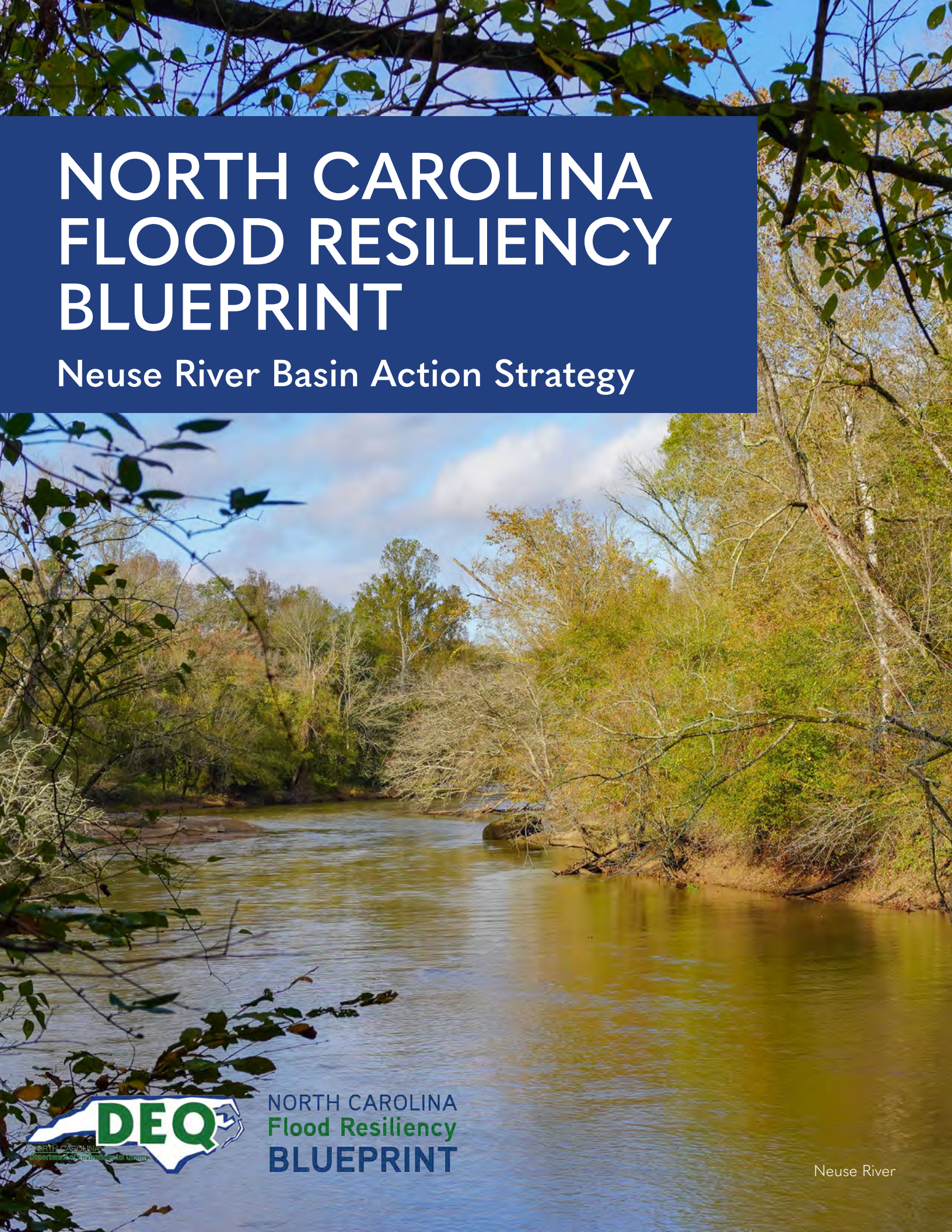
NORTH CAROLINA FLOOD RESILIENCY BLUEPRINT

Neuse River Basin Action Strategy



NORTH CAROLINA
Flood Resiliency
BLUEPRINT

Neuse River

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EXECUTIVE SUMMARY

Flood Risk, Vulnerability, and Capacity

The Neuse River Basin Action Strategy (Neuse RBAS) was developed as part of the North Carolina Flood Resiliency Blueprint (Blueprint) to identify flood resilience actions that address current and future flood risk throughout the basin. The RBAS was developed through the integration of basin-wide flood risk and vulnerability analyses, local and regional priorities, existing planning efforts, and implementation considerations. The result is an RBAS that supports flood resilience planning, investment, and decision-making across the Neuse River Basin.

Flooding affects communities, infrastructure, economies, and natural systems throughout North Carolina and remains a recurring challenge across the Neuse River Basin. The basin encompasses more than 6,200 square miles across 23 counties and includes a diverse range of geographic, hydrologic, and community conditions (see Basin Overview). Flood hazards within the basin are influenced by riverine flooding, stormwater flooding, coastal processes, land use patterns, and future development. These characteristics result in varying levels and kinds of flood risk and resilience needs across the basin.

The Neuse RBAS evaluates current and future flood conditions using advisory flood modeling, exposure analyses, and vulnerability assessment methods supported by the Blueprint Tool. The Neuse RBAS vulnerability assessment identified locations where flooding impacts people, structures, and systems today and estimates changes to risk into the future (see Flood Risk Planning & Analysis). Flood exposure is projected to increase throughout the basin over time as changes in precipitation patterns, land use, development, and coastal influences affect the number of people, assets, and systems exposed to flooding.

Under current conditions, approximately 21% of the basin's land area and more than 205,000 residents are exposed to flooding during a 1% Annual Exceedance Probability event (commonly referred to as 100-year storm). By mid-century, the exposed population is projected to exceed 239,000 residents. Increases in exposure and impacts are also projected for residential structures, critical facilities, and infrastructure.

Flood risk varies across the basin. The communities in the upper portion of the basin contain the highest concentrations of population, development, and critical infrastructure impacted by flooding. The communities in the middle portion include areas where future exposure is projected to increase alongside continued development and growth. In the lower portion of the basin, riverine, tidal, and coastal processes all contribute to community flood risk. These differing conditions highlight the need for resilience actions that reflect local circumstances while supporting basin-wide resilience objectives.

The Neuse RBAS also considers local and regional capacity to support flood resilience planning and implementation (see Actionable Data, Modeling, & Analysis). There is variation in the administrative, technical, and financial capacity of communities across the basin. While some jurisdictions have established resources and programs to support flood resilience activities and involvement in the Blueprint program, other communities face staffing, funding, technical expertise, and other related challenges. These differences in capacity influence the ability of communities to pursue, implement, and sustain resilience projects.

Prioritized Actions

The Neuse RBAS establishes a prioritized portfolio of actions intended to reduce flood risk and support long-term flood resilience (see Priority Action List). Action development incorporated local input, existing plans and studies, basin-wide analyses, and Blueprint prioritization criteria (see Action Review, Creation, Adjustment, and Selection).

An initial inventory of 1,235 flood resilience actions was evaluated through a screening and prioritization process that resulted in 113 Priority Actions. Further evaluation identified 29 High Priority Actions that are recommended for early consideration as potential first steps toward implementation, based on a number of factors including local and regional priorities and local flood risk reduction needs. These actions are intended to help guide initial investment and coordination, while allowing flexibility for communities and partners to advance actions as funding, capacity, and local priorities evolve.

