuse River Basin jurisdictions and helps to illustrate the differences in need across communities.

Assessment methods included a desktop review of publicly available information that can serve as indicators of capacity and a digital survey of jurisdictions. Data was drawn from municipal and county websites (budgets, staffing/department information, adopted plans), regional planning council and Councils of Government (COG) websites, state-level databases (including the NC Office of State Budget and Management), and U.S. Census Bureau American Community Survey (ACS) data. The review also looked for information within supplemental documents such as ordinance libraries, meeting minutes, press releases, local news, GIS/open data portals, and budget documents.

The capacity assessment was conducted basin-wide for jurisdictions within the Neuse River Basin. Each jurisdiction received scores for three assessment domains—administrative, technical, and financial capacity—and a composite score (average of the three domains; range 0–5). Where information was missing or could not be interpreted, the relevant indicator was scored as zero, which may understate capacity in some cases.

Capacity Assessment Domains

Administrative capacity (people and structure): whether a jurisdiction has staff and departments to manage projects (e.g., Public Works, Planning, Engineering, Emergency Management, GIS) and access shared expertise through COG participation.

Example of variance within Administrative domain: staffing in key departments ranges from large jurisdictions such as Wake County (450) to smaller municipalities such as Bridgeton (12).

Technical capacity (plans and rules): whether key plans and ordinances are in place (e.g., hazard mitigation planning, flood damage prevention ordinance, comprehensive plan, capital improvement plan, stormwater management planning) to develop, evaluate, and prioritize actions.
Example of variance within Technical domain: New Bern was found to have all five plan/ordinance types, while some smaller towns have only one or two.

Financial capacity (funding to implement): whether dedicated funding mechanisms exist (e.g., stormwater utility and rates, stormwater/CIP budgets, stormwater revenue reporting, general fund scale) to design, build, operate, and maintain actions over time.

Example of variance within Financial domain: Durham reports $25 million in FY25 stormwater fee revenue (with a published $4.75/ERU monthly fee), compared to smaller reported stormwater fee revenues such as Pine Level ($68,000) where a stormwater fee is listed.

Each domain was defined based upon an understanding of key factors that influence whether a jurisdiction can move flood resilience actions from concept to implementation and which vary across the basin. They are intended as a practical lens for interpreting the results and for identifying where additional coordination, technical assistance, or implementation support may be needed.

Capacity varies widely across the Neuse River Basin, which affects the pace and feasibility of implementing flood resilience actions. Higher-capacity cities and counties are generally positioned to take on actions that require sustained program management, engineering/ design, procurement, and long-term operations and maintenance. In contrast, many small towns have limited stormwater staffing, fewer planning tools, and less access to dedicated local funding, and therefore may depend on county services or regional partners for support. These conditions can make implementation more challenging without added coordination and support.

The Upper Neuse contains a concentration of higher-capacity jurisdictions. The Middle Neuse is more mixed, with counties and larger municipalities generally scoring higher than many smaller towns. The Lower Neuse shows the greatest spread in capacity, including a divide between larger cities and small rural towns. Across sub-basins, missing technical and financial information is most common among the smallest jurisdictions, indicating where follow-up and targeted assistance may be warranted. Through the Blueprint Program, the state can continue to work with communities across the Neuse River Basin to discuss local needs, address gaps identified through this and other assessments, and support jurisdictions as they refine, pursue, and implement flood resilience actions.

COMMUNITY ENGAGEMENT & DISCOVERY

Engagement with Local Communities & Agencies

People and places in the Neuse River Basin are best protected when communities understand flood risks, can share ideas about how flood risks can be reduced, and can actively participate in resilience planning through using the Blueprint Tool. To create a comprehensive and community-informed Action Strategy, an Outreach and Engagement Plan (Appendix X) was developed. The Outreach and Engagement Plan (O&E Plan) established a framework for connecting with local and regional governments and organizations that play a direct role in flood resilience planning through the Neuse River Basin. The elements of the O&E Plan ensured that stakeholders were supported in understanding and accessing the Blueprint Tool, submitting local flood resilience actions, and providing feedback through various stages of development of the Action Strategy. In this way, the O&E Plan helped support the Blueprint program's mission: Provide local governments, the state, and partners with the data, tools, and processes to guide investments that minimize the cost and disruption of future flooding.

Building on the valuable information gathered during these engagement efforts, the Neuse River Basin Action Strategy reflects the flood resilience needs of communities across the river basin. The development of the Action Strategy is aimed at providing actionable approaches to protecting the tens of thousands of people with current and future flood risk exposure across the basin.

River Basin Action Stakeholders

Three primary groups were engaged throughout the development of the Action Strategy: the River Basin Advisory Group (RBAG), the Blueprint Partners (BPPs), and the public. These three groups are comprised of subject matter experts on flooding, local and regional government staff with flood related responsibilities, and members of the public who are impacted by flooding. Each group provided critical perspective and input into the Action Strategy development process and will be discussed in more detail on the following pages.

RBAG Meeting

Blueprint Partners

The Neuse BPPs consist of community leaders, technical staff from local, regional, and federal entities, and any organizations who can assist local governments in creating flood resilience actions. BPPs provided critical information on the flood resilience priorities and needs for communities throughout the Neuse River Basin, primarily through the submission of flood resilience actions in the Blueprint Tool (later referred to as locally prioritized actions). Various parts of the basin (sub-basins) experience different flood impacts, risks, and vulnerabilities. To capture these differences, and to facilitate context-specific stakeholder engagement with BPPs across the Neuse River Basin, the basin was sectioned into three sub-basins: Upper Neuse, Middle Neuse, and Lower Neuse (see page 12 for details). This division made participation more accessible for stakeholders across the river basin and focused discussions on sub-basin-specific flood resilience challenges and priorities

Blueprint Tool Trainings

Throughout the development of the Action Strategy, virtual Blueprint Tool trainings were offered to Blueprint Partners. These training sessions included live demonstrations of the Blueprint Tool's modules, including step-by-step instructions of how to create a flood resilience action. One-on-one technical assistance meetings were also offered and held with various BPPs to support local action plan development.

Utilizing the Neuse RBAS Vulnerability Assessment (Appendix X) and Local and Regional Government Capacity Assessment (Appendix X) results, 17 under-resourced communities were also identified throughout the basin to conduct additional engagement with to support utilization of the Blueprint Tool. These communities contained high flood risk areas in their jurisdictions and scored lower in the Capacity Assessment, therefore benefitting from additional engagement to support Blueprint program involvement.

Neuse BPP Meetings Summary

Three meetings were held for each sub-basin BPP group over the course of Action Strategy development: January 2026, March 2026, and May 2026.

The first set of meetings (January 2026) focused on providing an overview of the Action Strategy development process and collecting BPP feedback on the list of pre-identified flood resilience actions. There is already critical work happening to identify and implement flood resilience actions. These pre-identified flood resilience actions were collected from published local and regional planning documents, such as regional Hazard Mitigation Plans. This feedback was used to finalize the pre-identified actions list uploaded into the Blueprint Tool, where BPPs can utilize this information as a starting point for developing their local action plans.

During the second set of meetings (March 2026), BPPs reviewed initial findings from the Neuse vulnerability assessment to ask questions and provide feedback on. Additionally, BPPs received a tutorial on the Blueprint Tool, and meeting time was devoted to hands-on assistance for the Blueprint Tool. BPPs were supported in using the Blueprint Tool to submit local action plans for the Neuse River Basin.

The third and final set of meetings (May 2026) focused on reviewing and collecting feedback from BPPs on the draft Action Strategy. As a part of this review, BPPs were encouraged to provide feedback on the draft list of priority actions included in the draft Action Strategy to ensure that the actions encompassed the needs of their communities.

Upper Neuse Blueprint Partner Meeting

Neuse River Basin Advisory Group

The Neuse RBAG is composed of subject matter experts from state agencies, local and regional governments, non-governmental organizations, academic institutions, and technical fields. The RBAG provided specialized knowledge and experience throughout Action Strategy development milestones; bringing to bear research on flooding impacts, best practices for flood resilience actions, and creative problem-solving for the most challenging flooding problems. RBAG members also helped guide the evaluation of the priority actions included in the Action Strategy, ensuring that these actions are practical, effective, and responsive to the needs and priorities of the Neuse River Basin communities.

Principal and Technical Advisory Group

The Blueprint program continues to be supported by principal and technical advisory groups made up of representatives from federal and state government agencies, Councils of Government, private industry partners, and nongovernmental organizations. These groups provided overarching programmatic and technical guidance on all the North Carolina River Basin Action Strategies currently under development to ensure consistency and dedication to the Blueprint program's mission.

Neuse RBAG Meetings Summary

The Neuse RBAG met four times over the course of Action Strategy development: December 2025, February 2026, April 2026, and June 2026. The first meeting (December 2025) focused gathering input from RBAG members on the planned Action Strategy development process. The second meeting (February 2026) consisted of reviewing the community capacity analysis and gaps analysis results and assessing the outcomes from the first set of Neuse Blueprint Partner meetings. During the third meeting (April 2026), RBAG members reviewed outcomes from the second set of Blueprint Partner meetings, the vulnerability assessment results, the initial action plan submissions from Blueprint Partners, and provided feedback on the draft flood resilience action evaluation methodology. The final meeting (June 2026) focused on gathering further input from RBAG members on the draft Action Strategy.

Middle Neuse Blueprint Partner Meeting

Engagement with the General Public

The people and stewards of places most impacted by flooding and future flood risks were a critical piece of the outreach and engagement effort. Residents, businesses, and organizations from across the Neuse River Basin were invited to attend public meetings during Action Strategy development. The Action Strategy was designed to ensure that all voices, including those from vulnerable, underserved, and under-resourced communities, were heard and considered in the planning process. Engagement with the public helped inform the completion of the Action Strategy, as well as support community understanding of DEQ's flood resilience efforts.

Engagement with Under-Resourced Communities

Utilizing the Neuse RBAS Vulnerability Assessment (Appendix X) and Local and Regional Government Capacity Assessment (Appendix X) results, 17 under-resourced communities were also identified throughout the basin to conduct additional engagement with to support utilization of the Blueprint Tool. These communities contained high flood risk areas in their jurisdictions and scored lower in the Capacity Assessment, therefore benefitting from additional engagement to support Blueprint program involvement.

Public Meetings Summary

Two public meetings were held during the development of the Action Strategy: March 2026 and June 2026. The first meeting (March 2026) provided a general overview of the North Carolina Flood Resiliency Blueprint program, the Blueprint Tool, and the purpose of the River Basin Action Strategies currently being developed throughout North Carolina. The presentation also covered how the Action Strategy will be implemented, and what the next steps of the Blueprint program will consist of. The second meeting (June 2026) provided an overview of the draft Action Strategy and encouraged participants to ask questions and provide feedback. Written feedback was also collected by the public on the draft Action Strategy.

Sunrise Over the Neuse River

FLOOD RISK PLANNING & ANALYSIS

Flood risk planning in the Neuse River Basin considers where flooding occurs and the extent to which people, buildings, and systems are exposed under both current and future conditions. For this Action Strategy, a basin-wide Vulnerability Assessment (Appendix X: Flood Risk and Vulnerability Analysis Report) was conducted to provide a data-driven view of how flood hazards, development patterns, and assets interact and influence flooding impacts across the Upper, Middle, and Lower Neuse sub-basins.

The assessment considered both flood risk and flood vulnerability across the basin. Flood risk focuses on the magnitude and distribution of exposure, including people, structures, assets, and more, associated with a 1% Annual Exceedance Probability (AEP) flood event and how outcomes are expected to change over time. Flood vulnerability reflects how that exposure translates into impacts on people, housing, infrastructure, and essential services. While flood risk describes where flooding occurs and what is exposed, vulnerability helps characterize where flooding is more likely to disrupt daily life, damage critical systems, and affect populations that may face greater challenges preparing for, responding to, and recovering from flood events. Across the basin, vulnerability varies based on development patterns, infrastructure concentration, and the distribution of potentially underserved population block groups (PUBGs). Assessing vulnerability as part of this Action Strategy helps support and inform targeted flood resilience actions across the Neuse River Basin.

Flood Risk

Flood risk in the Neuse River Basin is shaped by multiple flood sources that vary across the basin and, in some cases, combine to produce compound flooding. Riverine flooding remains a dominant hazard, though flood hazards are changing over time as flood extents expand under future conditions, heavier rainfall increases runoff, continued development adds impervious cover, and coastal influences intensify flooding in downstream communities.

Across the basin, flood behavior reflects differences in topography, land use, and other location and vulnerability-based characteristics (for more information on geographic influences on flood risk see Appendix X. Flood Risk and Vulnerability Report). While there is considerable variation in flooding hazards and impacts across the basin, there are some themes that are helpful in characterizing risk and vulnerability in different community contexts.

In the more urbanized and rapidly developing metropolitan areas (including Raleigh, Durham, and surrounding communities), flood risk is also influenced by urban stormwater and flash flooding. In those areas, concentrations of cement and other types of impervious cover can overwhelm drainage systems and increase localized flooding. In the flatter inland and coastal plain portions of the basin, broader floodplains and slower drainage contribute to longer inundation durations and slower recovery. This kind of disruption from flooding can particularly affect agricultural lands, as well as transportation corridors and access to population centers.

Closer to the estuary and Pamlico Sound, flood hazards are shaped not only by riverine flow but also by tidal processes, storm surge, elevated base water levels, and backwater effects, creating compound flooding conditions in communities such as New Bern and in other low-lying coastal areas.

Historic events illustrate how various flood sources have affected different parts of the Neuse River Basin. Hurricanes Fran (1996) and Floyd (1999) produced severe riverine flooding that affected both upstream and downstream communities and inspired discussions about floodplain management and preparedness practices. More recent storms, including Hurricanes Matthew (2016) and Florence (2018), demonstrated the basin's vulnerability to long-duration inland flooding, roadway disruption, and prolonged impacts to homes, infrastructure, and essential services. Hurricane Dorian (2019) further highlighted the importance of coastal and tidal flooding in the lower basin, while more recent intense rainfall events in the Research Triangle's cities have illustrated the potential impacts of urban stormwater and flash flooding.

These flood sources may occur independently or concurrently and can affect human safety, residential and commercial structures, transportation systems, utilities, critical facilities, and natural systems. Understanding the different sources and locations of flooding across the Neuse River Basin provides important context for the current and future flood risk results presented in the following pages.

Flooding at Historic Yates Mill County Park

Current Conditions - Risk

Under current conditions, approximately 21% of the Neuse River Basin's land area is exposed to flooding under a 1% AEP event (see Figure 3 for percent by county). Over 205,000 residents, comprising 9.6% of the basin-wide population, are exposed to flooding under those same existing conditions.

The basin's diverse landscapes are exposed to flooding at varying levels. Currently, wetland areas are the most exposed to flooding, with exposure rates of 58.1% for emergent herbaceous wetlands and 57.4% for woody wetlands. While the wetland areas are more exposed to flooding relative to most land cover types, they also play an important role in moderating flood impacts by providing infiltration, storage, and flow-attenuation functions that can reduce flood depths and slow runoff under certain conditions.

In the Upper Neuse sub-basin, approximately 127,000 residents are exposed during a 1% AEP event. The notably higher concentration of population and development in the Upper Neuse sub-basin leads to the greatest level of population and asset exposure and, as a result, the highest absolute costs of associated damages under current conditions.

The Middle Neuse sub-basin encompasses two distinct geographies which have an influence on the area's flood risk. The Piedmont region makes up a small portion of the sub-basin and is characterized by its varied forests and river and stream ecosystems, featuring steeper gradients and more narrowly confined channels. This region transitions into the larger Coastal Plain region, which continues to the coast and is characterized by low relief and slower moving rivers and streams. In the Middle Neuse, approximately 50,000 residents are exposed during a 1% AEP event under current conditions.

Under current conditions, flooding in the Lower Neuse sub-basin is widespread and persistent due to its low-lying geography. It experiences flooding influenced by both riverine and coastal processes, including more frequent, but lower magnitude high-tide flooding events. Approximately 28,800 residents are exposed during a 1% AEP event under current conditions. Although this is the smallest exposed population in absolute terms among the three sub-basins, the Lower Neuse has the highest relative population exposure, meaning a larger share of its residents are affected by flooding than in any other part of the basin.