Prioritized actions within the Neuse River Basin include structural and non-structural measures such as stormwater system improvements, transportation and roadway upgrades, critical infrastructure protection, nature-based solutions, structure-level mitigation projects, and policy and planning actions (see What is an Action?). Collectively, these actions make progress toward addressing critical current and projected flood risk conditions while reflecting local and regional resilience priorities.

The RBAS also identifies 17 Representative Actions that illustrate the range of resilience approaches included in the broader action portfolio (see Prioritized Basin Actions). These Representative Actions are not intended to serve as a separate priority ranking; rather, they demonstrate the variety of action types, geographic scales, implementation pathways, and resilience benefits that may be applicable across the basin.

Implementation Considerations

Successful implementation of the Neuse RBAS will require continued coordination among local governments, regional organizations, state and federal agencies, nonprofit organizations, and private-sector partners (see Community Engagement & Discovery). The Neuse RBAS provides information about some potential funding sources and implementation pathways that may support advancement of prioritized actions (see Review of Funding Sources).

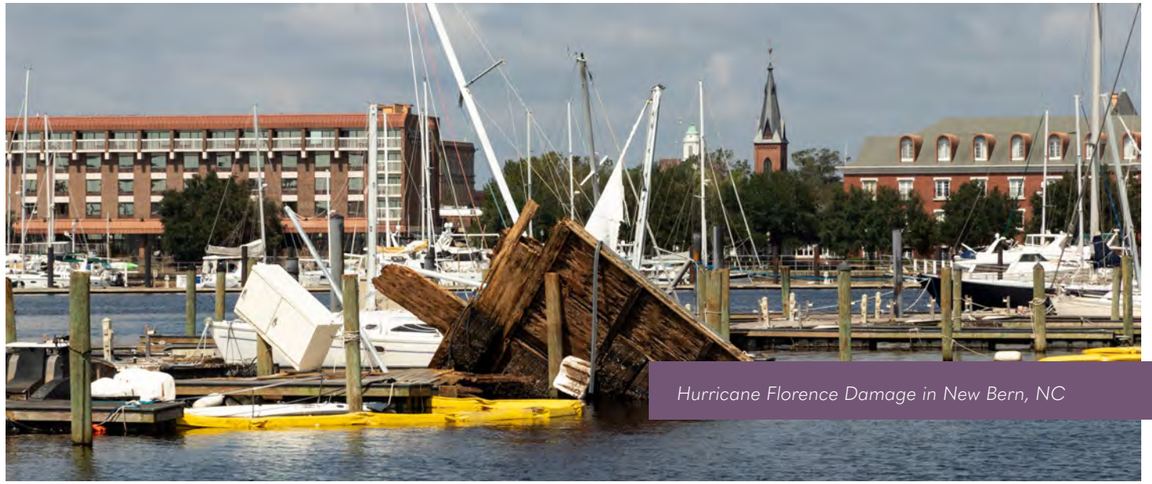
Through coordinated implementation of prioritized actions, communities and partner organizations can work to reduce flood risk, support resilient community development, protect critical assets and infrastructure, and improve preparedness for future flood conditions. Continued investment in resilience planning, project development, and implementation can help reduce future flood-related damages, support more resilient infrastructure systems, and improve community preparedness for future flood conditions.

Falls Lake Dam

TERMS & ACRONYMS

AAL	Average Annualized Loss
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.
AEP	Annual Exceedance Probability
ACS	American Community Survey
Blueprint	North Carolina Flood Resiliency Blueprint program
Blueprint Tool	North Carolina Flood Resiliency Blueprint Tool
BPP	Blueprint Partners
BRIC	Building Resilient Infrastructure and Communities
CDBG DR	Community Development Block Grants Disaster Recovery
CDBG MIT	Community Development Block Grants Mitigation
CIP	Capital Improvement Plan
COG	Council of Government
CPF	Community Project Funding
CWSRF	Clean Water State Revolving Fund
DCM	DEQ Division of Coastal Management
DEQ	Department of Environmental Quality
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
FEMA	Federal Emergency Management Agency
Flood Resilience	The capacity of individuals, a community, business, or natural environment to reduce, withstand, respond to, and recover from flooding by positively mitigating the impacts of changing conditions and challenges including climate change, increasing rain fall, and sea level rise, and adapting to those conditions.
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
Local Action Plan	Plans submitted through the Blueprint Tool that consist of flood resilience action(s) submitted by local governments or delegated authorities of local governments
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.
MPO	Metropolitan Planning Organization
NBS	Nature Based Solutions

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
NC OSBM	North Carolina Office of State Budget and Management
NIFMP	Natural Infrastructure Flood Mitigation Program
NCDMS	DEQ Division of Mitigation Services
NCDOT	North Carolina Department of Transportation
NFWF	National Fish and Wildlife Foundation
NGO	Nongovernmental Organization
NOAA	National Oceanic and Atmospheric Administration
NRCS WFPO	Natural Resources Conservation Service Watershed and Flood Prevention Operations
O&E Plan	Outreach and Engagement Plan
Priority Actions	Actions that met defined standards for flood risk reduction and appropriateness
PUBG	Potentially Underserved Block Group
RCCP	Resilient Coastal Communities Program
RBAG	River Basin Advisory Group
RBAS	River Basin Action Strategy
Representative Actions	Actions that showcase a balanced, illustrative suite of flood resilience solutions across the river basin.
Resilience	Capacity of individuals, a community, business, or natural environment to reduce, withstand, respond to, and recover from flooding by positively adapting and mitigating the impacts of changing conditions and challenges, including flooding and climate change.
RPO	Rural Planning Organization
SRF	State Revolving Funds
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
WRDG	Water Resources Development Grant Program
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

In 2021, the North Carolina General Assembly (NCGA) directed the North Carolina Department of Environment Quality (DEQ) to develop a statewide Flood Resiliency Blueprint (Blueprint). The Blueprint serves as the backbone of NC's flood resiliency planning and is based on the best available science, stakeholder engagement, and sound decision-making to develop cost-effective flood resilience actions. Working closely with local governments and state agencies, the Blueprint supports coordinated, proactive investments that strengthen community resilience across North Carolina. At the heart of the Blueprint is an online decision-support tool to help local governments, agencies, and non-governmental partners develop, evaluate, and prioritize resilience actions as well as plan and marshal funding to implement those priorities. The Blueprint supports a wide array of potential actions such as floodplain restoration, stream debris removal, elevation of utilities, stormwater controls, and policy changes. The Blueprint will make North Carolina more resilient to flooding by funding projects that limit flood extent and severity, allowing communities to recover more quickly and limit future risk as storms become more frequent and severe.

Flood Resiliency 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). Recently, Hurricanes Helene and Debby (2024), Potential Tropical Cyclone Eight (2024), and Tropical Storm Chantal (2025) have had devastating impacts statewide in the Mountains, Piedmont, and Coastal Plain. Flooding is not limited to tropical storms. Flash flooding from localized severe rain events has caused tremendous damage and loss of life across the state.

These events have demonstrated that flood risk is a statewide challenge that affects communities, infrastructure, economies, and natural systems across all of North Carolina's 17 river basins, highlighting the need for coordinated, proactive investments to increase flood resilience statewide.