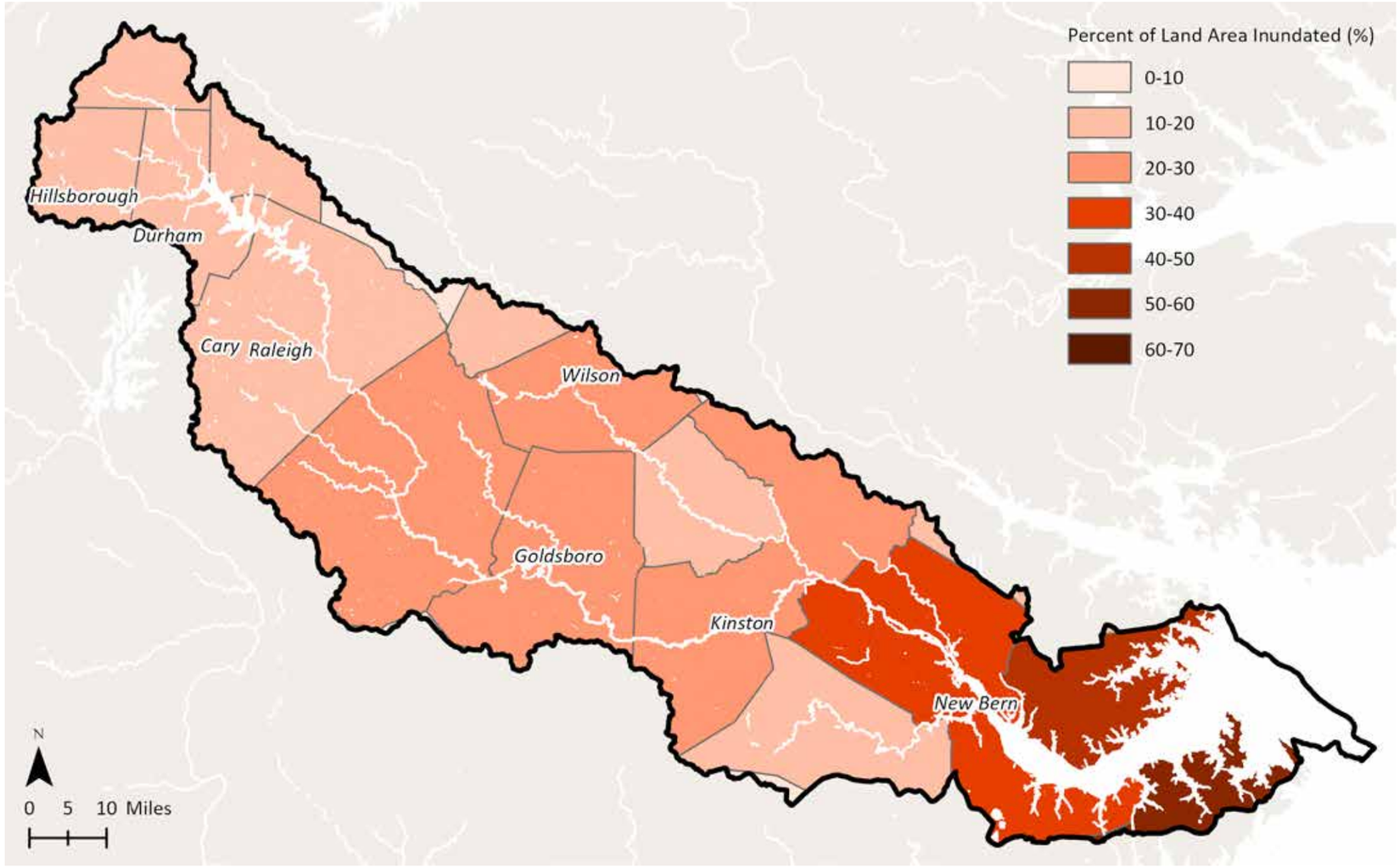


Figure 3. Percent Land Area Inundation for 1% AEP Flood Event under current conditions.

Falls of Neuse Road Crossing in Raleigh, NC

Future Conditions - Risk

Under future conditions at mid-century, flood exposure increases across the Neuse River Basin and for all sub-basins. The percentage of land exposed to flooding in the basin is expected to reach approximately 26%, or a 5% increase, by mid-century. A similar increase is expected for population exposure with the percentage increasing from 9% to 13% of the basin-wide population, resulting in more than 276,000 residents expected to be exposed to flooding by 2060. The most exposed land type categories remain unchanged from present day conditions, increasing by more than 5% over time.

In the Upper Neuse sub-basin, land and population exposure and damages increase significantly relative to current conditions and result in the exposure of approximately 157,000 residents to flooding under a 1% AEP event at mid-century. Figure 4 shows population changes by mid-century. Exposure increases are also seen in the Middle Neuse sub-basin, where they are largely driven by expanding floodplains across multiple counties. Approximately 22.8% of land area and nearly 80,000 of sub-basin residents are projected to be exposed to flooding by mid-century. In fact, all nine counties in the Middle Neuse sub-basin are expected to see exposure increases greater than 50% by mid-century.

In the Lower Neuse sub-basin, future flood exposure remains widespread with wide-reaching impacts across the sub-basin's geography. All five counties in the Lower Neuse sub-basin are projected to have greater exposure by mid-century, resulting in projected exposure for approximately 40% of land area and over 39,000 residents in the sub-basin.

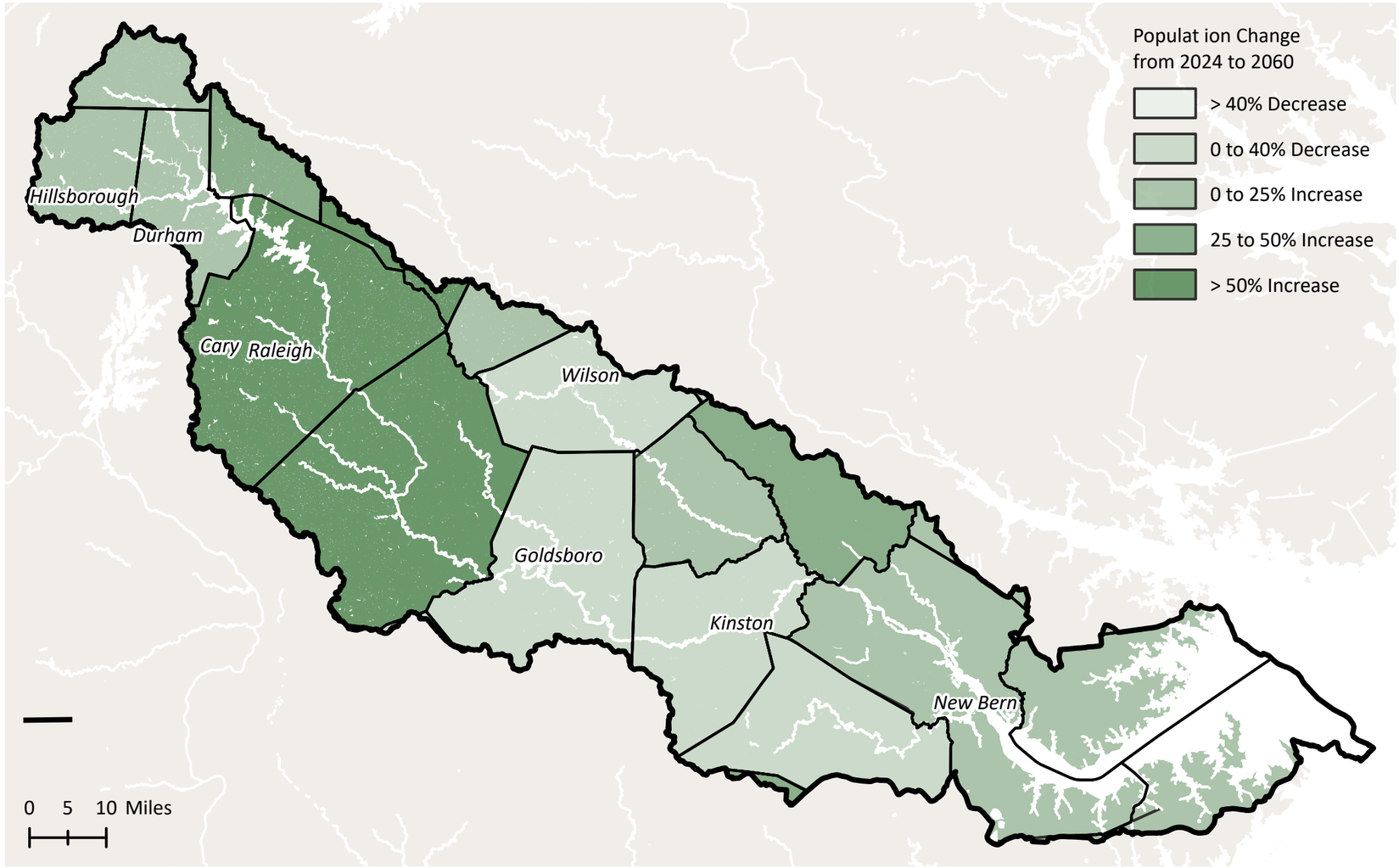


Figure 4. Projected Population Change by 2060.

Minnesott Beach, NC

Flood Vulnerability Analysis

Current Conditions - Vulnerability

Under current conditions, flood vulnerability across the Neuse River Basin reflects the distribution of exposed populations, residential development, critical facilities, and transportation networks. As with flood risk, vulnerability is not uniform across the basin and is influenced by differences in settlement patterns, infrastructure systems, and the presence of potentially underserved communities (which are present and exposed in all three sub-basins under current conditions).

In several parts of the basin, flood exposure coincides with repeated roadway inundation and the exposure of critical facilities, increasing the potential for service disruption and reduced access during flood events. In portions of the Upper and Middle Neuse, roadway exposure is already widespread, while in the Lower Neuse, vulnerability is compounded by the interaction of riverine and coastal flooding processes. Water and transportation infrastructure consistently emerge as facility types with notable exposure under current conditions, indicating that flood impacts can extend beyond direct building damages to affect broader community function and mobility.

Residential structures comprise the largest share of exposed and repeatedly exposed buildings basin-wide and remain the dominant contributor to exposure and damages under current conditions. Approximately 10% to 24% of residents living in PUBGs in the Upper and Lower Neuse are exposed during a current 1% AEP event. Figure 5 shows the sub-basin average annualized loss (AAL). Within the Lower Neuse, AAL across all buildings is approximately nine times higher from coastal flooding than from riverine flooding, underscoring the significance of coastal influences on flood impacts in downstream communities. By comparison, the average riverine AAL in the Upper Neuse is approximately twice as high reflecting a different, but still substantial, pattern of vulnerability.

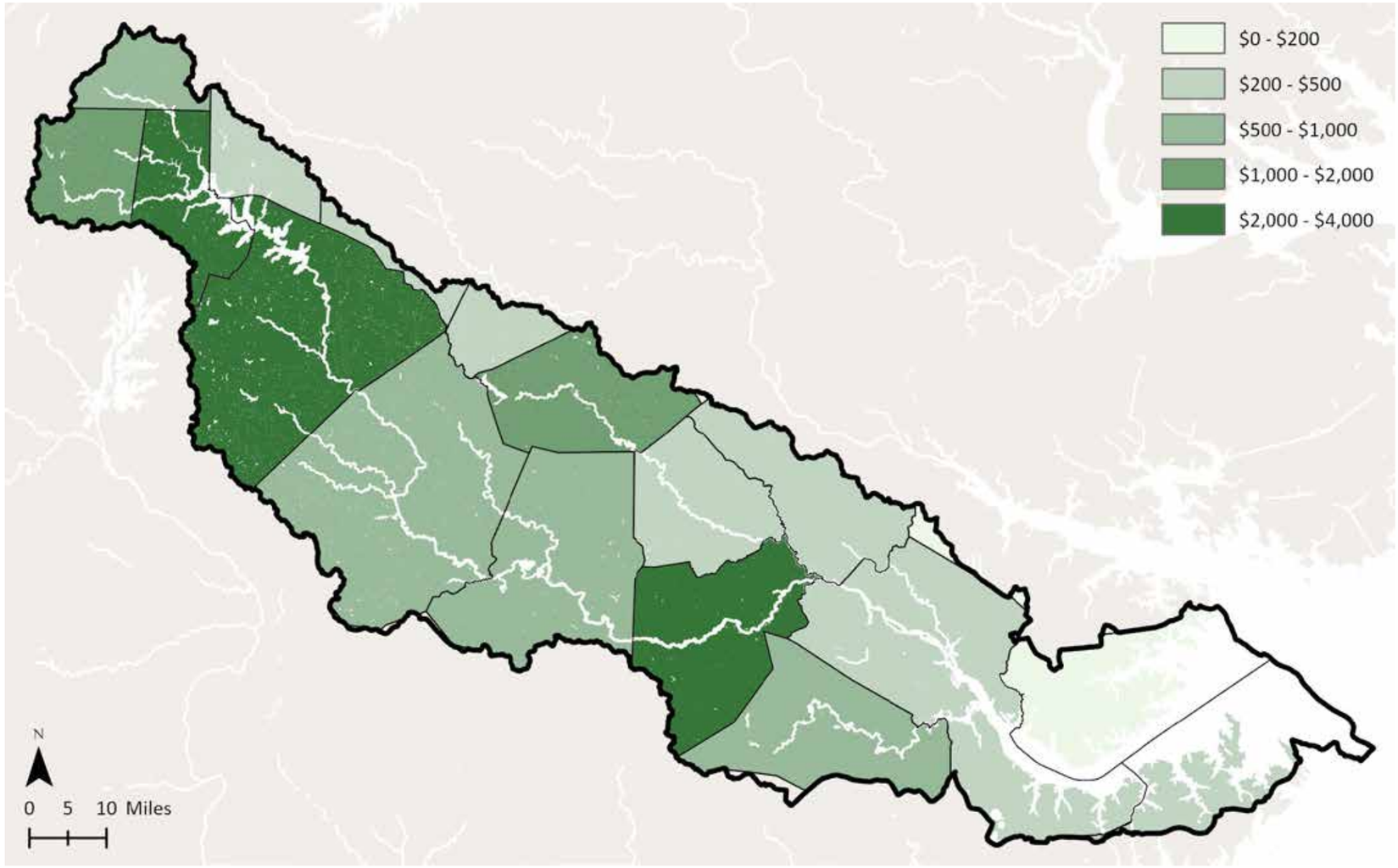


Figure 5. Average Annual Loss (AAL) for structures under current conditions.

Future Conditions - Vulnerability

Under future conditions at mid-century, flood vulnerability increases across the Neuse River Basin as flood exposure expands and affects a greater share of populations, residential structures, critical facilities, and infrastructure systems. Flood depths under future conditions are shown in Figure 6. Broader exposure may also indicate greater potential for disruption to housing, mobility, utility service, and access to essential community functions.

Residential exposure also rises as flood extents expand, and the exposure of critical facilities (e.g., water and energy utilities, healthcare and emergency service assets) increases across the basin. In the Middle Neuse, counties are projected to experience some of the largest proportional increases in vulnerable population and residential exposure. In the Lower Neuse, the share of residents exposed to flooding increases for the total population. Exposure for residents in PUBGs increases from approximately one-quarter under current conditions to more than one-third by mid-century.

Flooded land area across the sub-basin increases from approximately 36% to 44%, with portions of Carteret and Pamlico Counties exceeding 60% inundation under future conditions by mid-century. Damages in the Lower Neuse also increase substantially, from approximately $159 million under current conditions to about $358 million by mid-century. In the Upper Neuse, residential exposure increases to more than 6,500 homes, and total damages increase from approximately $590 million under current conditions to more than $1 billion by mid-century. The Vulnerability Assessment illustrates that vulnerability will likely intensify across the basin, with growing implications for residents regarding community services, infrastructure reliability, and long-term resilience.

Implications for the Neuse River Basin Action Strategy

The vulnerability assessment shows that flood risk is increasing across the Neuse River Basin, with future conditions affecting more people, homes, and essential systems across the basin. These findings inform the Neuse River Basin Action Strategy by identifying where different types of flood resilience actions are most needed and why a mix of approaches is appropriate. Results from the Neuse River Basin Flood Risk and Vulnerability Analysis (Appendix X) were used to identify regional resilience actions, referred to throughout the remainder of the report as vulnerability assessment based actions, which should be considered alongside actions developed by Neuse River Basin communities.

The analysis supports action selections that address different flood risk conditions across the basin, including concentrated population and asset exposure, growing infrastructure and access vulnerability, widespread and persistent flooding in low-lying areas, and repeated disruptions to roads and service corridors.

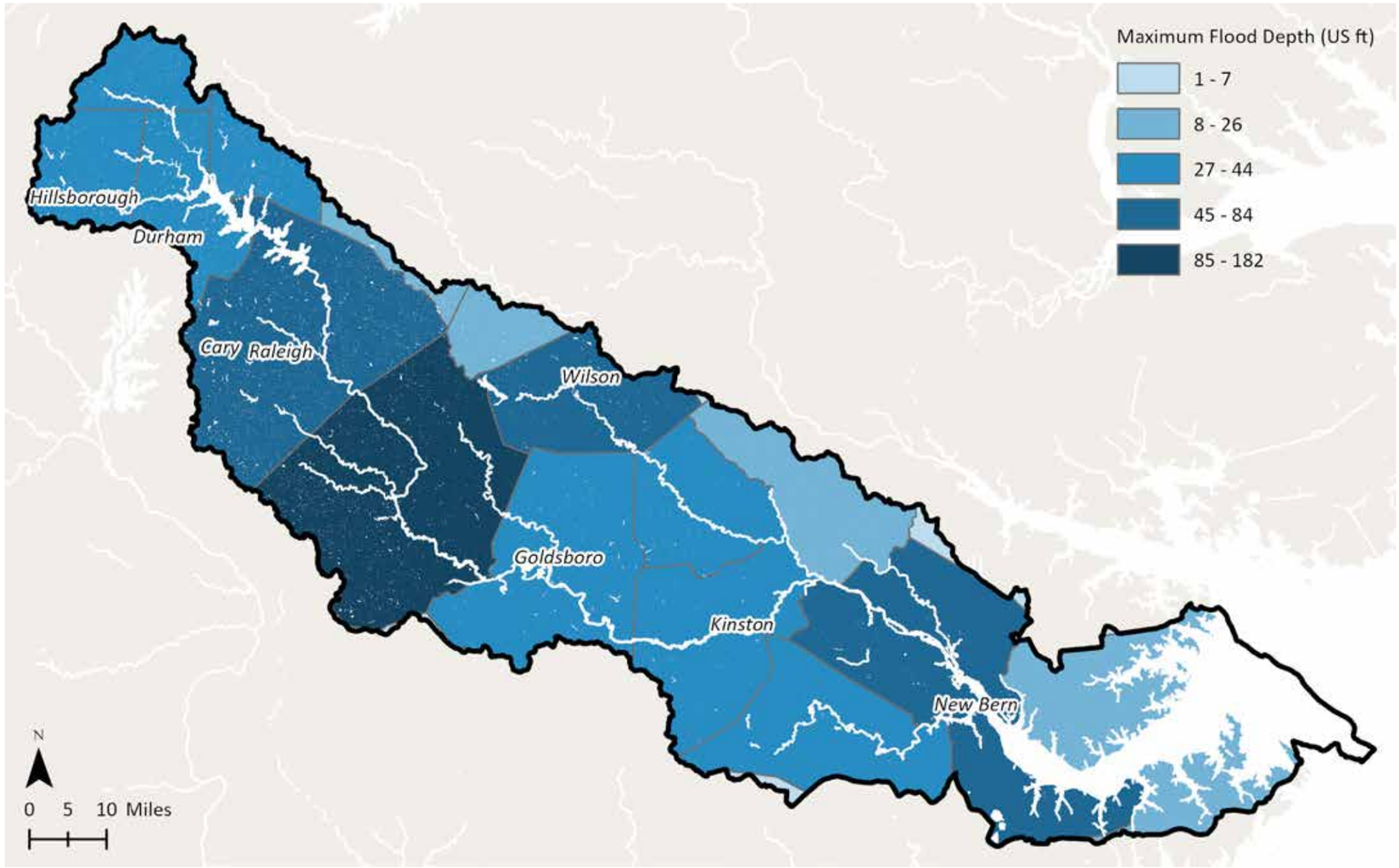


Figure 6. Maximum Flood Depths for a 1% AEP Flood Event under future conditions by mid-century.

ACTION REVIEW, CREATION, ADJUSTMENT, AND SELECTION

This Neuse River Basin Action Strategy translates flood vulnerability analyses and stakeholder engagement outputs into a set of flood resilience actions that can be advanced at the local, regional, or basin-wide scale through planning, design, funding, and construction. Local flood resilience action concepts from around the basin were compiled with the help of BPPs and combined with new action concepts developed in response to the Vulnerability Assessment results. This Action Strategy documents a refined and prioritized action set, summarizes the evaluation of actions against metrics to identify featured actions, and highlights key funding, capacity, and technical assistance needs to help move actions toward implementation.

The actions recommended in this Action Strategy were identified through two primary approaches: an inductive approach (locally prioritized actions) and a deductive approach (vulnerability assessment based actions). The action inventory (Appendix X) includes the full set of locally prioritized actions and vulnerability assessment based actions.

Neuse River Banks

Locally Prioritized Actions

Locally Prioritized Actions reflect actions where local governments know that specific actions are needed. These actions were inductively collected from direct outreach to local government stakeholders. These actions have already been prioritized and vetted through community engagement processes and thus have greater public support.

- Projects with existing support
- May include partial funding
- May be more developed in concept
- Respond to a known flood risk

Vulnerability Assessment Based Actions

Vulnerability Assessment Based Actions were compiled through a deductive process – they reflect recommended Actions to mitigate flood risks identified through the Action Strategy's Vulnerability Assessment results.

- Projects with potentially larger scale impacts
- Projects that may address future vulnerability (as opposed to experienced flooding)
- Projects not currently covered under the Locally Prioritized Actions

Prioritization Process

The evaluation framework developed for this Action Strategy (Appendix X) used a multi-step process to pare down the action inventory from the initial full list of actions that were compiled to a set of priority actions (Appendix X) and featured actions. The framework's application allows for the inclusion of both locally prioritized and vulnerability assessment based actions; creating a list of interventions, that if funded, would address the needs and contexts of different areas, draw from local support, and promote basin-wide flood resilience.

1 Action concepts were screened against baseline inclusion criteria for impact potential and appropriateness. Actions originated from local jurisdictional plans (locally prioritized actions) or were clearly grounded in the basin vulnerability assessment (vulnerability assessment based actions). Actions that are reasonably expected to reduce flood risk for the area and not induce or exacerbate flooding in surrounding area are deemed Priority Actions (see Appendix X. Priority Action list).

2 Priority Actions were then scored across three metrics: local buy-in, feasibility and capacity, and potential impact and benefit. These scores differentiated actions based on their local support, technical readiness, and the magnitude of flood resilience benefits, including cost effectiveness (see call out box). The framework recognized that different places have unique needs and that actions were in various stages of development.

3 Finally, Featured Actions were selected from among the Priority Actions. Featured Actions were not selected in isolation, but rather as part of a suite of Actions that showcase a balanced mix of flood resilience solutions across the river basin. Considerations included diversity of flooding types addressed and the mix of action types, geography, jurisdictions, and stages of action development represented.

APPENDIX X: Priority Action List *- Each Priority Action includes information on the action type, description, location, sub-basin, and whether it is a Locally Prioritized Action or a Vulnerability Assessment Based Action.*

Evaluating Cost Effectiveness for Flood Resilience Actions

When creating a flood resilience action in the Blueprint Tool, the tool generates an estimated cost for the proposed action, as well as an estimated cost effectiveness ratio. The ratio is calculated based on dividing the estimated cost benefit if the action were implemented by the estimated cost of the action. Local governments and partners can use this information as a starting point for resilience planning but should consult the applicable technical experts for exact development costs for each flood resilience action.

REVIEW OF FUNDING SOURCES

North Carolina communities face growing challenges from flooding, aging infrastructure, rapid development, and extreme weather. To address these risks, a wide ecosystem of federal, state, regional, and private funding sources exists—but navigating this landscape is complex. The Funding Sources Writeup provides a comprehensive catalog of the programs available to support resilient infrastructure, watershed restoration, nature-based solutions, disaster recovery, stormwater improvements, and long-range community planning.

This summary synthesizes the full document into three pages, highlighting the major categories of funding, core features of key programs, and strategic considerations for project selection, eligibility, and implementation. It is intended to support staff, local governments, and partners in identifying viable funding pathways and aligning resilience needs with the strongest opportunities.

Federal Funding Landscape

Federal agencies administer a wide range of programs that support flood mitigation, disaster recovery, transportation resilience, water/wastewater infrastructure, land conservation, and ecosystem restoration. Many of these programs are competitive, require detailed benefit cost analysis, and operate on recurring annual cycles or disaster specific funding streams.

FEMA Programs

FEMA funds are among the most significant sources for hazard mitigation and flood resilience:

25%

Across all FEMA programs, eligible applicants in North Carolina include local governments, tribes, and state agencies. Projects generally require a 25% local match unless the community qualifies for disadvantaged or severe repetitive loss adjustments.

- **Building Resilient Infrastructure and Communities (BRIC)**
  provides competitive funding for mitigation projects, with strong emphasis on shovel-ready infrastructure protection solutions, improved codes and code enforcement and long-term resilience in the face of changing conditions.
- **Flood Mitigation Assistance (FMA)**
  supports repetitive loss and severe repetitive loss properties through elevation, acquisition, and floodproofing, floodplain restoration, and flood mitigation planning.
- **Hazard Mitigation Grant Program (HMGP)**
  is available after major disasters and supports a wide range of projects such as buyouts, structural mitigation, and infrastructure retrofits.

HUD Community Development Block Grants

HUD administers **CDBG Disaster Recovery (CDBG DR)** and **CDBG Mitigation (CDBG MIT)** programs following major disasters. These funds support:

Housing Reconstruction | **Long-term Recovery** | **Mitigation** | **Infrastructure Upgrades** | **Planning**

States manage allocation plans that define eligible activities and target low and moderate income communities.

USDA Programs

The U.S. Department of Agriculture supports agriculture focused and rural community water infrastructure:

- NRCS Watershed and Flood Prevention Operations (WFPO)
- Emergency Watershed Protection (EWP)
- Rural Development Water & Waste Disposal Loans and Grants

These programs fund watershed improvements, streambank restoration, emergency stabilization, and water/sewer infrastructure in rural communities.

EPA and Water Infrastructure Programs

EPA's major programs include:

- Clean Water State Revolving Fund (CWSRF)
- Drinking Water State Revolving Fund (DWSRF)
- WIFIA Loans for large scale water infrastructure

These sources offer low interest loans and forgivable principal for eligible communities.

Department of Transportation (DOT) Resilience Programs

DOT's resilience programs—including **PROTECT, RAISE,** and other discretionary grants—support projects that improve resilience of transportation systems, culverts, roadways, and multimodal networks.

Congressional Spending

Legislative Pre-Disaster Mitigation (L-PDM) and Community Project Funding (CPF) are Congressionally directed spending programs that can be used to mitigate against flooding. These funds are accessed directly through the local Congressional representative.

NOAA and Interior Programs

Environmental agencies support conservation, floodplain restoration, and nature based solutions. NOAA's funding for habitat restoration and coastal resilience and the U.S. Fish & Wildlife Service's programs for wetlands, rivers, and wildlife corridors offer opportunities for ecosystem based flood mitigation.

State of North Carolina Funding Programs

North Carolina has one of the most diverse state-level funding environments for water, land, flood, and resilience-related projects. Many state sources provide match flexibility, technical assistance, or planning support not available from federal programs.

North Carolina Land & Water Fund (NCLWF)

NCLWF supports land acquisition, stream and floodplain restoration, innovative stormwater management, and planning for water quality and flood resilience. Programs include:

- Acquisition Grants for riparian buffers, wetlands, and floodplain conservation
- Restoration Grants for streams, wetlands, and natural infrastructure
- Innovative Stormwater Projects
- Planning Grants for long-range watershed and restoration strategies

NC Division of Water Resources (DWR)

DWR administers several programs including:

- Water Resources Development Grant Program (WRDG)
- State cost share support for flood mitigation and water-based recreation
- Planning assistance for hydrologic and watershed studies

These programs support construction and planning for flood reduction projects, stormwater controls, and water supply solutions.

State Revolving Funds (SRF)

North Carolina administers CWSRF and DWSRF with added benefits for disadvantaged communities. Funds include loan forgiveness, match assistance, and priority scoring for resilience and green infrastructure.

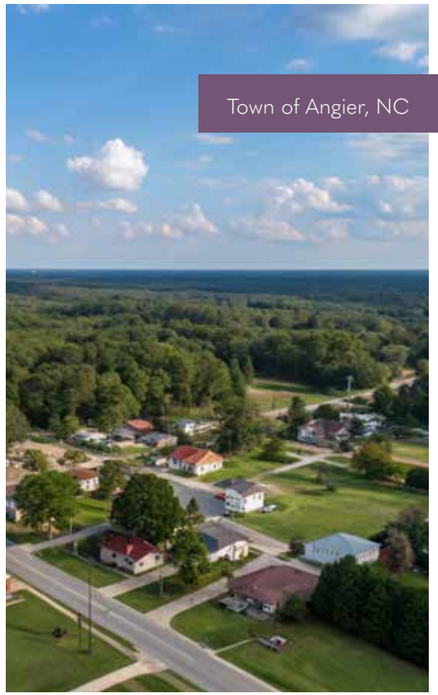
Coastal and Environmental Programs

For coastal communities, the state offers:

- Coastal Storm Damage Mitigation Fund
- Resilient Coastal Communities Program (RCCP)
- CAMA grants for shoreline, planning, and hazard mitigation

Other programs, such as the Environmental Enhancement Grant (EEG) and agricultural conservation programs, support habitat restoration, water quality enhancements, and preservation of natural lands.

North Carolina has one of the most diverse state level funding environments for water, land, flood, and resilience related projects.



Town of Angier, NC

Blueprint Project Implementation Funding

The North Carolina Flood Resiliency Blueprint represents one of the largest state investments in long term flood mitigation planning. Funded initially with $96 million and now operating with $76 million, the Blueprint aims to:

- Develop basin specific strategies for major river systems
- Identify priority flood mitigation projects
- Guide implementation of high value, multi-benefit projects
- Support interagency coordination and unified resilience planning

Blueprint implementation funds are designed to move high priority projects from concept to construction, particularly where solutions reduce community flood risks, restore natural systems, and provide durable watershed benefits. As strategies are finalized for each basin, these funds will act as a state-level catalyst for projects that align with Blueprint priorities.

Legislative Appropriations from the NC General Assembly

The North Carolina General Assembly (NCGA) can allocate funding for resilience and infrastructure through:

- Biennial state budgets
- Supplemental appropriations bills
- Local, regional, or project specific earmarks

Recent budgets have included substantial statewide investments in water, sewer, and stormwater infrastructure, as well as direct allocations to counties, municipalities, and utilities. Legislative appropriations are often strategic tools for addressing urgent needs or advancing major projects that do not fit traditional grant programs.

Local governments can work with legislators to elevate priority projects for potential inclusion in budget cycles, especially when projects align with statewide resilience, infrastructure, and economic development objectives.

Local, Regional, and Nonprofit Funding Sources

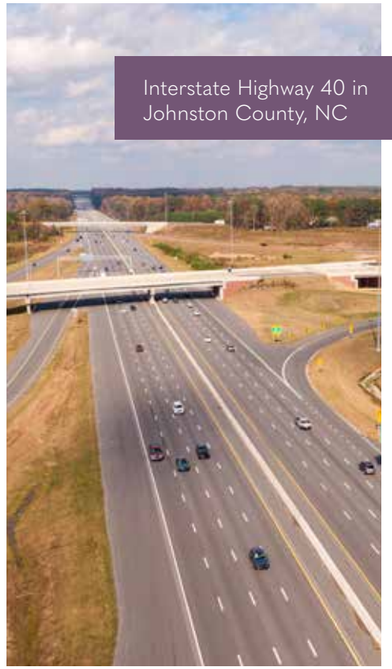
Local governments, regional planning organizations, and nonprofit partners provide essential complementary resources that can fill match requirements, support early-stage planning, or implement smaller scale resilience solutions.

Local and Utility Funding

Local sources include:

These funds can be used as match for federal or state programs or to advance preliminary engineering.

- **General funds**
- **Stormwater utility fees**
- **Water & sewer enterprise funds**
- **Local capital improvement plans (CIPs)**



Interstate Highway 40 in Johnston County, NC

Regional Transportation Planning Funds

Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) can incorporate resilience components into transportation improvement programs, often unlocking federal dollars for culverts, bridges, greenways, and road related stormwater improvements.

Nongovernmental Organizations (NGOs) and Philanthropy

Nonprofit organizations can serve as applicants, co applicants, match partners, land stewards, or technical supporters. Key partners include:

- North Carolina Community Foundation
- National Fish & Wildlife Foundation (NFWF)
- The Nature Conservancy
- Conservation Trust for NC
- Local land trusts and conservation groups

These partners often bring additional capacity, volunteer support, specialized expertise, and access to philanthropic funding streams.

Strategic Considerations for Project Success

The document highlights several cross cutting considerations:

Eligibility and Governance

Eligibility differs across programs:

- Some require the applicant to be a unit of local government
- Others accept nonprofit organizations or special districts
- Utility authorities may be eligible for water infrastructure funds
- FEMA programs require state sponsorship and hazard mitigation planning compliance

Understanding institutional eligibility early in project development is critical.

Matching, Cost Share, and Funding Stacking

Most major programs require local match contributions, typically ranging from 0% to 25%, though disadvantaged community provisions may reduce this requirement. Many projects are financed through braided funding, combining:

- Federal grants
- State grants or loans
- Local funds
- Philanthropic contributions

Planning and Readiness

Competitive programs prioritize:

- Strong benefit cost analysis
- Permitting readiness
- Engineering feasibility
- Multi benefit outcomes (e.g., water quality + flood reduction + recreation)
- Community engagement and social impact outcomes

Nature-Based Solutions

Many programs strongly encourage or explicitly prioritize nature based approaches such as:

- Floodplain reconnection
- Wetland restoration
- Stream restoration and buffer enhancement
- Green stormwater infrastructure

These solutions typically score well in competitive evaluations and provide durable long term benefits.