The Blueprint was established to address this need. NCGA directed DEQ to develop the Blueprint through NC Session Law 2021-180, SB105. The Blueprint is North Carolina's science-based and stakeholder-driven initiative designed to support the planning, evaluation, and implementation of flood resilience actions.

Flooding impacts North Carolina's people, infrastructure, and systems in many ways. Building flood resilience and making proactive investments to reduce flood damage and disruption requires coordinated efforts across all levels of government. The Blueprint is working closely with local governments, organizations, and fellow state agencies to craft and implement resilience strategies throughout the six priority basins – Cape Fear, French Broad, Lumber, Neuse, Tar-Pamlico, White Oak (Figure 1) – to progress the program's mission.

Blueprint Mission

To provide the data, tools, and capacity to support decision making at the local, regional, and state level, while also strategically implementing flood resilience projects by leveraging available funding and filling gaps left by existing programs.

North Carolina River Basins

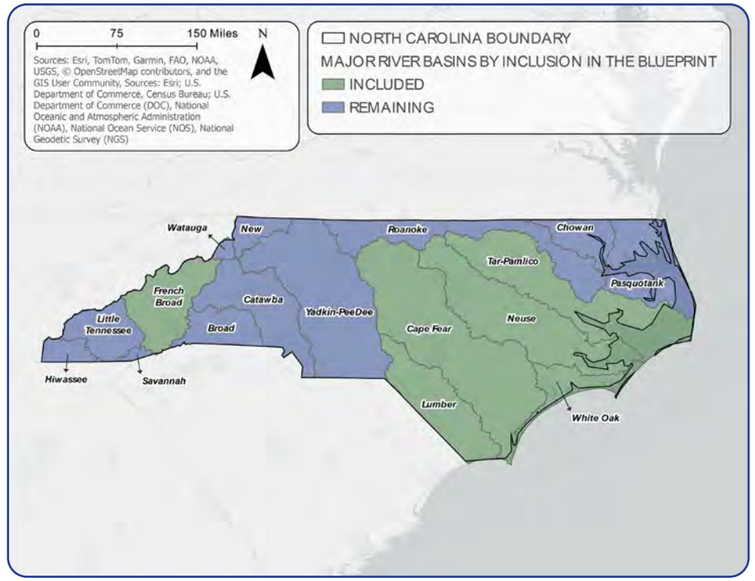


Figure 1. Map of North Carolina River Basins and Blueprint program status.

Objectives

As a first-of-its-kind comprehensive program for planning, modeling, and project development, the Blueprint unifies existing resources and knowledge, leveraging the best available science and tools in order to enhance North Carolina's flood resilience in a cost-effective manner. The Blueprint consists of several components developed in three phases, each of which will be covered in more detail. Each component has been developed to achieve the Blueprint's three legislative objectives.

Blueprint Objectives:

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

Blueprint Phases

Blueprint is being completed in three phases of development, each focused on a core program component:

1. Develop the **Blueprint Process**
2. Build and launch the **Blueprint Tool**
3. Publish **River Basin Action Strategies**

Blueprint in Action

These phases can be broken down into eight key steps (Figure 2) that guide communities through the development of River Basin Action Strategies (RBAS), including this Neuse RBAS.

The Blueprint process (Figure 2) is intended to move communities from shared understanding of flood risk to locally informed action identification, evaluation, implementation, and future updates. This structure is important for the Neuse RBAS because the basin includes varied flood sources, development patterns, community capacity, and infrastructure vulnerabilities. As such, recommended actions must be grounded in both technical analysis and local input. The steps shown in Figure 2 also help explain the organization of this document: the sections that follow summarize basin context, data and modeling, engagement, risk and vulnerability findings, action review and prioritization, funding considerations, and next steps for implementation – all critical components of the Blueprint.

Phase I established the Blueprint process by applying foundational resilience planning practices to create a structured, step-based framework (Figure 2). This framework reduces cost and complexity while supporting consistent RBAS development. A Draft Neuse RBAS was also developed in Phase I to serve as both a model and the foundation for later phases.

In Phase II, the Blueprint Tool was created, tested, and launched. The Blueprint Tool is an online decision support resource that enables a user to work through the Blueprint process steps. The Tool provides flood risk and vulnerability assessments, supports evaluation and prioritization of mitigation actions, and informs the development of Local Action Plans. Phase II also advanced a 2D Rain-on-Grid modeling approach which better represents exposure to flooding under current conditions. This also allows for the projection of future flooding in the Neuse River Basin that reflects expected changes in precipitation, sea level, and land use. These enhancements improve the accuracy and usability of flood risk information and are integrated into the Tool. Ongoing efforts focus on Tool refinement and expanding local adoption.

Flood Modeling, Mapping, and Risk

FEMA Flood Insurance Rate Maps (FIRMs) are official maps developed to support the National Flood Insurance Program (NFIP). They are a useful tool, but they have limitations. A study of eastern North Carolina found that 43% of flood damages between 1996 and 2020 occurred outside mapped FEMA floodplains (Garcia et al.,2025).[1] To address these limitations, DEQ partnered with North Carolina Emergency Management to develop improved 2D rain-on-grid models. This approach provides enhanced insight into flood depth, extent, and velocity across watersheds and can identify potential flood risk in areas that may not be fully captured by regulatory maps. The resulting flood maps and risk data underpin the Blueprint tool and the analysis presented in this RBAS.

[1] Garcia et al. (2025, July 14). Reconstructing Repetitive Flood Exposure Across 78 Events From 1996 to 2020 in North Carolina, USA. Retrieved from AGU: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025EF006026

Now, the Blueprint program is entering a critical stage as early investments in planning, modeling, and tool development are applied across the six priority basins. Phase III, launched in 2024, applies the Blueprint process and the Tool to develop RBAS for priority basins, including updating the Neuse RBAS. During the Neuse RBAS development, local and regional government staff have been engaged and trained on the use of the Tool to submit Local Action Plans, 113 priority actions were identified from the Local Action Plans in the development process (for more about identifying and evaluating actions, see Neuse River Basin Action Strategy section).

The Blueprint Beyond RBAS Development

The completion of the Neuse RBAS is an important milestone toward flood resilience, but much work remains. Sustained technical support for local governments and other partners is critical to continuing the planning and implementation of flood resilience actions. DEQ and its partners will continue to provide targeted assistance to local governments to support planning, project development, and implementation while building local capacity. Through the implementation of the Neuse RBAS, DEQ will work to align efforts across local, state, and federal levels, resulting in more impactful and efficient investments in flood resilience.

The Blueprint process calls for each RBAS to be updated on a 5-year cycle, contingent on funding. In each update, River Basins will integrate newly available data and review updated Local Action Plans within the Tool to revise the RBAS priority action list. These are just some of the reasons continued investment in the Blueprint by the NCGA and NC DEQ leadership will enable broader implementation, support resilient recovery, and advance prioritized projects, strengthening flood resilience across North Carolina.

Combined, these phases can be broken down into eight key steps (Figure 2).