Conclusion

North Carolina has access to one of the most diverse and strategically aligned funding environments for flood mitigation, watershed restoration, and resilience in the United States. The programs cataloged in the Funding Sources Writeup provide a broad spectrum of opportunities for planning, engineering, land conservation, stormwater improvements, resilient infrastructure, and long-term community capacity building.

Aligning local project needs with the right funding source—while leveraging multi-agency partnerships and taking full advantage of the Flood Resiliency Blueprint—positions communities to make transformative progress in reducing flood risks and improving watershed health.

NEUSE RIVER BASIN ACTION STRATEGY

This Action Strategy provides essential context for understanding Priority and Featured Actions for building flood resilience across the Neuse River Basin. By considering a wide variety of action types, this Action Strategy aims to identify appropriate and effective solutions for different flooding hazards experienced across the basin, now and into the future.

Neuse River Greenway in Raleigh, NC

WHAT IS AN ACTION?

An action is a flood mitigation or resilience measure that can be implemented by a local government or a set of partners. Actions may be capital projects, policy and planning measures, or other defined efforts that reduce risk of flooding. Actions may be local, regional, or basin-wide in scale, and may require coordination across jurisdictions or sectors.

Actions fall into five main categories: Building Level Mitigation, Channel Modification, Infrastructure & Control Structures, Nature Based Solutions, Policy & Planning, and others. Below, the action categories and action types are described. The range of action types and categories included in the current inventory reflects the set of actions most appropriate for the Neuse River Basin, based on today's best practices and region-specific needs. However, it is important to recognize that some action types, and potentially categories, may not yet be represented in the inventory, as novel approaches and technologies continue to emerge.

Building Level Mitigation

ACTION TYPES

- Relocation
- Utility Elevation
- Acquisition/Demolition
- Dry Floodproofing
- Mitigation Reconstruction
- Wet Floodproofing
- Structural Elevation

The building level mitigation action category highlights targeted physical and policy measures implemented at the individual structure scale to reduce flood exposure and improve resilience. Action types include Relocation (moving a structure or people out of a high-risk area), Utility Elevation (raising critical mechanical, electrical, and plumbing systems), Acquisition/Demolition (buying and/or removing vulnerable structures), Dry Floodproofing (sealing a structure to prevent floodwaters from entering), Mitigation Reconstruction (rebuilding or retrofitting a structure to improved standards), Wet Floodproofing (designing a structure to allow controlled inundation while minimizing damage), and Structural Elevation (raising the structure above forecasted flood levels).

Building level mitigation delivers risk reduction where people live and work, providing a path to loss reduction and continuity of operations at the smallest scale. These actions protect life and property, lower insurance and recovery costs, and preserve community assets and economic recovery after flooding events. They also offer flexible, scalable options, from individual property upgrades to neighborhood-scale buyouts, which can be prioritized based on cost-effectiveness and environmental considerations. Since these actions operate at the individual structure scale, they can sometimes be faster to implement than projects at the local-government wide or interjurisdictional scale, but they can sometimes face funding and private property ownership challenges.

Channel Modification

ACTION TYPES

- Debris Removal
- Channel Dredging, Widening, Diversion

Channel modification actions include interventions designed to alter natural or manmade waterways to improve their capacity and functionality. Key Action types include Debris Removal (clearing blockages such as sediment, vegetation, and waste) and Channel Dredging, Widening, and Diversion (deepening, expanding, or redirecting channels to increase flow capacity and reduce bottlenecks).

Channel modification actions help manage flood risk by enabling water to flow more efficiently and predictably through vulnerable areas. By removing debris and altering channels, these interventions help prevent blockages and overflow, reducing the likelihood of disruptive and damaging floods. Channel modifications minimize property damage, protect critical infrastructure, and support rapid recovery by moving flood waters away from vulnerable areas to reduce disruptions. These actions can restore or enhance natural water movement.

Infrastructure & Control Structures

ACTION TYPES

- Storm Water Management Activities
- Levee/Dike/Berm
- Critical Infrastructure
- Quarries
- Roadway Elevation/Road Crossing Modification
- New and Existing Dam Structures

Infrastructure and control structures include a range of engineered systems that prevent or redirect water from reaching vulnerable areas. Action types include Storm Water Management Activities (such as retention basins and green infrastructure), Levee/Dike/Berm construction (earthen or structural barriers preventing overflow), Critical Infrastructure protection (safeguarding utilities and essential services), Quarries (used for temporary water storage), Roadway Elevation/Road Crossing Modification (raising or redesigning roads to prevent flooding), and New and Existing Dam Structures (controlling water flow and storage).

Infrastructure and control structure actions are a key part of flood resilience strategies because they block or redirect water, keeping it away from people, property, and essential services. Protecting critical infrastructure ensures that power, water, healthcare, communications, and other critical services remain operational during and after flooding events. Collectively, these actions are crucial for maintaining public safety, minimizing economic disruption, and quickly recovering after severe flooding events by preventing water from moving into areas where it can do the most harm.

Hurricane Florence Damage in Oriental, NC

Nature Based Solutions

ACTION TYPES

- Water Farming
- Permeable Pavement
- Bioretention
- Green Roofs
- Living Shorelines
- Raingardens/Sand Filters/ Bio-Swales
- Afforestation
- Floodplain Preservation
- Flood Storage Wetlands
- Floodplain Restoration
- Riparian Buffers

Nature based solutions (NBS) actions leverage natural processes and green infrastructure to manage water while enhancing ecosystem services. Key action types include Water Farming (temporarily storing water on agricultural land), Permeable Pavement (allowing water to infiltrate through surfaces), Bioretention (using soil and plants to filter and store runoff), Green Roofs (vegetated rooftops that absorb and slow the release of rainfall), Living Shorelines (using natural materials to stabilize coasts), Raingardens/ Sand Filters/Bio-Swales (landscape features that capture and treat runoff), Afforestation (planting trees to increase infiltration and reduce runoff), Floodplain Preservation (protecting existing floodplains that absorb water) and Floodplain Restoration (restoring floodplains to original or enhanced water absorbing capacities), Flood Storage Wetlands (areas that absorb and release floodwaters), and Riparian Buffers (vegetated zones along waterways).

Nature based solutions provide an array of benefits for flood risk reduction by harnessing the power of natural processes and landscapes. These solutions help to slow, absorb, and safely move excess water, reducing the intensity and frequency of flooding events. By increasing the capacity of soil and vegetation to capture and store rainfall, nature based actions lower runoff and decrease the likelihood of overwhelming drainage systems. Restored wetlands, floodplains, and riparian buffers provide natural storage areas for floodwaters, protecting downstream communities from sudden surges. Additionally, nature based solutions improve water quality, support biodiversity, and offer recreational and aesthetic value to local communities. They are often cost-effective, adaptable, and sustainable, making them a resilient approach to managing flood risks.

Policy & Planning

ACTION TYPES

- Advanced Regulations (Land Use and Impervious Surface Restrictions)
- Stormwater, Water Quality, Floodplain Regulations
- Advanced Regulations (GIS Capacity Building)
- Multi-Use Floodplains
- Advanced Regulations (Enhanced Zoning)

Policy and planning actions focus on the frameworks and regulatory tools that govern how communities prepare for and manage flood risks. Key action types include Advanced Regulations such as land use and impervious surface restrictions (limiting development and hard surfaces in vulnerable areas), Stormwater, Water Quality, and Floodplain Regulations (guiding how water is managed and protected), Advanced Regulations for GIS Capacity Building (enhancing data-driven decision-making through geographic information systems), Multi-Use Floodplains (designating areas for recreation, habitat, and temporary water storage), and Enhanced Zoning (adapting land use codes to reflect flood risk).

Planners, policymakers, and local governments use these actions to inform which flood risk reduction measures are required, permitted, funded, prioritized, and implemented. By setting clear regulations and guidelines, these actions promote development that occurs in safer locations, that infrastructure is built to withstand flooding, and that natural landscapes are preserved for their protective benefits. Strong policy and planning frameworks create the foundation for coordinated, long-term flood risk management, ensuring that public resources are invested wisely and that communities become more resilient over time.

Other

ACTION TYPES

- Coastal - Road Elevation/ Modification
- Coastal - Building Mitigation
- Beaver Management

Some actions do not fit neatly into the other categories of actions. The actions in the 'other' category, however, are still critical to flood resilience and blend across action categories where special considerations are required. Coastal Road Elevation or Modification is the elevation of roadways that are impacted by coastal flooding. Coastal Building Mitigation is building level adaptation strategies that account for the periodic or enduring flooding that comes with coastal and tidal conditions, including storm surge, saltwater intrusion, and others. Beaver management includes actively managing beaver populations and removing beaver-made dams to restore the natural flow of waterways and prevent blockages that worsen flooding during heavy rainfall events.

WHERE AND WHY ARE THESE ACTIONS NEEDED?

When using the Blueprint Tool, location and vulnerability are two key factors that shape which actions are recommended for each community. The unique characteristics of each place, such as its geography, climate, and existing infrastructure, determine the types and frequency of flood hazards faced, as well as any environmental or policy-based constraints on viable solutions. At the same time, understanding who and what is most vulnerable to these hazards (including people, properties, infrastructure, and ecosystems) helps direct resources to where they have the greatest flood risk reduction potential. Because not all actions are appropriate for every community, their effectiveness depends on a match between local hazards, vulnerabilities, environmental context, and local support. Therefore, actions are most effective when selected and tailored for the specific location and flood risk a community faces.

Location

The location of a community or structure is a primary factor in determining which flood risk reduction actions are appropriate. Different areas face different hazard types, such as coastal flooding, riverine flooding, or urban stormwater flooding, as well as varying frequency and severity of flood events. Environmental constraints, such as soil type, topography, and existing land use, further influence which action types will be most effective.

Vulnerability

Vulnerability refers to the people, infrastructure, and ecosystems at risk of harm from flooding. Assessing vulnerability helps prioritize actions where they will have the greatest impact; protecting at-risk populations, critical services, or valuable habitats.

FEATURED RESILIENCE ACTIONS

This section builds upon the evaluation framework for reviewing actions (see Action Review, Creation, Adjustment, and Selection section) and outlines the unique characteristics of each sub-basin that underscore their respective selected Featured Actions. Included below is an abbreviated description of the unique location and vulnerability characteristics of each sub-basin that influence the types of actions that are most appropriate and recommended (further details can be found in the Flood Risk Planning and Analysis section). Recommended critical needs are also highlighted for each sub-basin, outlining flood resilience actions that should be further explored based on the findings of the vulnerability assessment.

Following these descriptions are the selected Featured Actions for each sub-basin. These Featured Actions were chosen from the full 115 Priority Actions list (Appendix X) and represent a balanced, illustrative suite of flood resilience solutions. In some cases, these Featured Actions correlate to the recommended critical needs, but further flood resilience actions should be explored to ensure all communities' flood resilience priorities and needs are addressed.

Aerial of Falls Lake

UPPER NEUSE SUB-BASIN

Location Characteristics

The Upper Neuse sub-basin is characterized by its steeper and more varied terrain. Flood hazards here are largely riverine and the steep gradients and small floodplains limit the spreading of floodwaters, while the soil types in this region support fast drainage.

Development in the Upper Neuse sub-basin consists of dense urban and suburban developments with significant concentrations of population and economic assets. The region is experiencing ongoing growth, including some expansion into the floodplain, which has led to a notable increase in overall exposure to flood hazards. The Upper Neuse sub-basin's transportation networks are extensive and critical, but their density also makes them susceptible to disruption during flood events. Rapid development and urbanization in the sub-basin are contributing to higher levels of impervious cover which increases stormwater runoff and worsens local flooding issues.

Vulnerability Characteristics

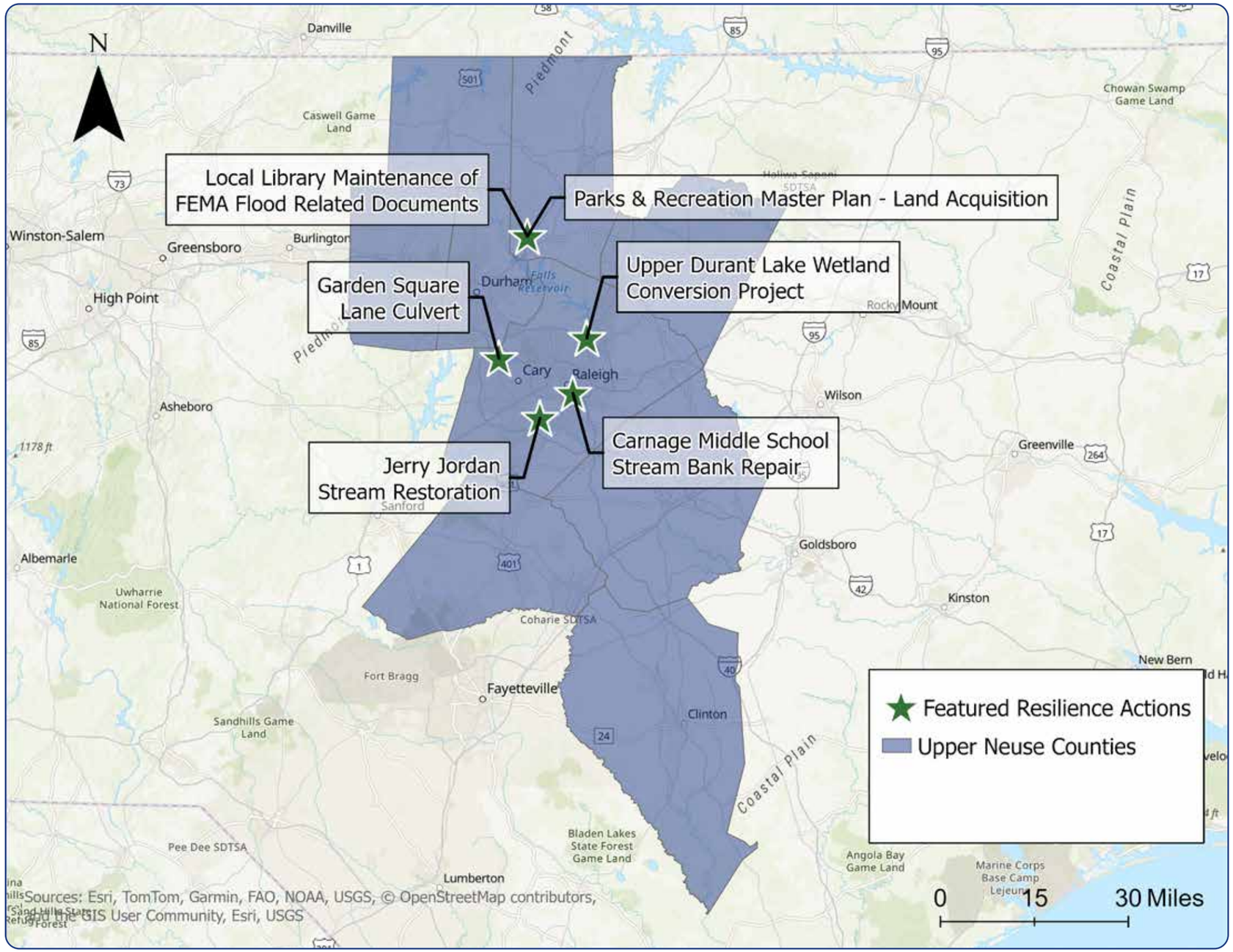
The Upper Neuse sub-basin faces the largest absolute increase in exposed residents among the sub-basins, making population vulnerability a significant concern. Residential structures are the greatest driver of projected flood losses, representing 69% of the entire basin's residential structures and the greatest percentage exposed to flooding rates. The concentration of critical assets (water, energy, and communications infrastructure) amplifies the potential impact of flood events and can extend recovery timelines. Flooding of roads and transportation infrastructure (e.g., major highways and arterial roadways) in the Upper Neuse sub-basin is severe, as most roads (62%) are vulnerable to current and future projected flooding and may result in more limited access to essential facilities and emergency services, further increasing risk for residents.