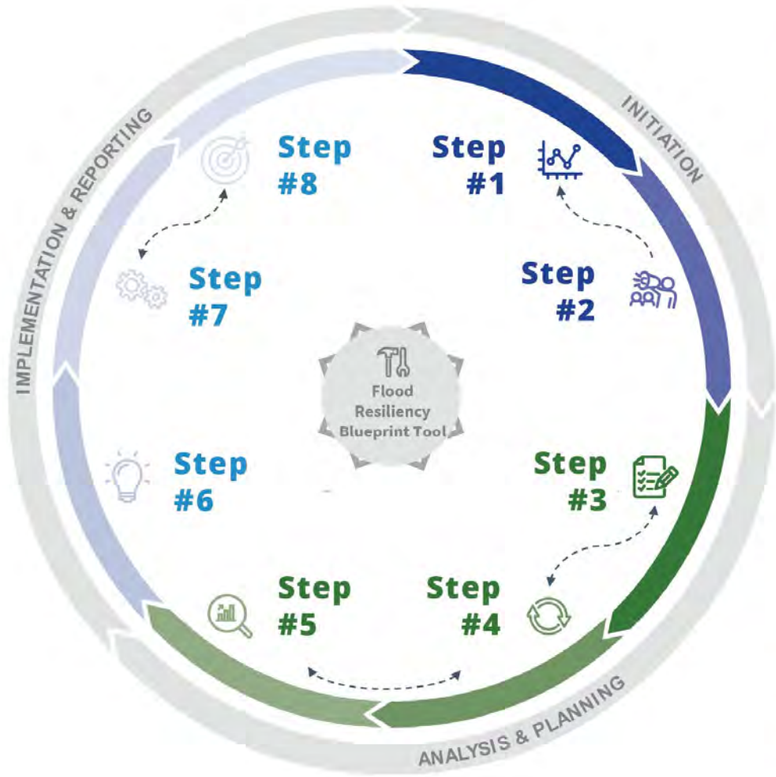


Figure 2. North Carolina Department of Environmental Quality (DEQ) Flood Resiliency Blueprint Tool and Process (DEQ, 2024b).

Purpose of RBAS

Within this broader Blueprint framework, the RBAS applies the statewide process to basin-specific flood risks, needs, and priorities. DEQ's objective for each RBAS is to identify priority regions and mitigation actions within the basin. The RBAS also documents data needs and limitations to highlight areas where continued refinement may be needed. Development of an RBAS uses detailed flood modeling datasets for both current and future conditions to produce a detailed vulnerability assessment and support long-term planning. The RBAS process also features a capacity assessment to understand local governments' ability to plan, fund, and implement flood resilience actions. The capacity and vulnerability assessments help the State focus support and resources. Stakeholder engagement is also a central component of the RBAS process, helping ensure that decisions and recommendations are informed by local and regional entities and the specific needs of the basin. Overall, the RBAS results in a prioritized list of flood resilience actions that provides a starting point for 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 across 23 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).

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.

For the purposes of developing the Neuse RBAS, both for the vulnerability analysis and in community engagement, the basin was divided into three sub-basins (Figure 3) -- 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.

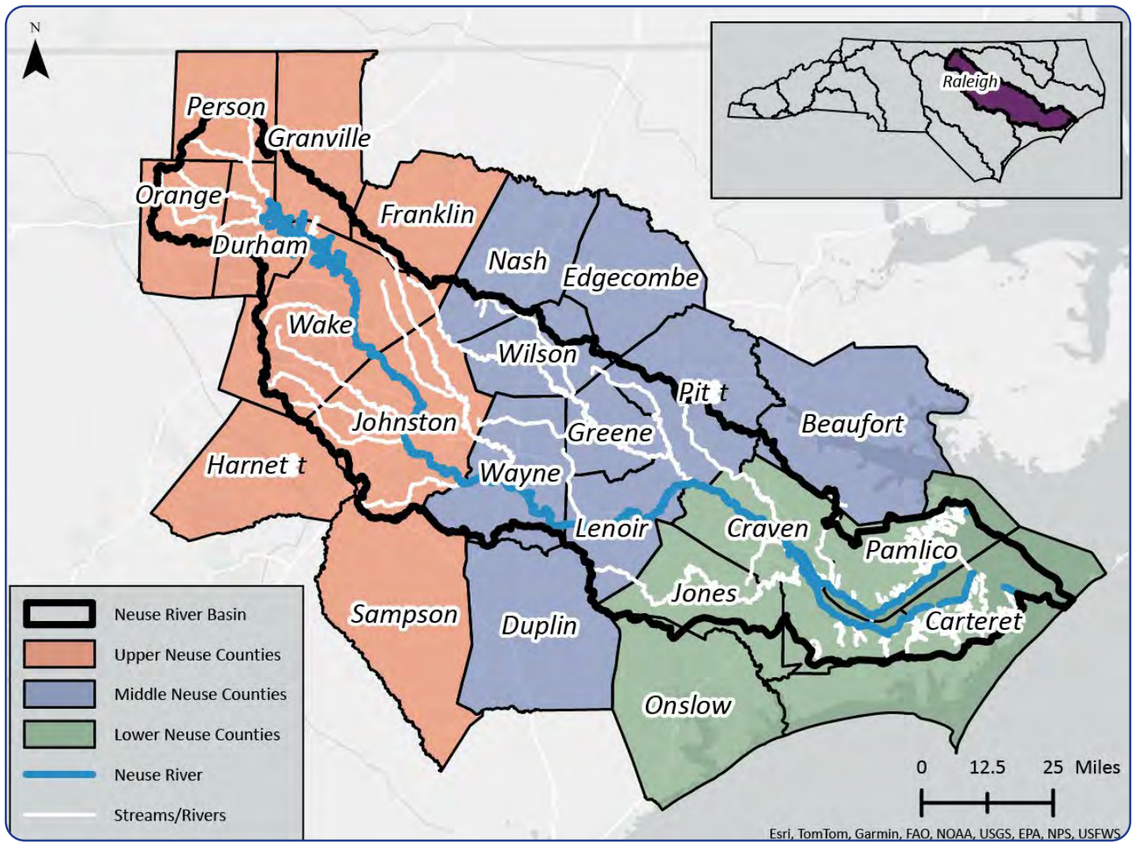


Figure 3: Map of the municipalities in each sub-basin.

Flood Risk

The Neuse River Basin experiences a variety of flood risks ranging from localized and flash flooding from frequent, small scale events to high impact events, most often associated with hurricanes and tropical systems. Long-term flood risk in the Neuse River Basin is influenced by changes in climate that can increase the frequency and magnitude of flooding over time. Population growth and rapid development can lead to increases in impervious surfaces and altered hydrology in parts of the basin.

Flood mitigation actions 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 effective and adaptable mitigation investments that strengthen long-term resilience. For more information on flood risk and vulnerability in the Neuse River Basin, see the Flood Risk Analysis and Planning section of this document.

Flood Drivers

In the Upper Neuse, intense rainfall can produce flash flooding, urban runoff, and localized tributary flooding even when the mainstem Neuse River remains within its banks. In the Raleigh area, Crabtree Creek and Walnut Creek are among the most visible sources of recurring urban flooding. Farther south, Swift Creek, Middle Creek, and other tributaries drain rapidly growing portions of Wake and Johnston Counties, increasing stormwater management challenges and contributing flow to downstream areas. Falls Lake provides flood storage on the upper Neuse River system and helps reduce downstream peak flows during major storms, although flood risk remains in tributary and downstream areas.