Recommended Critical Needs

- Targeted urban stormwater management and upgrades for high-density areas
- Floodproofing and protection of critical facilities (water, healthcare, energy)
- Elevated roadways out of flood prone areas
- Strategic land use planning to limit development in high-risk zones
- Raising key infrastructure in areas of concentrated exposure

Featured Actions

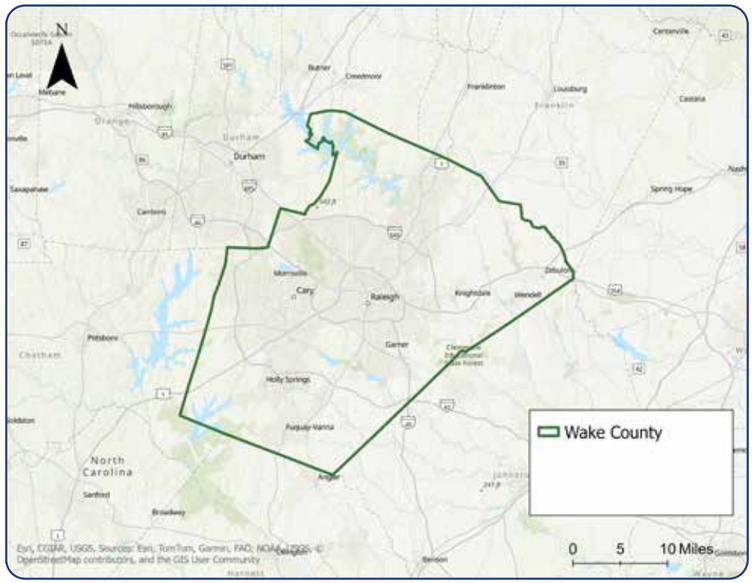
- Jerry Jordan Stream Restoration
- Parks & Rec Land Acquisition
- Library FEMA Documents
- Carnage Middle School Stream Repair
- Upper Durant Wetland Conversion
- Garden Square Lane Culvert



City of New Bern, NC

Featured Resilience Action: Jerry Jordan Stream Restoration

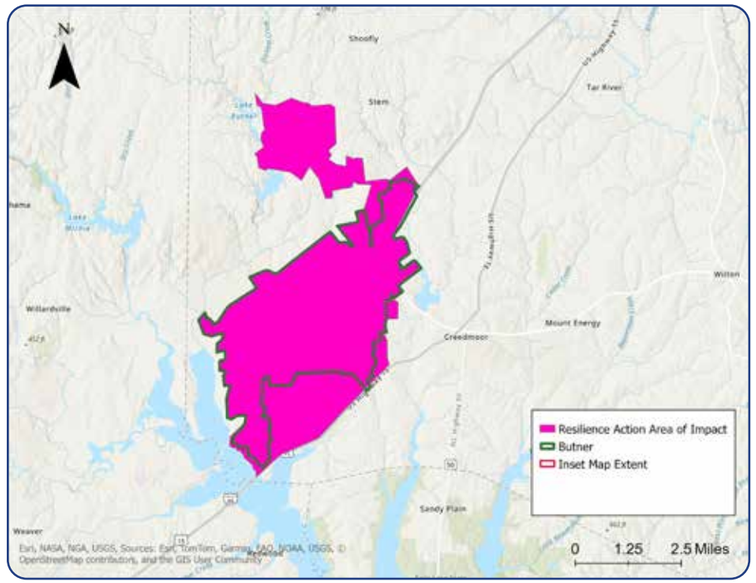
This action was submitted as part of the Wake County Action Plan. The Upper Neuse River sub-basin includes dense urban and suburban landscapes, and has steeper terrain, making little room for flooding waters to go. With this in mind, this action includes a variety of nature based solutions in an unnamed tributary of Guffy Branch, including 550LF of stream restoration, 115lf of channel stabilization, .5acres of wetland enhancement, and .6 ac of buffer restoration to improve the tributaries ability to move water more efficiently and less disruptively. Creating more places for water to go will help reduce flooding in the Upper Neuse River Basin and have benefits lower down in the basin. The action builds on secured matching funds and would improve floodplain function and resilience in a suburban area of Wake County.



Jurisdiction:
Wake County
Community Type:
Suburban
Primary Flood Type:
Riverine Flooding
Secondary Flood Type:
Stormwater/Urban Drainage
Implementation Type:
Funded/Near-Ready
Sub-basin:
Upper Neuse
Action Category:
Nature-based Solutions
Action Type:
Floodplain Restoration
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

Featured Resilience Action: Parks & Recreation Master Plan - Land Acquisition

As part of the Town of Butner's Plan, the Town identified the need for an updated Parks and Recreation Master Plan. In the highly urbanized Upper Neuse sub-basin, it's hard to find new places to store and move water more effectively and less disruptively. Similarly, it can be challenging to define who will be responsible for managing flood prone land, when the land is faced with unique vulnerabilities. Through a Parks and Recreation department Master Plan action for the Town of Butner, the Town can strategically identify parcels that are vulnerable to flooding and create a strategy for acquiring the land. Flood prone lands, while they serve lower economic uses, can still provide fruitful recreational opportunities if managed appropriately. This action would reduce long-term flood exposure while preserving natural floodplain functions and expanding community recreational space.

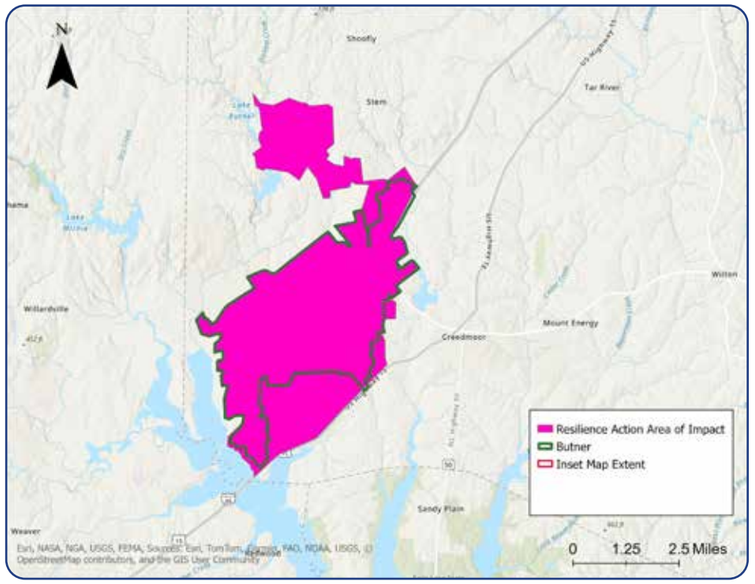


Jurisdiction:
Town of Butner
Community Type:
Rural / Regional
Primary Flood Type:
Riverine Flooding
Secondary Flood Type:
Growing Exposure
Implementation Type:
Regional Studies/Plans
Sub-basin:
Upper Neuse
Action Category:
Land and Property Acquisition
Action Type:
Stormwater, Water Quality, Floodplain Regulations
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Driven Action

Municipality of Oriental, NC

Featured Resilience Action: Local Library Maintenance of FEMA Flood-related Documents

The Town of Butner in their Action Plan, identified the need for securing and centralizing information about flooding to ensure informed and transparent communications about flooding. This action supports the local library in maintaining documents about flood insurance, flood protection, floodplain management, and the natural and beneficial functions of floodplains. Information about flooding helps communities make informed choices about flood risk reduction, necessitating making this information accessible. Providing free public access to this information would improve community awareness, understanding, and preparedness related to flood risk.



Jurisdiction:

Town of Butner

Community Type:

Rural / Regional

Primary Flood Type:

All Flood Types

Secondary Flood Type:

Capacity Building

Implementation Type:

Quick Wins/Low Complexity

Sub-basin:

Upper Neuse

Action Category:

Policy/Planning

Action Type:

Stormwater, Water Quality, Floodplain Regulations

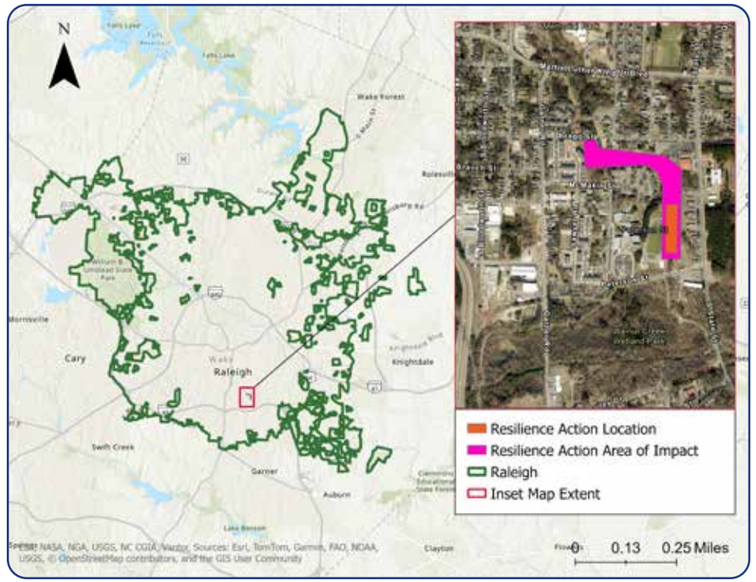
Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

Featured Resilience Action: Carnage Middle School Stream Bank Repair

This action was advanced through the City of Raleigh's Action Plan. The Stream Bank Repair project addresses severe bank erosion along Little Rock Creek. The action area encompasses a portion of Little Rock Creek Greenway and its associated greenway easement, the northern portion of Walnut Creek Wetland Park, the eastern portion of Carnage Middle School, and the western portion of several residential lots where the City's greenway easement is located. This erosion poses safety risks, threatens water quality, and endangers public infrastructure within the Upper Neuse River Basin. The action will stabilize and repair both sides of the stream, improving ecological conditions and safety, preventing further erosion, and protecting downstream water resources.

The improvements to the stream corridor will also provide water quality and conveyance benefits to a traditionally marginalized area of the City. Considerations for the project are the potential for future development of the park, existing utilities, and the incorporation of existing stormwater device and public art projects. This action is a collaborative effort between the City of Raleigh and the Wake County Public School System (WCPSS). WCPSS will lead design and construction across the affected areas, with City funding and involvement where City-owned property is included. By coordinating efforts, the action reduces costs, minimizes community disruption, and creates educational opportunities for local students.



Jurisdiction:

City of Raleigh

Community Type:

Urban

Primary Flood Type:

Riverine Flooding

Secondary Flood Type:

PUBG/Equity

Implementation Type:

Funded/Near-Ready

Sub-basin:

Upper Neuse

Action Category:

Other

Action Type:

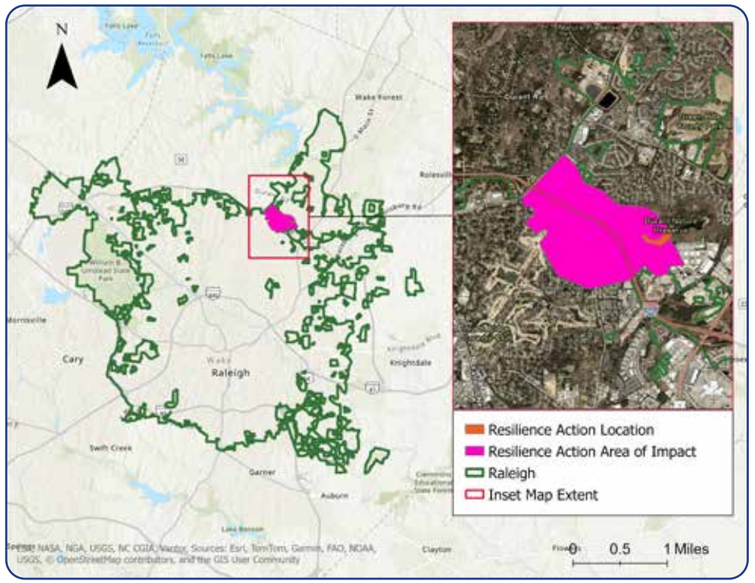
Miscellaneous

Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

Featured Resilience Action: Upper Durant Lake Wetland Conversion Project

This action was included in the City of Raleigh's Action Plan and advances dam safety and ecological restoration. The Upper Durant Lake Dam was deemed to be insufficient condition by the division of Dam Safety. The lake has experienced sedimentation over the past several decades and thus has lower volume capacity. This action would convert Upper Durant Lake to a wetland, repair the dam from the impacts of sedimentation, and bring the dam up to sufficient condition. The dam will be fully reconstructed and design to convey the 100-year storm event. The conversation of the Lake to a wetland will improve habitat, water quality, ecological function, and storm conveyance while supporting the adjacent Durant Nature Preserve. Several aquatic species found in the Preserve will benefit from these enhancements. Dams that are in insufficient condition are at a higher risk of failure, potentially worsening flooding conditions or leading to catastrophic impacts.

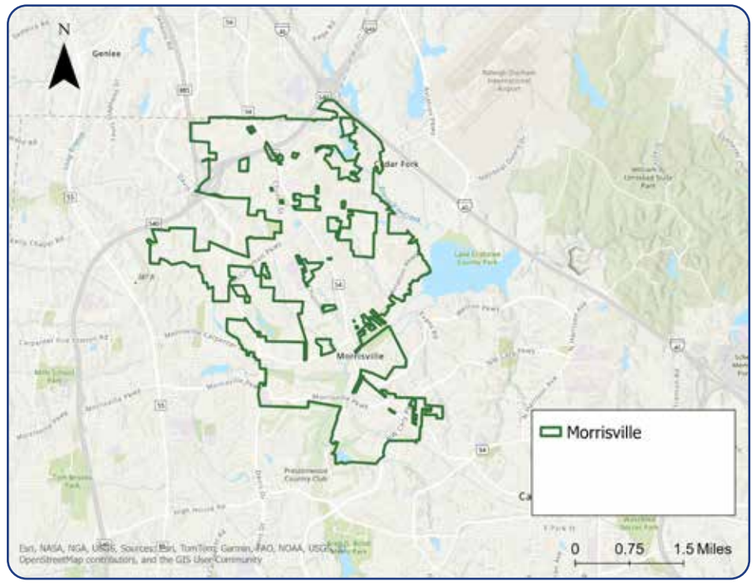


Jurisdiction:
City of Raleigh
Community Type:
Suburban
Primary Flood Type:
Riverine Flooding
Secondary Flood Type:
Changing Hazards
Implementation Type:
Nature-based Restoration
Sub-basin:
Upper Neuse
Action Category:
Other
Action Type:
Miscellaneous
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

Blue Jay Point at Falls Lake

Featured Resilience Action: Garden Square Lane Culvert

This action was submitted as part of the Town of Morrisville's adopted Stormwater Master Plan. It includes studying two improvements – one, replacing a single pipe with a drainage channel and two, replacing a double culvert with a box culvert. These two improvements enhance culvert and drainage infrastructure at Garden Square Lane to reduce flood impacts to nearby residential structures and prevent roadway overtopping during the 100-year storm. Modeling indicates that the more comprehensive improvement option would alleviate backwater effects and protect both roadway access and surrounding properties. This action would help protect a population of 32,000 people from the annual 1% chance storm.



Jurisdiction:
Town of Morrisville
Community Type:
Suburban
Primary Flood Type:
Stormwater/Urban Drainage
Secondary Flood Type:
Riverine Flooding
Implementation Type:
Major Infrastructure
Sub-basin:
Upper Neuse
Action Category:
Infrastructure & Control Structures
Action Type:
Critical Infrastructure
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

MIDDLE NEUSE SUB-BASIN

Location Characteristics

The Middle Neuse sub-basin lies largely in the coastal plain and is characterized by flatter terrain and broader floodplain extents. As a result, floodplains in the sub-basin are expected to grow between 26 and70%. Flood hazards typically stem from riverine events, but urban stormwater flooding is projected to increase due to development pressures, especially near transportation corridors and municipalities, especially in Goldsboro, Wilson, Kinston, and the Greenville urban area. Land use is a patchwork of urban, agricultural, managed, and forested landscapes, with development concentrated along key corridors. Ongoing land use changes are also contributing to increased impervious surfaces and altered runoff patterns. These characteristics necessitate Actions that are responsive to rural-urban transitions, where rural areas have less capacity to implement Actions.

Vulnerability Characteristics

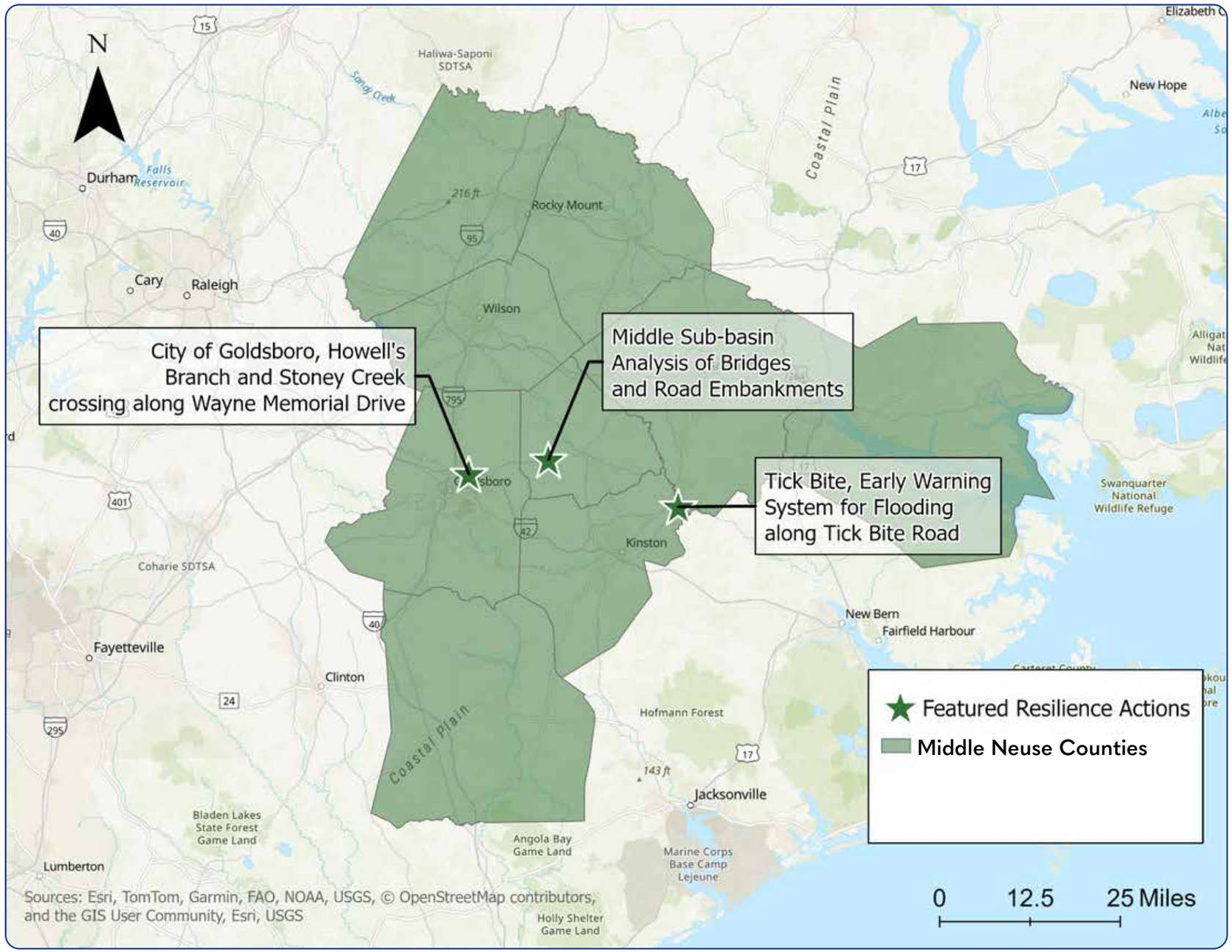
The Middle Neuse sub-basin experiences both moderate existing flooding and rapidly increasing flood risk, particularly for populations, roadways, and residential structures. The sub-basin is experiencing expanding floodplains that are intersecting with new development at the rural-urban interface, putting more people at risk.
The lower, flatter terrain of this sub-basin means that this entire portion of the basin is susceptible to roadway flooding. Transportation and access failures to major population centers dominate expected flooding impacts. These impacts will lead to greater service disruptions, as opposed to asset losses. In a similar vein, more than 40% of water facilities are already exposed to flooding under current conditions.

Recommended Critical Needs

- Resilient transportation network upgrades and redundancies
- Floodplain management and development controls for growing corridors
- Infrastructure adaptation to reduce service disruption (utilities, roads, communications)
- Protect critical assets in flood prone areas
- Enhanced emergency response to ease evacuation

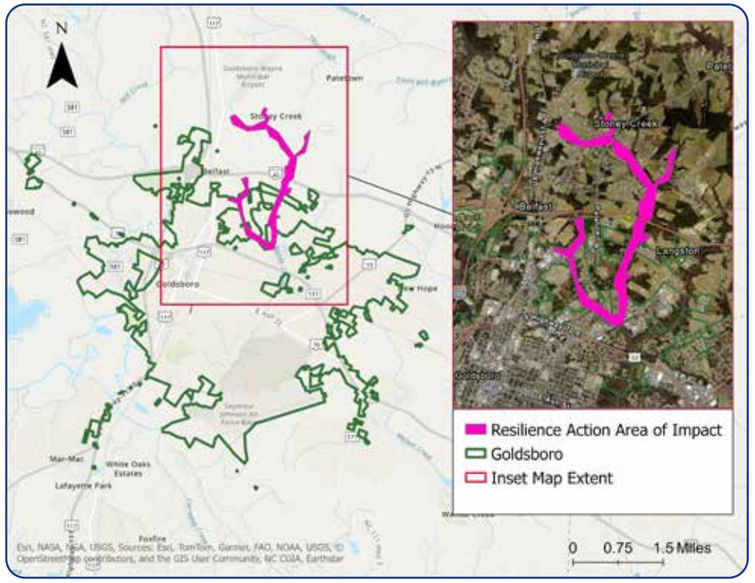
Featured Actions

- Wayne Memorial Dr Culverts/Levee
- Tick Bite Early Warning System
- Middle Sub-basin Bridge Study



Featured Resilience Action: Howell's Branch and Stoney Creek Crossing

This action was identified through the vulnerability assessment as an action that would protect and enhance vulnerable road networks to and from the regional hospital. Several road crossings of tributaries already are impacted by smaller flooding events. This roadway is predicted to be inundated by 2 to 5 feet during a 1% storm event, and if it becomes impassable, emergency access to the hospital from the west would be significantly affected without major detours. Transportation network upgrades and redundancies are a critical need in the Middle Neuse. Investigating and upsizing the culvert crossings of Howell's Branch and Stoney Creek along Wayne Memorial Drive would help improve transportation network resilience.

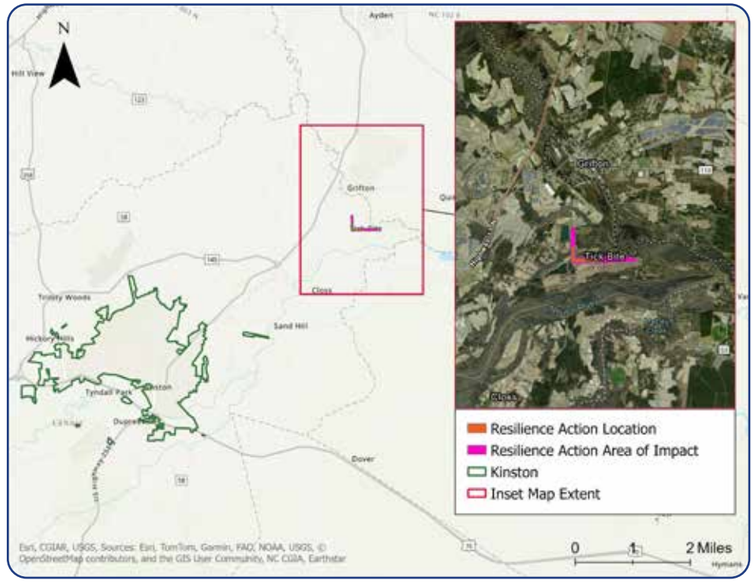


Jurisdiction:
City of Goldsboro
Community Type:
Suburban / Regional
Primary Flood Type:
Riverine Flooding
Secondary Flood Type:
System Failures
Implementation Type:
Major Infrastructure
Sub-basin:
Middle Neuse
Action Category:
Infrastructure & Control Structures
Action Type:
Storm Water Management Activities
Locally Prioritized or Vulnerability Assessment-Based Action:
Vulnerability Assessment-Based Action

Cliffs of the Neuse State Park

Featured Resilience Action: Early Warning System for Flooding along Tick Bite Road

This action was developed based upon the vulnerability assessment results for Lenoir County. The Middle Neuse Sub-basin needs emergency response support to ease evacuation, as transportation and access failures impact a growing number of people in the basin. To support this need, the Early Warning System action for flooding along Tick Bite Road would provide residents with early notification when floodwater is approaching the level where Tick Bite Road becomes impassable. This location experiences riverine flooding – with early notice about waters rising in the upper parts of the basin, early warning systems can be effective ways to encourage people to move to safety. This action would improve public awareness and safety in a flood-prone rural area and could be scaled to other locations in the future. This project is low in complexity and would be an easy quick win to build capacity for early warning systems in the basin.

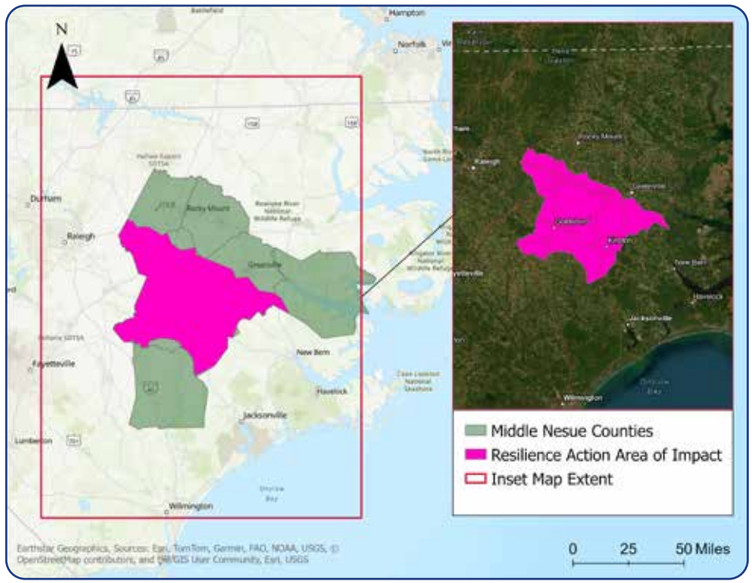


Jurisdiction:
City of Kinston
Community Type:
Rural
Primary Flood Type:
Riverine Flooding
Secondary Flood Type:
Growing Exposure
Implementation Type:
Quick Wins/Low Complexity
Sub-basin:
Middle Neuse
Action Category:
Other
Action Type:
Miscellaneous
Locally Prioritized or Vulnerability Assessment-Based Action:
Vulnerability Assessment-Based Action

Pitt County Courthouse

Featured Resilience Action: Middle Sub-basin Analysis of Bridges and Road Embankments Branch and Stoney Creek crossing along Wayne Memorial Drive

This action was identified by the project team as a critical need for planning for future flood impacts in the Middle Neuse Sub-Basin. The Middle Neuse Sub-Basin is experiencing rapidly growing flood risk due to increasing development pressures. As such, a better understanding of bridge and roadway impacts from flooding is needed. This action is a study of future floodplain extents and impacts on bridges and roads and would culminate in a plan for addressing expected future impacts. The study would use ditch times velocity calculations and future-condition floodplain data to identify bridges and roads at risk from scour, embankment failure, and increasing floodplain widths.



Jurisdiction:

Regional

Community Type:

Regional

Primary Flood Type:

Compound/Multi-hazard

Secondary Flood Type:

System Failures

Implementation Type:

Regional Studies/Plans

Sub-basin:

Middle Neuse

Action Category:

Infrastructure & Control Structures

Action Type:

Storm Water Management Activities

Locally Prioritized or Vulnerability Assessment-Based Action:

Vulnerability Assessment-Based Action

City of Goldsboro, NC

LOWER NEUSE SUB-BASIN

Location Characteristics

The Lower Neuse sub-basin is defined by low elevation, broad floodplain extents, and exposure to compound flooding processes due to its coastal exposure. Impacts are driven by tidal influences, storm surge, elevated base water levels, and riverine flow. Coastal processes complicate hazard exposure patterns, particularly in counties like Carteret, Pamlico, and Jones where the Neuse River delta connects to the Atlantic Ocean. Floodplain expansion is significant, increasing from approximately 36% to 44% of land area under future scenarios, with portions of Carteret and Pamlico Counties reaching up to 60% inundation. Land use is dominated by rural and coastal communities, with infrastructure often situated in areas highly susceptible to flooding, particularly in the City of New Bern.

Vulnerability Characteristics

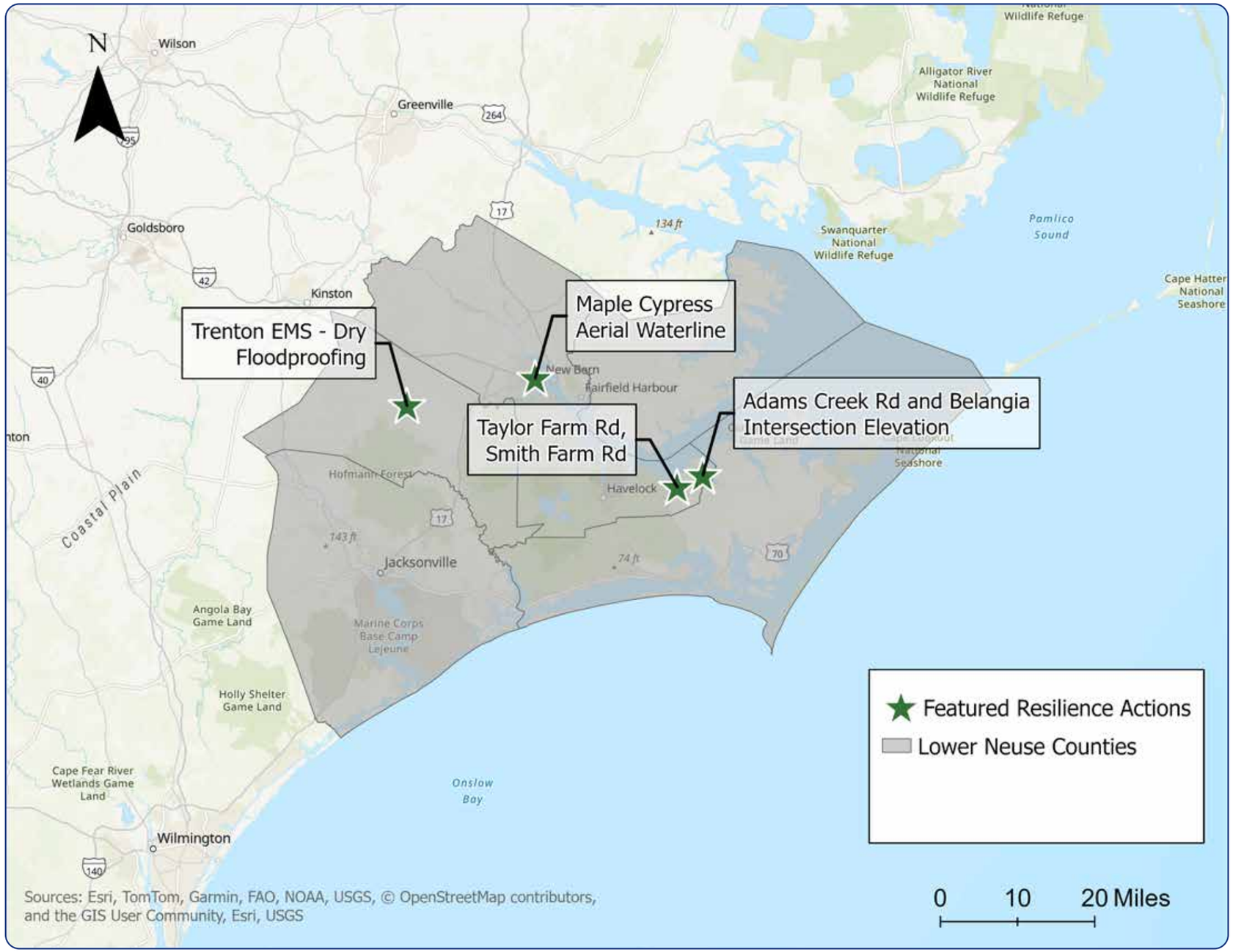
Communities in the Lower Neuse sub-basin experience wide-spread impacts, often leading to elevated isolation risk and disrupting access in and out communities. Despite smaller populations and fewer assets compared to the other two sub-basins, the proportion of Lower Neuse residents, land area, and infrastructure impacted during flood events is among the highest in the basin. Vulnerable infrastructure includes transportation networks that are easily disrupted, prolonging recovery timelines. Ecosystems at risk include coastal wetlands and estuarine environments, which play critical roles in flood mitigation but face degradation from repeated inundation.

Critical Needs

- Community-wide flood protection measures (levees, barriers, nature-based solutions)
- Protection and enhancement of evacuation routes and access corridors
- Coastal ecosystem restoration and nature-based solutions to buffer against compound flooding
- Distributed backup systems for critical services and communications
- Long-term resilience planning for isolated and small communities

Featured Actions

- Maple Cypress Aerial Waterline
- Adams Creek Rd Intersection Elevation
- Taylor Farm Rd Nature-based
- Trenton EMS Floodproofing



City of Raleigh Skyline

Featured Resilience Action: Maple Cypress Aerial Waterline

This action was submitted as part of the Craven County Local Action Plan to protect critical water supply infrastructure from future flooding damage and other disasters. This water line project supports flood resilience by ensuring continuous supply of water both during and after a flood event occurs.

The Maple Cypress water line is currently located above ground and is highly susceptible to damage caused by flooding and other disasters. Specifically, the water line is currently exposed to flooding during the 10-year storm, meaning the infrastructure has a 10% chance of flood exposure during the year.