In the Middle Neuse sub-basin, flood risk becomes more concentrated along the mainstem as flows from major tributaries, including the Little River near Goldsboro and Contentnea Creek in Wilson, Greene, Pitt, and Lenoir Counties, move into the Neuse River corridor. Hominy Swamp Creek in western Lenoir County provides a localized example of recurring flood impacts and has been a focus of flood mitigation planning.

In the Lower Neuse sub-basin, mainstem river flooding remains a concern but is increasingly affected by downstream water levels in the estuary and Pamlico Sound. This interaction is especially important near New Bern, where the Trent River joins the Neuse and high river flows, elevated estuary levels, storm surge, and heavy rainfall can combine to create compound flooding.

History of Flooding

Over the past several decades, tropical storms and hurricanes have caused extensive flooding, loss of life, and significant economic damage across North Carolina. Flooding associated with Hurricanes Fran (1996) and Floyd (1999) highlighted limitations in existing floodplain management, hazard mitigation planning, and preparedness efforts. Flooding from Hurricanes Matthew (2016) and Florence (2018) reinforced the need for approaches that better account for future conditions and changing flood behavior. More recent events, like Hurricane Dorian (2019) and Tropical Storm Chantal (2025), further demonstrate the basin's continued exposure to flood hazards and have highlighted the need for continued improvements in forecasting, planning assumptions, and flood resilience strategies (Davis, 2024).[2]

Significant flooding is also experienced throughout the basin during unnamed storm events. Events such as high tide flooding, flash floods, and intense rainfall cause considerable impacts to communities, causing road closures and damage to homes and businesses. These events can also cause fatalities, especially when the intensity of a storm is unexpected. In August 2025, severe rainfall and flooding caused major road closures throughout the Neuse River Basin and led to two deaths in Nash County (Daniely, 2025).[3]

[2] Davis, C. (2024, September 5). Five Years Ago, Dorian Tested Our Post-Florence Preparedness. Retrieved from North Carolina State Climate Office: https://climate.ncsu.edu/blog/2024/09/five-years-ago-dorian-tested-our-post-florence-preparedness/

[3] Daniely, W. (2025, August 11). Monday storms part of summer weather whiplash around Raleigh & central NC. Retrieved from WRAL News: https://www.wral.com/weather/monday-storms-summer-whiplash-raleigh-central-nc-aug-2025/

Basin Dynamics

Weather and Climate

The Neuse River Basin experiences a humid subtropical climate characterized by warm, humid summers, generally mild winters, and precipitation throughout the year. Tropical storms and hurricanes have played a significant role in some of the basin's most damaging flood events, while seasonal thunderstorms and prolonged rainfall can also contribute to flooding. North Carolina's climate has warmed by more than 1°F since the beginning of the 20th century, and climatic conditions across the basin contribute to a range of flood hazards, including flash, riverine, coastal, and compound flooding (NOAA NCEI, 2022).[4]

Projections from downscaled climate models 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.

The 2023 North Carolina Enhanced State Hazard Mitigation Plan anticipates increased flood hazards due to climate trends, including more extreme precipitation, storm intensity, and sea level rise.

[4] NOAA National Centers for Environmental Information (NCEI). North Carolina State Climate Summary 2022. Asheville, NC: NOAA National Centers for Environmental Information, 2022.

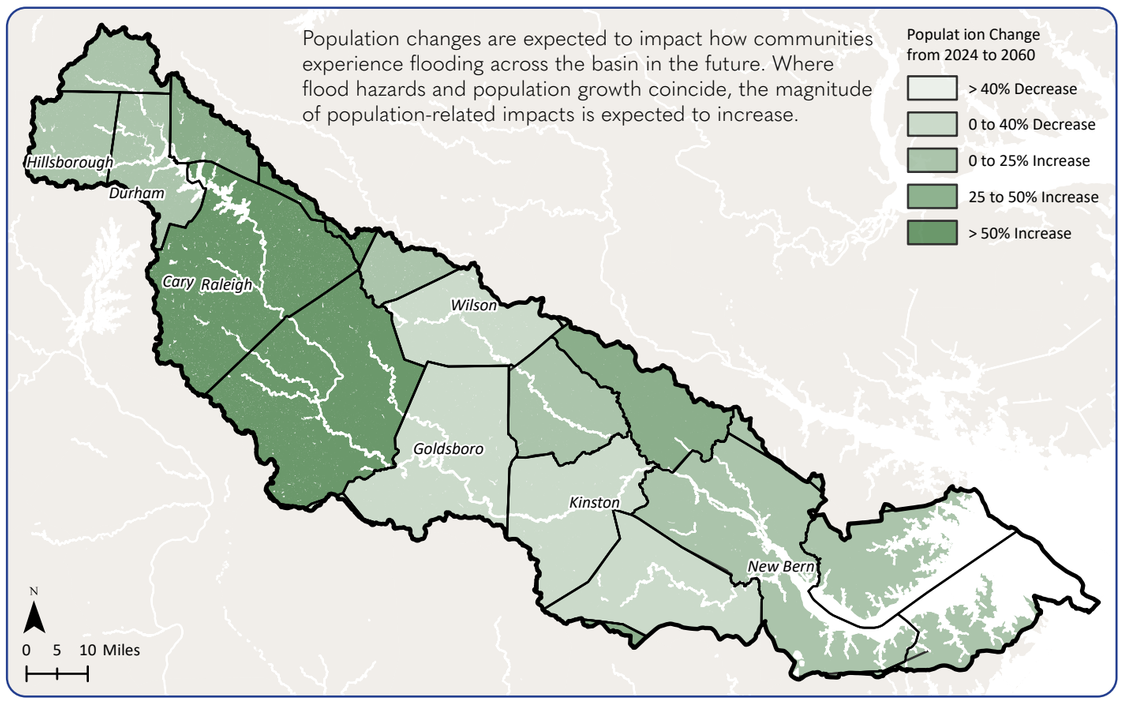


Figure 4: Projected Percent Change in County Population, 2024 to 2060. Source: North Carolina Office of State Budget & Management, Vintage 2025 Population Projections.

Umstead State Park in Raleigh, NC

Population Shifts

The Neuse River Basin is home to approximately 2.12 million people, with nearly 75% of the basin population living in the Upper Neuse around Raleigh, Durham, and Hillsborough. The basin has experienced significant population growth over the past two decades and now represents a large share of North Carolina's total population. Figure 4 shows projected county-level population change across the basin between 2024 and 2060 (North Carolina Office of State Budget and Management, 2025)[5], illustrating some counties are projected to continue growing, while others are projected to remain relatively stable or decline.

Projected population shifts are relevant to Neuse RBAS development and strategic flood resilience planning because growth can influence where land use and development changes occur. In communities with limited growth or population decline, capacity constraints may affect the ability to plan for, fund, and implement flood risk management actions. The population changes shown in Figure 4 provide context for interpreting future population exposure, local capacity needs, and the types of actions that may be needed across different parts of the basin.

Land Use Changes and Development

Land use changes, combined with increasing flooding under mid-century (2050) projects, leads to increased exposure across all land use types (e.g., developed, agricultural, and natural areas) in the basin. Wetlands in the Upper Neuse are already roughly 75% inundated under current conditions, limiting additional natural buffering. In the Middle Neuse, cultivated cropland exposure increases by roughly a fourth. In the Lower Neuse, exposure grows by more than 50% across green areas (e.g., grassland/herbaceous, shrub/scrub, forested, and cultivated classes). 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. The increase in impervious surfaces associated with population growth and development can prevent water from infiltrating the soil and increase surface runoff during rainfall events. These three factors – more frequent and severe flooding, population growth, and land use changes -- have collectively influenced the frequency, intensity, and spatial distribution of flooding events within the Neuse River Basin.

[5] North Carolina Office of State Budget & Management (NC OSBM), Vintage 2024 Population Estimates & Vintage 2025 Population Projections

RIVER BASIN ACTION STRATEGY DEVELOPMENT PROCESS

The Neuse RBAS was developed through a multi-step process (Figure 2). The first step in that process involved a literature review to identify existing plans, data, and programs in the Neuse River Basin (Figure 5). This review was done to document previous and current flood resilience efforts in the basin and compile a list of pre-identified flood resilience actions. The resulting list of 1,235 pre-identified actions was then used as a resource during Blueprint engagement with local and regional governments.

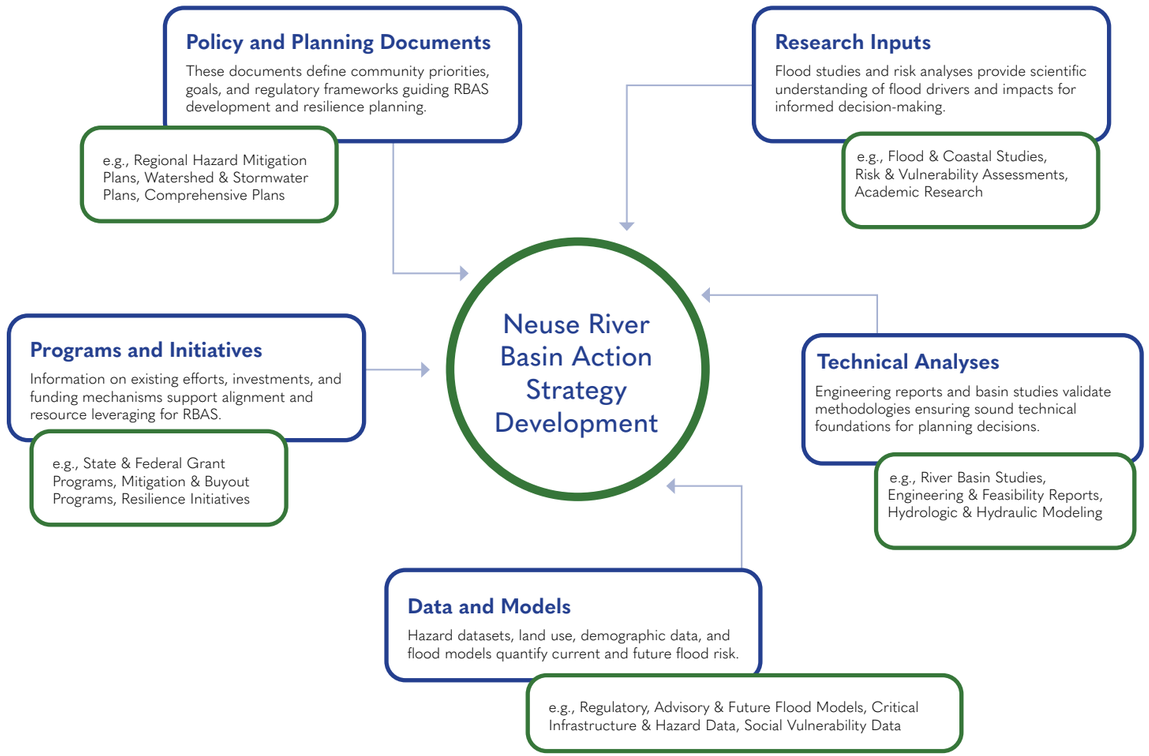


Figure 5. Resource types informing the Neuse River Basin Action Strategy Development Process

The Neuse River Basin flood risk vulnerability assessment was conducted to produce a clear understanding of current and potential future flood risk across the basin. Using outputs from the advisory data created for the Blueprint Tool, new insights were made into flood risk locations and magnitudes; these insights informed the identification and selection of several priority actions (Table 2) across the river basin. Stakeholders and the public were engaged throughout the Neuse RBAS development process to gather key insights and perspectives on flood resilience needs and community priorities.

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 an inventory of up-to-date and credible flood resilience efforts. This inventory includes a wide variety of information types as shown in Figure 5. These resource types served complementary purposes: plans and strategies identified documented priorities, research projects provided technical insight, programs outlined implementation pathways, and datasets are relevant to modeling, screening, and action evaluation.

Figure 5 summarizes the major resource types reviewed during development of the Neuse RBAS, including plans and strategies, research projects, programs, and datasets. These resources collectively help to update the inventory of existing flood resilience efforts in the basin, identify previously documented actions and needs, and inform later steps in modeling, engagement, action development, and prioritization. The range of resource types also reflects the purpose of the Blueprint process: to build from existing local, regional, and state knowledge rather than duplicating prior efforts.

Resources included in the literature review and data inventory met the following criteria:

- Basin-wide or smaller geographic scope: 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.
- Importantly for the development of the Neuse RBAS, this inventory provided a starting point for identifying pre-existing flood resilience actions to support the development of Local Action Plans. Actions documented in plans, studies, programs, and related datasets were compiled and used to inform stakeholder discussions. It also allowed for the pre-population of actions in the Tool, potentially streamlining the development of Local Action Plans and reducing capacity demands on local governments in the Blueprint process.

As flood resilience related planning, research, and other efforts continue, this inventory should be revisited in collaboration with local and regional governments to ensure that relevant advancements are integrated into the updated RBAS (currently planned for a 5-year update cycle, contingent on funding). Additional detail about the resource inventory and update process is compiled in the Appendix A: Data Collection Report. State-scale resources reviewed during earlier Blueprint phases are summarized in the Draft RBAS Strategy.

Updated Plans and Strategies

Primary plan and strategy types with Neuse River Basin-relevant flood resilience 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.

Updated Programs

Four state and local programs were identified within the Neuse River Basin. DEQ Division of Coastal Management (DCM) administers the Resilient Coastal Communities Program (RCCP) providing technical and financial assistance for coastal resilience efforts. DEQ 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 (NCFMP) and Central Pines Regional Council Water Resources Program also provide or develop projects within the basin. NCFMP supports flood hazard data and mapping products, while the CPRCWRP provides regional coordination, technical assistance, and watershed planning support for communities.

Updated Research Projects

In 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 Environmental Finance Center (EFC) at UNC-Chapel Hill, 2021).[6] 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 (Thomson, et al., 2021).[7] 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 (Doll, et al., 2020).[8] 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 (NOAA, 2021).[9]

Updated Data Sets

Data sets inventoried for the Neuse RBAS 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.