The water line serves approximately 10,000 people and would cause the community significant disruption if damaged, as the service would be lost until repairs could be completed. The proposed action consists of relocating the water line under the Neuse River by directional boring approximately 1,400 linear feet. Water infrastructure, like this line, is susceptible to corrosion, particularly from salt water. Protecting this critical infrastructure will ensure this service remains functional to the surrounding community during and after flood events. This will help reduce the burden on County officials to respond to potential damages to the water line and allow them to direct their focus on other emergency response needs.

Jurisdiction:
Craven County
Community Type:
Rural
Primary Flood Type:
Coastal/Tidal
Secondary Flood Type:
High Frequency (10%)
Implementation Type:
Major Infrastructure
Sub-basin:
Lower Neuse
Action Category:
Infrastructure & Control Structures
Action Type:
Critical Infrastructure
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

Featured Resilience Action: Adams Creek Road and Belangia Intersection Elevation

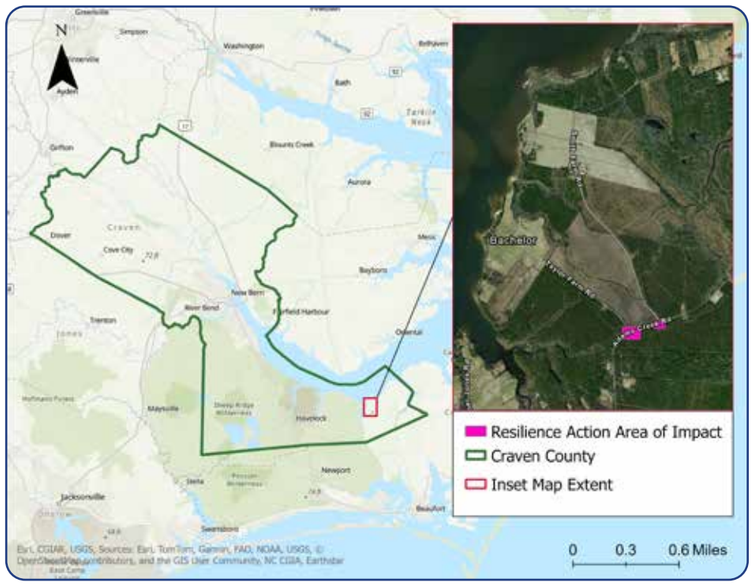
This action was submitted as part of the Craven County Local Action Plan to maintain access to the fire station during and after flooding events. This road is susceptible to coastal and tidal flooding, and its closure can mean community isolation in certain flooding events. The proposed action raises the roadway elevation of the intersection or to resize culverts to prevent flooding and ensure the fire station remains accessible. As first responders to flooding events, maintaining access to the fire station is critical for mounting an efficient and effective response to floods. Addressing flooding at this intersection will help improve community resilience by maintaining a strong emergency response.

Jurisdiction:
Craven County
Community Type:
Rural
Primary Flood Type:
Coastal/Tidal
Secondary Flood Type:
Community Isolation
Implementation Type:
Major Infrastructure
Sub-basin:
Lower Neuse
Action Category:
Infrastructure & Control Structures
Action Type:
Roadway Elevation/Road Crossing Modification
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

Lake Crabtree in Morrisville, NC

Featured Resilience Action: Taylor Farm and Smith Farm Road Nature-Based Solutions

This action was submitted as part of the Craven County Action Plan and supports the implementation of nature based projects along roadways and stream crossings across the county to reduce on-road flooding. This action builds upon existing work being done with the NC Department of Agriculture, which includes cost share for implementation of nature based projects. While more projects may be identified, initial projects are slated for Taylor Farm Road and Smith Farm Road at Clubfoot Creek. Benefits including reduced flooding risk, improved roadway resilience, better public safety, and enhanced habitat and water quality. The Lower Neuse is vulnerable to transportation network disruptions due to its low-lying nature. Transportation access actions like these will help ensure the resilience of and access to critical transportation network segments.



Jurisdiction:

Craven County

Community Type:

Rural/Suburban

Primary Flood Type:

Coastal/Tidal

Secondary Flood Type:

Compound/Multi-hazard

Implementation Type:

Nature-based Restoration

Sub-basin:

Lower Neuse

Action Category:

Policy & Planning

Action Type:

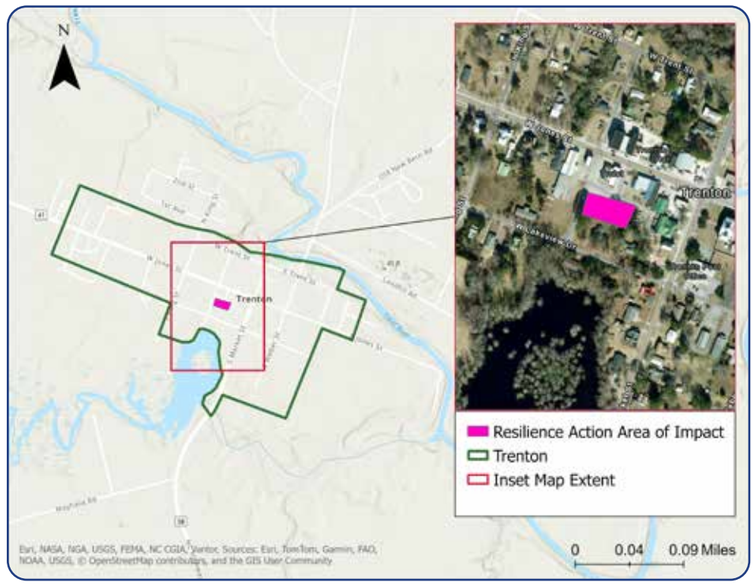
Stormwater, Water Quality, Floodplain Regulations

Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

Featured Resilience Action: Trenton EMS - Dry Floodproofing

This action was identified through the vulnerability assessment as a key action that would drive flood resilience across jurisdictions. The Trenton EMS facility provides critical emergency care to the Town of Trenton and surrounding communities. Dry floodproof the Trenton EMS facility at 105 South Cherry Street in Trenton would protect critical emergency services from flood damage. The facility is at risk in multiple storm scenarios, and this action would help prevent current and future losses of essential emergency response capacity in the Lower Neuse sub-basin.



Jurisdiction:

City of New Bern, Town of Pollocksville, Pamlico County, Town of Trenton, Town of Beaufort, Town of Bridgeton, Town of Vanceboro, Craven County, Carteret County, Jones County

Community Type:

Rural / Regional

Primary Flood Type:

Coastal/Tidal Flooding

Secondary Flood Type:

Compound/Multi-hazard

Implementation Type:

Major Infrastructure

Sub-basin:

Lower Neuse

Action Category:

Building Level Mitigation

Action Type:

Dry Floodproofing

Locally Prioritized or Vulnerability Assessment-Based Action:

Vulnerability Assessment-Based Action

ACTION STRATEGY TAKE-AWAYS

The Neuse River Basin Action Strategy is intended to support local governments, regional partners, state agencies, and other organizations in identifying and advancing flood resilience actions that are appropriate to different conditions across the basin. The vulnerability assessment shows that flood risk is increasing under future conditions, with more people, homes, critical facilities, and essential systems exposed to flooding over time. These and other findings support the need for an action strategy that can guide both near-term risk reduction and longer-term flood resilience planning across the basin.

This Action Strategy includes a mix of Priority and Featured Actions that reflect differences in flood risk, vulnerability, and implementation context across the Neuse River Basin. Some actions are intended to reduce concentrated flood losses in more developed areas, some are intended to protect infrastructure and maintain access to essential services, and others are intended to support adaptation in places where flooding is widespread or persistent. Taken together, the Action Strategy provides a basin-wide framework for understanding flood resilience needs and for advancing actions through continued coordination, funding, technical assistance, and project development.

Falls Lake

NEXT STEPS AND IMPLEMENTATION

DEQ Program and Project Accountability

Through the development of the River Basin Action Strategies, local governments, Councils of Government, and other partners have used the Blueprint Tool and staff support to develop local resilience plans. River Basin Advisory Groups and Blueprint Teams have further evaluated and prioritized actions for inclusion in the RBAS. These planning efforts are a critical part of building a more resilient state, but they must be matched with funding and implementation.

The completion of the River Basin Action Strategies is not an endpoint. The Blueprint team will continue working with local governments and other partners to support flood resilience planning and will collaborate with basin partners to help identify funding for prioritized mitigation actions. As of April 2026, NCDEQ has received funding for RBAS development in six basins, as well as an additional $96 million for project implementation in those basins. To implement projects, NCDEQ has used a range of funding mechanisms, including direct partnerships with local governments, funding private firms for full-delivery flood mitigation projects, and collaboration with fellow state agencies and programs, including North Carolina Emergency Management (NCEM), the North Carolina Land and Water Fund (NCLWF), the North Carolina Department of Agriculture and Consumer Services (NCDA&CS), the Division of Water Resources (DWR), and the North Carolina Department of Transportation (NCDOT). These partnerships support the efficient implementation of priority projects and help address gaps in current mitigation efforts. The RBAS process has also identified a need for funding to support engineering and design, in addition to construction. Moving forward, this is an area where the Blueprint can be especially impactful.

Additional funding is needed to complete RBAS development, identify projects, and support project implementation in the remaining eleven river basins. In addition, the RBAS process will identify areas where data improvements are needed, allowing those needs to be prioritized to ensure that the most accurate data is used to inform these critical decisions.

Overall, NCDEQ is committed to making the state more flood resilient by providing local governments, state agencies, and other partners with the data, tools, and support needed to guide investments that reduce the cost and disruption of future flooding.

Blueprint Tool

The Blueprint Tool is available statewide, but its functionality is limited outside the initial six basins. With additional funding, improved flood mapping and expanded data development will be completed for the rest of the state, allowing the Blueprint Tool to effectively support all communities across North Carolina. Continued investments to improve and refine the Blueprint Tool will better serve North Carolina's residents and ensure the state remains a leader in data-driven flood resilience planning.

In the basins currently engaged, Blueprint staff will continue providing support and resources to build local capacity to use the Tool from project conception through completion. This approach will enable local entities and basins to continue applying the Blueprint Process beyond the initial RBAS effort.

ACKNOWLEDGEMENTS

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Lee Worsley, Central Pines Regional Council

Mary Alice Holley, City of Raleigh

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Sasha Godwin, Wake County

Taylor Register, Sound Rivers

Yesenia Cuello, NC FIELD

Blueprint Partners & Supporting Project Teams

Albemarle-Pamlico National Estuary Partnership

American Rivers

Arcadis

Town of Apex

Town of Ayden

Bolton & Menk

Town of Butner

Carteret County

Town of Cary

Central Pines Regional Council

Town of Clayton

Conservation Trust for North Carolina

Craven County

City of Durham

Durham County

Eastern Carolina Council

Eastern North Carolina Sentinel Landscape Partnership

Eno River Association

ESP Associates

Town of Garner

City of Goldsboro

Greene County

City of Greenville

City of Havelock

Kerr-Tar Regional Council of Governments

Kimley-Horn

Town of Knightdale

Town of La Grange

Lenoir County

Mid-Carolina Regional Council

Mid-East Commission Council of Governments

Town of Morrisville

City of New Bern

NC Association of Soil and Water Conservation Districts

NC Coastal Federation

NC Department of Natural and Cultural Resources

NC Department of Transportation

NCDEQ Division of Coastal Management

NCDEQ Division of Mitigation Services

NCDEQ Division of Water Resources

NCDEQ State Resilience Office

NC Environmental Justice Network

NC Farm Bureau Federation

NC FIELD

NC Foundation for Soil & Water Conservation

NC State Coastal Dynamics Design Lab

NC State Extension

NC State Grange

NC State Kenan Institute for Engineering, Technology, & Science

NC Water Resources Research Institute

North Carolina Conservation Network

Partners for Environmental Justice

Person County

Pitt County

City of Raleigh

Town of River Bend

RK&K

City of Roxboro

Seymour Johnson Air Force Base
Town of Sims

Soil & Water Conservation District – Eastern Region

Soil & Water Conservation District – Central Region

Sound Rivers

Southeastern Drainage Corporation

Town of Stantonsburg

The Nature Conservancy

Town of Trenton

Town of Trent Woods

United States Army Corps of Engineers

United States Geological Survey – South Atlantic Water Science Center

Upper Coastal Plan Council of Government

Town of Vandemere

Wake County

Town of Wake Forest

Wayne County

Town of Wendell

City of Wilson

Wilson County

Town of Winterville

APPENDICES

Above Cape Fear River at Sunset

PRIORITY ACTION LIST

Action Name	Action Category	Action Type	Jurisdiction(s)	Sub-basin	Locally Prioritized or Vulnerability Assessment Based Action
Pollock St & Liberty St Stormwater Improvements	Infrastructure & Control Structures	Storm Water Management Activities	City Of New Bern	Lower Neuse	Locally Prioritized
Front St & Hancock St Stormwater Improvements	Infrastructure & Control Structures	Storm Water Management Activities	City Of New Bern	Lower Neuse	Locally Prioritized
Green Park Terrace Culvert Replacement	Infrastructure & Control Structures	Storm Water Management Activities	City Of New Bern	Lower Neuse	Locally Prioritized
Hazel Ave Culvert Replacement	Infrastructure & Control Structures	Storm Water Management Activities	City Of New Bern	Lower Neuse	Locally Prioritized
Christopher Ave Culvert Replacement Project	Infrastructure & Control Structures	Storm Water Management Activities	City Of New Bern	Lower Neuse	Locally Prioritized
Improvement Area 6 - Aber Nath Rd and Trent Shores Dr	Infrastructure & Control Structures	Storm Water Management Activities	Town Of Trent Woods	Lower Neuse	Locally Prioritized
Improvement Area 2 - Trent Wood Dr and EdgeHill Rd	Infrastructure & Control Structures	Storm Water Management Activities	Town Of Trent Woods	Lower Neuse	Locally Prioritized
Improvement Area 1 - Pine Crest Rd and Moye Rd	Infrastructure & Control Structures	Storm Water Management Activities	Town Of Trent Woods	Lower Neuse	Locally Prioritized
Improvement Area 5 -Wedgewood Dr and Canterbury Rd	Infrastructure & Control Structures	Storm Water Management Activities	Town Of Trent Woods	Lower Neuse	Locally Prioritized
Improvement Area 4 - Darby Rd & Drainage Channel to Wedgewood Dr	Channel Modification	Debris Removal	Town Of Trent Woods	Lower Neuse	Locally Prioritized
Maple Cypress Aerial Waterline	Infrastructure & Control Structures	Critical Infrastructure	Craven County	Lower Neuse	Locally Prioritized
Marsh Still and Living Shoreline , Chery Branch-Minnesott Beach Ferry Terminal	Nature Based Solutions	Living Shoreline	Craven County	Lower Neuse	Locally Prioritized
Marsh Sill and Living Shoreline, Brinson Memorial Elementary School	Nature Based Solutions	Living Shoreline	Craven County	Lower Neuse	Locally Prioritized
Shoreline Dr	Infrastructure & Control Structures	Critical Infrastructure	Craven County	Lower Neuse	Locally Prioritized
Crop buying facility	Infrastructure & Control Structures	Critical Infrastructure	Craven County	Lower Neuse	Locally Prioritized
Elevation of Weyerhaeuser Road	Infrastructure & Control Structures	Roadway Elevation/Road Crossing Modification	Craven County	Lower Neuse	Locally Prioritized
Adams Creek Rd and Belangia Intersection Elevation	Infrastructure & Control Structures	Roadway Elevation/Road Crossing Modification	Craven County	Lower Neuse	Locally Prioritized
Cherry Branch-Minnesott Beach Ferry Terminal	Infrastructure & Control Structures	Critical Infrastructure	Craven County	Lower Neuse	Locally Prioritized
Targeted Repetitive Flooding Drainage Assessment	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Craven County	Lower Neuse	Locally Prioritized
Taylor Farm Road and Smith Farm Road Nature-Based Solutions	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Craven County	Lower Neuse	Locally Prioritized
Marsh Sill and Living Shoreline, Vernon Blades Park, Town of Bridgeton	Nature Based Solutions	Living Shoreline	Craven County	Lower Neuse	Locally Prioritized