Hurricane Matthew Flooding at Contentnea Creek

[6] The Environmental Finance Center (EFC) at UNC-Chapel Hill. (2021). Flood resilience and NC water and wastewater utilities. Retrieved from https://collaboratory.unc.edu/wp-content/uploads/sites/476/2021/05/flood-resilience-and-nc-water-and-wastewater-utilities.pdf

[7] Thomson, H., Zeff, H. B., Kleiman, R., Sebastian, A., & Characklis, G. W. (2021, May 1). Financial Risk of Flood Events in Eastern North Carolina. Retrieved from https://collaboratory.unc.edu/wp-content/uploads/sites/476/2021/05/financial-risk-of-flood-events-in-eastern-north-carolina.pdf

[8] Doll, B., Line, D., Kurki-Fox, J., & Page, J. (2020, June). Flood Abatement Assessment for Neuse River Basin (NCDOT Project RP-2018-32). Retrieved from https://connect.ncdot.gov/projects/research/RNAProjDocs/Final%20Report%20RP2018-32.pd

[9] National Oceanic and Atmospheric Administration (2021). Improving North Carolina's Resilience To Coastal Riverine Flooding. Retrieved from https://repository.library.noaa.gov/view/noaa/49651

Local & Regional Capacity

A Local and Regional Government Capacity Assessment (Appendix C) was completed as part of the Neuse RBAS development process. The purpose of the capacity assessment is to understand communities' ability to plan, secure funding, and provide the administration needed to manage grants and implement actions. The assessment complements capacity scores in the Blueprint Tool and is not intended as a definitive measure; rather, it provides a baseline understanding of relative capacity across communities and helps identify where additional support may be needed.

The assessment was conducted through a desktop review of publicly available information from municipal and county websites, regional planning councils and Councils of Government, state databases, U.S. Census Bureau American Community Survey (ACS) data, and other relevant sources. Each jurisdiction was scored across three assessment domains, which were combined into a composite score. Where information was missing or could not be interpreted, the relevant indicator was scored as zero, which may understate capacity in some cases. Additional information on the assessment domains is provided below, with full methods and results included in Appendices A (Data Collection Report) and C (Blueprint Capacity Results Spreadsheet).

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, budgets, and revenue reporting) 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).

Higher-capacity jurisdictions are generally better positioned to manage activities such as engineering and design, procurement, grant administration, program management, and long-term operations and maintenance. Smaller jurisdictions often have fewer dedicated stormwater staff, planning tools, and local funding sources, increasing reliance on county services, Councils of Governments (COG), Blueprint staff, or other regional partners. Assessment results indicate a concentration of higher-capacity jurisdictions in the Upper Neuse, more variation in the Middle Neuse, and the widest range of capacity in the Lower Neuse. Missing technical and financial information was most common among the smallest jurisdictions, highlighting where follow-up and targeted assistance may be warranted.

These findings have direct implications for implementation. Capacity constraints can affect a jurisdiction's ability to identify needs, develop projects, secure funding, and manage implementation over time. Existing support from Blueprint staff, COG partnerships, and programs such as RCCP can help supplement local capacity, but additional recurring resources and sustained technical assistance will be needed to address gaps more comprehensively over time.

COMMUNITY ENGAGEMENT & DISCOVERY

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 B) 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 throughout 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. The O&E Plan was developed to support the Blueprint program's mission: to 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 RBAS 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.

Engagement with Local Communities & Agencies

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.

Upper Neuse BPP 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 developing 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) as part of a Local Action Plan. 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 Tool trainings were offered to BPPs. These training sessions included live demonstrations of several Tool 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.

Neuse BPP Meetings Summary

Three meetings were held for each sub-basin BPP group over the course of Neuse RBAS 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 BPP 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. They pointed to 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 (NGOs). 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 BPPs, 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.

RBAG Meeting

Middle Neuse BPP Meeting

Engagement with the General Public

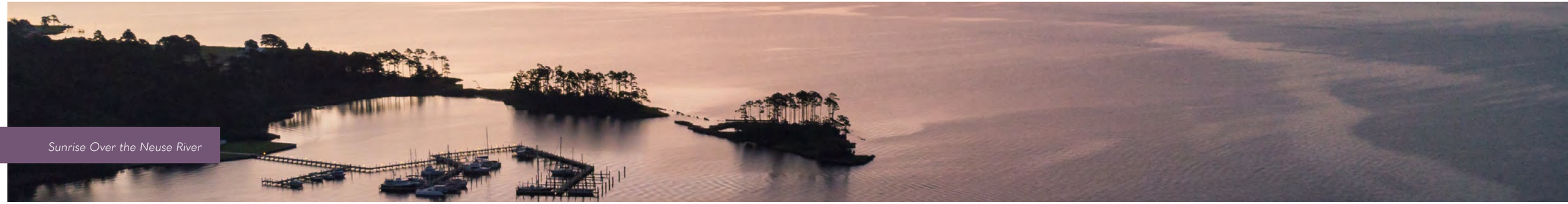
The people and stewards of places most impacted by flooding and future flood risks were a critical piece of the outreach and engagement effort. Residents, businesses, and organizations from across the Neuse River Basin were invited to attend public meetings during Action Strategy development. The Action 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

Based upon Vulnerability Assessment (Appendix E) and Local and Regional Government Capacity Assessment (Appendix C) 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 and were therefore further engaged to support Blueprint 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 in the six priority river basins. The presentation also covered how the Action Strategy will be implemented, and the next steps of the Blueprint program. 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 identifies 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 E: 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 and affect populations facing greater challenges preparing for, responding to, and recovering from flood events. Across the basin, vulnerability varies based on several characteristics including development patterns, infrastructure concentration, and the distribution of potentially underserved block groups (PUBGs). Assessing vulnerability as part of this Action Strategy helps support and inform targeted flood resilience actions across the Neuse River Basin.

Explore Flood Data in the Blueprint Tool

Detailed flood maps and risk data can be explored through the Blueprint Tool (see the Tool's quick start guide). The Tool also includes impact assessments and community-scale vulnerability information for communities throughout the Neuse River Basin. This vulnerability assessment and additional flood risk data can be viewed within the Tool for local governments and organizations to explore, craft, analyze, and evaluate flood resilience actions. This advisory data can help support communities in their long-term flood resilience planning, as the data available includes flood risk extents based on future conditions (2050 and 2100).

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 the dominant driver, 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.

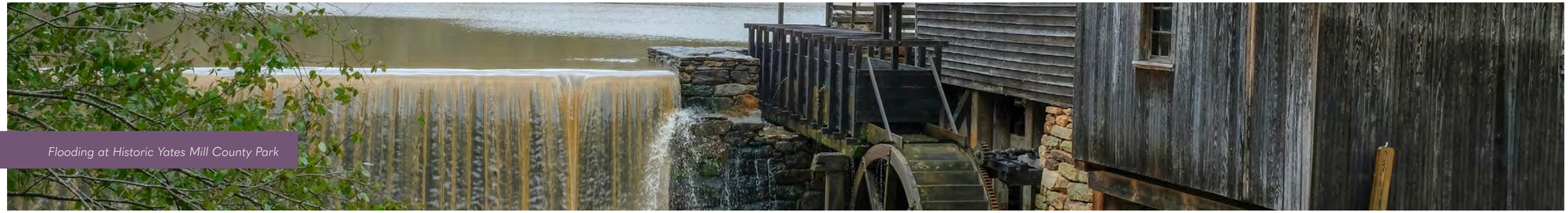
Across the basin, flood behavior reflects differences in topography, land use, and other location and vulnerability-based characteristics (for more information on geographic influences on flood risk see Appendix E. Flood Risk and Vulnerability Report). While there is considerable variation in flooding 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.