Action Name	Action Category	Action Type	Jurisdiction(s)	Sub-basin	Locally Prioritized or Vulnerability Assessment Based Action
Sarah Lynn Streambank Stabilization Project	Nature Based Solutions	Floodplain Restoration	Wake County	Upper Neuse	Locally Prioritized
Jerry Jordan Stream Restoration	Nature Based Solutions	Floodplain Restoration	Wake County	Upper Neuse	Locally Prioritized
State Farmers Market Stream Restoration and Stormwater Management	Nature Based Solutions	Floodplain Restoration	Wake County	Upper Neuse	Locally Prioritized
NCSU Beef Unit Floodplain Restoration and Farm Resiliency Project	Nature Based Solutions	Floodplain Restoration	Wake County	Upper Neuse	Locally Prioritized
Max Littlefield Stream Restoration	Nature Based Solutions	Floodplain Restoration	Wake County	Upper Neuse	Locally Prioritized
Crabtree Creek Flood Control Site #1-Sorrels Grove Embankment Stabilization	Infrastructure & Control Structures	New and Existing Dam Structures	Wake County	Upper Neuse	Locally Prioritized
Crabtree Creek Site #13 - Shelley Lake Embankment Stabilization	Infrastructure & Control Structures	New and Existing Dam Structures	Wake County	Upper Neuse	Locally Prioritized
Agricultural Dam Prioritization Plan	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Wake County	Upper Neuse	Locally Prioritized
Goldsboro Water Treatment Plan	Infrastructure & Control Structures	Levee/Dike/Berm	City Of Goldsboro	Middle Neuse	Locally Prioritized
Big Ditch Restoration Project	Other	Miscellaneous	City Of Goldsboro	Middle Neuse	Locally Prioritized
Parks & Recreation Master Plan - Land Acquisition	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Town Of Butner	Upper Neuse	Locally Prioritized
Local Library Maintenance of FEMA Flood-related documents	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Town Of Butner	Upper Neuse	Locally Prioritized
Communication and Education	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Town Of Butner	Upper Neuse	Locally Prioritized
Rose Lane Safe Access Project	Infrastructure & Control Structures	Roadway Elevation/Road Crossing Modification	City Of Raleigh	Upper Neuse	Locally Prioritized
South Street-Blount Street Infrastructure Improvement	Infrastructure & Control Structures	Critical Infrastructure	City Of Raleigh	Upper Neuse	Locally Prioritized
Acquisition of Flood-Prone Multi-Family Properties	Building Level Mitigation	Acquisition/Demolition	City Of Raleigh	Upper Neuse	Locally Prioritized
Eden Pond Dam Removal	Infrastructure & Control Structures	New and Existing Dam Structures	City Of Raleigh	Upper Neuse	Locally Prioritized
West Street Extension Drainage Improvements	Infrastructure & Control Structures	Critical Infrastructure	City Of Raleigh	Upper Neuse	Locally Prioritized
Innovative Floodproofing at City-Owned Facilities	Building Level Mitigation	Dry Floodproofing	City Of Raleigh	Upper Neuse	Locally Prioritized
Active Lake Level Management along Crabtree Creek	Infrastructure & Control Structures	Storm Water Management Activities	City Of Raleigh	Upper Neuse	Locally Prioritized
Leesville & Millbrook Rd Flood Mitigation Project	Infrastructure & Control Structures	Critical Infrastructure	City Of Raleigh	Upper Neuse	Locally Prioritized
Upper Longview Dam Repair	Infrastructure & Control Structures	New and Existing Dam Structures	City Of Raleigh	Upper Neuse	Locally Prioritized
Powell Drive Park Dam	Infrastructure & Control Structures	Critical Infrastructure	City Of Raleigh	Upper Neuse	Locally Prioritized
Flood Emergency Preparedness Kits for Repetitive Loss Areas	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Acquisition of Vacant Properties in the Floodplain	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Citywide Watershed Master Plan for CRS Credit	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	City Of Raleigh	Upper Neuse	Locally Prioritized
Flood Early Warning System Expansion	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized

Action Name	Action Category	Action Type	Jurisdiction(s)	Sub-basin	Locally Prioritized or Vulnerability Assessment Based Action
Capital Boulevard/Atlantic Avenue Stream Restoration Project	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Pigeon House Branch Connector Stream Restoration	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Carnage Middle School Stream Bank Repair	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Dix Park Rocky Branch Creek and Grove Project	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Upper Durant Lake Wetland Conversion Project	Other	Miscellaneous	City Of Raleigh	Upper Neuse	Locally Prioritized
Echo Creek Watershed Study	Other	Miscellaneous	Town Of Garner	Upper Neuse	Locally Prioritized
Reedy Creek Watershed Study	Other	Miscellaneous	Town Of Garner	Upper Neuse	Locally Prioritized
Flood Monitoring and Response Plan	Other	Miscellaneous	Town Of Garner	Upper Neuse	Locally Prioritized
Drainage Improvements and GSI	Other	Miscellaneous	Town Of Garner	Upper Neuse	Locally Prioritized
Public Outreach on SFHA	Other	Miscellaneous	Town Of Garner	Upper Neuse	Locally Prioritized
Buck Branch Watershed Study	Other	Miscellaneous	Town Of Garner	Upper Neuse	Locally Prioritized
City of Goldsboro Wastewater Treatment Plant	Infrastructure & Control Structures	Critical Infrastructure	City Of Goldsboro	Middle Neuse	Vulnerability Assessment Based
Town of Seven Springs Proposed Levee	Infrastructure & Control Structures	Levee/Dike/Berm	City Of Goldsboro	Middle Neuse	Vulnerability Assessment Based
Howell's Branch and Stoney Creek Crossing	Infrastructure & Control Structures	Storm Water Management Activities	City Of Goldsboro	Middle Neuse	Vulnerability Assessment Based
Stormwater Storage	Other	Miscellaneous	City Of Goldsboro	Middle Neuse	Vulnerability Assessment Based
US 70 Kinston Bypass - Construct new bridge crossing of the Neuse River	Infrastructure & Control Structures	Roadway Elevation/Road Crossing Modification	City Of Kinston	Middle Neuse	Vulnerability Assessment Based
Heritage Street Culvert Upgrade	Infrastructure & Control Structures	Storm Water Management Activities	City Of Kinston	Middle Neuse	Vulnerability Assessment Based
Adkin Branch Crossings	Infrastructure & Control Structures	Storm Water Management Activities	City Of Kinston	Middle Neuse	Vulnerability Assessment Based
Mitigate High AAL Structures	Other	Miscellaneous	City Of Kinston	Middle Neuse	Vulnerability Assessment Based
Early Warning System for Flooding along Tick Bite Road	Other	Miscellaneous	City Of Kinston	Middle Neuse	Vulnerability Assessment Based
Buckhorn Lake Dam Feasibility Study	Other	Miscellaneous	City Of Wilson, Town Of Stantonsburg	Middle Neuse	Vulnerability Assessment Based
Resiliency Action for Mid-Century 1% Storm Event	Other	Miscellaneous	City Of Wilson, Town Of Stantonsburg	Middle Neuse	Vulnerability Assessment Based
Town of Stantonsburg Roadway Hydraulics Study	Other	Miscellaneous	City Of Wilson, Town Of Stantonsburg	Middle Neuse	Vulnerability Assessment Based
I-587/US 264 Toisnot Swamp Crossing Improvements	Infrastructure & Control Structures	Roadway Elevation/Road Crossing Modification	City Of Wilson, Town Of Stantonsburg	Middle Neuse	Vulnerability Assessment Based
Wastewater Treatment Plant Relocation	Infrastructure & Control Structures	Critical Infrastructure	Town Of Hookerton	Middle Neuse	Vulnerability Assessment Based
Flood mitigation along Loop Rd	Other	Miscellaneous	Town Of Hookerton	Middle Neuse	Vulnerability Assessment Based
Road Inundation along Main St	Other	Miscellaneous	Town Of Hookerton	Middle Neuse	Vulnerability Assessment Based
Town of Farmville Residential Flood Mitigation	Building Level Mitigation	Structural Elevation	Town Of Farmville	Middle Neuse	Vulnerability Assessment Based
Town of Grifton Residential Flood Mitigation	Building Level Mitigation	Wet Floodproofing	Town Of Grifton	Middle Neuse	Vulnerability Assessment Based
Stormwater Management Plans	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Nash County, Town Of Whitakers, Town Of Middlesex, Town Of Bailey	Middle Neuse	Vulnerability Assessment Based

Action Name	Action Category	Action Type	Jurisdiction(s)	Sub-basin	Locally Prioritized or Vulnerability Assessment Based Action
Middle Sub-basin Analysis of Bridges and Road Embankments	Infrastructure & Control Structures	Storm Water Management Activities	City Of Goldsboro, City Of Kinston, Greene County, Town Of Fountain,Beaufort County, Town Of Grifton, Town Of Bailey, Town Of Ayden, Town Of Middlesex, Town Of Hookerton, Town Of La Grange, Town Of Eureka, Edgecombe County, Town Of Black Creek, Town Of Kenly, Lenoir County, City Of Greenville, Town Of Lucama, Town Of Farmville, Duplin County, Town Of Fremont, Town Of Pink Hill, Pitt County, Wilson County, Town Of Snow Hill, Wayne County, Town Of Whitakers, Town Of Walstonburg, Town Of Seven Springs, Village Of Simpson, Town Of Sims, Town Of Saratoga, City Of Wilson, Village Of Walnut Creek, Town Of Winterville, Seymour Johnson Air Force Base, Town Of Stantonsburg, Nash County, Town Of Mount Olive, Town Of Pikeville	Middle Neuse	Vulnerability Assessment Based
Swift Creek and Tributaries Snag and Drag	Channel Modification	Debris Removal	Pitt County	Middle Neuse	Locally Prioritized
Grifton Police Department	Building Level Mitigation	Relocation	Pitt County	Middle Neuse	Locally Prioritized
Acquisition at 1696 US-15 (Creedmoor)	Building Level Mitigation	Acquisition/Demolition	Granville County, Town Of Butner, Town Of Stem, Town Of Stovall, City OfOxford, City Of Creedmoor	Upper Neuse	Vulnerability Assessment Based
East Durham Warehouse Demolition and Acquisition	Building Level Mitigation	Acquisition/Demolition	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill	Upper Neuse	Vulnerability Assessment Based
Wastewater Treatment Plant Relocation	Building Level Mitigation	Relocation	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill	Upper Neuse	Vulnerability Assessment Based
Stormwater Assessment for Affordable Housing Project	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill	Upper Neuse	Vulnerability Assessment Based
Relocation and/or increase 4 server boxes located in the basement of the Johnston County courthouse	Infrastructure & Control Structures	Critical Infrastructure	Town Of Clayton, Town Of Four Oaks, Town Of Selma, Town Of Benson,Town Of Archer Lodge, Town Of Kenly, Town Of Wilson's Mills, Town Of Smithfield, Town Of Princeton, Johnston County, Town Of Micro, Town Of Pine Level	Upper Neuse	Vulnerability Assessment Based
Replace bridge No. 40 located on US 70 Business (Market St.) over Neuse River	Infrastructure & Control Structures	Roadway Elevation/Road Crossing Modification	Town Of Clayton, Town Of Four Oaks, Town Of Selma, Town Of Benson,Town Of Archer Lodge, Town Of Kenly, Town Of Wilson's Mills, Town Of Smithfield, Town Of Princeton, Johnston County, Town Of Micro, Town Of Pine Level	Upper Neuse	Vulnerability Assessment Based
Floodproofing Orange County Board of Elections	Building Level Mitigation	Wet Floodproofing	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County	Upper Neuse	Vulnerability Assessment Based
Relocation of Hillsborough Pumping Station	Building Level Mitigation	Critical Infrastructure	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County	Upper Neuse	Vulnerability Assessment Based
Elevate/Floodproof Eno River Mill	Building Level Mitigation	Structural Elevation	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County	Upper Neuse	Vulnerability Assessment Based
Commercial Building Acquisition at Wake Forest Road and Hodges St	Building Level Mitigation	Acquisition/Demolition	RDU, Town Of Wendell, City Of Durham, Town Of Zebulon, Town Of Apex,Town Of Rolesville, Town Of Clayton, Town Of Knightdale, City Of Raleigh, Town Of Cary, Wake County, Town Of Wake Forest, Town Of Morrisville, Town Of Fuquay-Varina, Town Of Garner, Town Of Angier, Town Of Holly Springs	Upper Neuse	Vulnerability Assessment Based
Commercial Building Utility Elevation at Wake Forest Road and Hodges St	Building Level Mitigation	Utility Elevation	RDU, Town Of Wendell, City Of Durham, Town Of Zebulon, Town Of Apex,Town Of Rolesville, Town Of Clayton, Town Of Knightdale, City Of Raleigh, Town Of Cary, Wake County, Town Of Wake Forest, Town Of Morrisville, Town Of Fuquay-Varina, Town Of Garner, Town Of Angier, Town Of Holly Springs	Upper Neuse	Vulnerability Assessment Based

Action Name	Action Category	Action Type	Jurisdiction(s)	Sub-basin	Locally Prioritized or Vulnerability Assessment Based Action
Trenton Floodplain Preservation	Nature Based Solutions	Floodplain Restoration	City Of Havelock, Craven County, Jones County, Town Of River Bend, TownOf Arapahoe, Town Of Trenton, Town Of Vanceboro, Town Of Pollocksville, City Of New Bern, Pamlico County	Lower Neuse	Vulnerability Assessment Based
Pollocksville Floodplain Preservation	Nature Based Solutions	Floodplain Restoration	City Of Havelock, Craven County, Jones County, Town Of River Bend, TownOf Arapahoe, Town Of Trenton, Town Of Vanceboro, Town Of Pollocksville, City Of New Bern, Pamlico County	Lower Neuse	Vulnerability Assessment Based
Arapahoe Floodplain Preservation	Nature Based Solutions	Floodplain Restoration	City Of Havelock, Craven County, Jones County, Town Of River Bend, TownOf Arapahoe, Town Of Trenton, Town Of Vanceboro, Town Of Pollocksville, City Of New Bern, Pamlico County	Lower Neuse	Vulnerability Assessment Based
River Bend Floodplain Preservation	Nature Based Solutions	Floodplain Restoration	City Of Havelock, Craven County, Jones County, Town Of River Bend, TownOf Arapahoe, Town Of Trenton, Town Of Vanceboro, Town Of Pollocksville, City Of New Bern, Pamlico County	Lower Neuse	Vulnerability Assessment Based
Ernul Floodplain Preservation	Nature Based Solutions	Floodplain Restoration	City Of Havelock, Craven County, Jones County, Town Of River Bend, TownOf Arapahoe, Town Of Trenton, Town Of Vanceboro, Town Of Pollocksville, City Of New Bern, Pamlico County	Lower Neuse	Vulnerability Assessment Based
Havelock Floodplain Preservation	Nature Based Solutions	Floodplain Restoration	City Of Havelock, Craven County, Jones County, Town Of River Bend, TownOf Arapahoe, Town Of Trenton, Town Of Vanceboro, Town Of Pollocksville, City Of New Bern, Pamlico County	Lower Neuse	Vulnerability Assessment Based
Mills Branch at Rowes Corner - Enlarge Culvert	Infrastructure & Control Structures	Critical Infrastructure	Craven County, City Of New Bern	Lower Neuse	Vulnerability Assessment Based
Chessway Drive Culvert	Infrastructure & Control Structures	Critical Infrastructure	Town Of Morrisville	Upper Neuse	Locally Prioritized
Garden Square Lane Culvert	Infrastructure & Control Structures	Critical Infrastructure	Town Of Morrisville	Upper Neuse	Locally Prioritized
Pollocksville Rescue Squad/Emergency Services - Dry Floodproofing	Building Level Mitigation	Dry Floodproofing	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County	Lower Neuse	Vulnerability Assessment Based
Bridgeton Rescue/EMS - Dry Floodproofing	Building Level Mitigation	Dry Floodproofing	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County	Lower Neuse	Vulnerability Assessment Based
Florence/Whortonsville Fire Dept - Dry Floodproofing	Building Level Mitigation	Dry Floodproofing	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County	Lower Neuse	Vulnerability Assessment Based
South River-Merrimon Fire & EMS - Dry Floodproofing/ Structural Elevation	Building Level Mitigation	Utility Elevation	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County	Lower Neuse	Vulnerability Assessment Based
Weyerhaeuser Company/Streets Ferry Heliport - Structural Elevation	Building Level Mitigation	Utility Elevation	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County	Lower Neuse	Vulnerability Assessment Based

Action Name	Action Category	Action Type	Jurisdiction(s)	Sub-basin	Locally Prioritized or Vulnerability Assessment Based Action
Trenton EMS - Dry Floodproofing	Building Level Mitigation	Dry Floodproofing	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County	Lower Neuse	Vulnerability Assessment Based
Seek Funding to facilitate implementation of Flood Mitigation Alternatives and Water Quality Recommendations	Policy & Planning	Stormwater, Water Quality, Floodplain Regulations	City Of Greenville	Middle Neuse	Locally Prioritized
North Prong Bay River Homes - Acquisition/Demolition	Building Level Mitigation	Acquisition/Demolition	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based
Bridgeton Coastal Homes - Structural Elevation	Building Level Mitigation	Structural Elevation	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based
Coastal New Bern Homes - Structural Elevation	Building Level Mitigation	Structural Elevation	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based
Northwest Creek, Fairfield Harbour Homes - Structural Elevation	Building Level Mitigation	Structural Elevation	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based
River Bend Community - Structural Elevation	Building Level Mitigation	Structural Elevation	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based
Homes on/near Oaks Rd, New Bern - Structural Elevation	Building Level Mitigation	Structural Elevation	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based
NC 304-, Hobucken Homes - Structural Elevation	Building Level Mitigation	Structural Elevation	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse	Vulnerability Assessment Based

REFERENCES

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