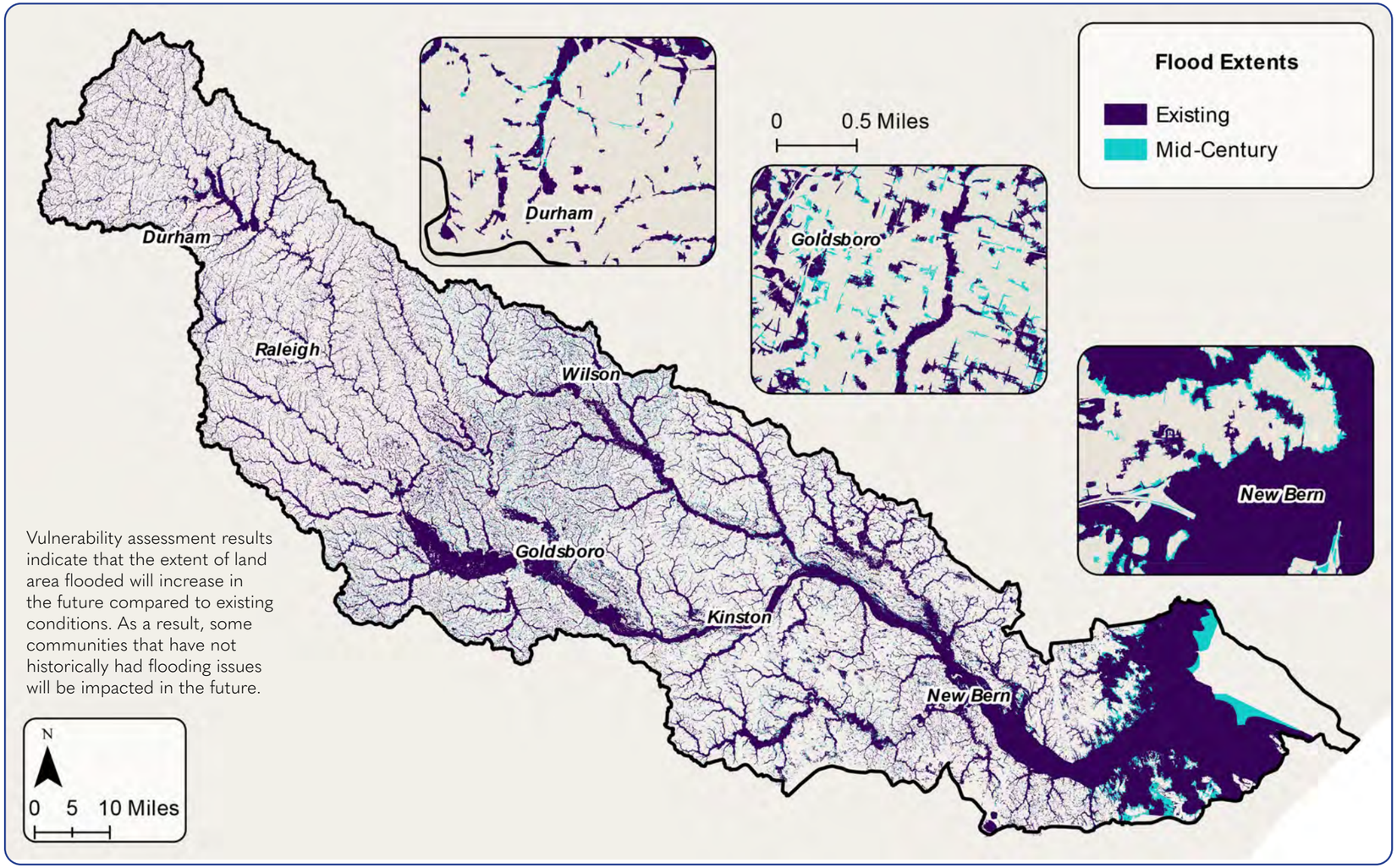
Flooding at Historic Yates Mill County Park

Current Conditions - Risk

Under current conditions, approximately 21% of the Neuse River Basin's land area is exposed to flooding during a 1% AEP event. This includes more than 205,000 residents, or 9.6% of the basin-wide population. Figure 6 shows the modeled existing and mid-century 1% AEP flood extents and provides spatial context for how exposure varies across the basin. The map shows more confined flood extents in portions of the Upper Neuse and broader floodplain exposure through much of the Middle and Lower Neuse.

Flood exposure also varies by land cover. Wetlands are the most exposed land cover types under current conditions, with 58.1% of emergent herbaceous wetlands and 57.4% of woody wetlands located within the 1% AEP flood extent. This high exposure reflects the location and function of wetlands within low-lying floodplain areas. While frequently exposed, wetlands can also moderate flood impacts by providing infiltration, storage, and flow attenuation that can reduce flood depths and slow runoff under certain conditions.

Population exposure is highest in absolute terms in the Upper Neuse, where approximately 127,000 residents are exposed during a current 1% AEP event. This sub-basin also experiences the highest absolute damage costs under current conditions. In the Middle Neuse, approximately 50,000 residents are exposed to flooding for a 1% AEP event. The transition from steeper Piedmont landscapes to the lower-relief Coastal Plain in the Middle Neuse results in broader floodplains and slower drainage patterns contribute to exposure. In the Lower Neuse, approximately 28,800 residents are exposed and although this is the smallest exposed population in absolute terms, the sub-basin has the highest relative population exposure, meaning a larger share of its residents are affected by flooding. These distinctions help explain why different parts of the basin require different flood resilience approaches (see Neuse River Basin Action Strategy section for more details).



Vulnerability assessment results indicate that the extent of land area flooded will increase in the future compared to existing conditions. As a result, some communities that have not historically had flooding issues will be impacted in the future.

Figure 6. Flood Extents for a 1% AEP event

Falls of Neuse Road Crossing in Raleigh, NC

Future Conditions - Risk

Under mid-century future conditions, flood exposure increases across the Neuse River Basin and in all three sub-basins. Basin-wide land exposure is projected to reach approximately 23%, an 11% increase from current conditions. Population exposure is also projected to increase, rising from approximately 9% to 11% of the basin-wide population. This results in more than 239,000 residents projected to be exposed to flooding by 2050 during a 1% AEP event.

In the Upper Neuse sub-basin, approximately 138,000 residents are projected to be exposed to flooding during a mid-century 1% AEP event. Because the Upper Neuse contains the basin's largest population and concentration of development, increases in exposure are expected to mean increased flood related impacts.

Figure 7 shows where increased population exposure is projected to impact PUBGs, including communities with fewer resources to prepare for, respond to, or recover from flooding. These areas may warrant particular attention during action refinement, technical assistance, and implementation planning.

Exposure also increases in the Middle Neuse sub-basin, largely due to expanding floodplains across multiple counties. By mid-century, exposure to a 1% AEP flood event could impact approximately 20% of land area and nearly 66,000 residents in the Middle Neuse with exposure increases greater than 10% for most counties expected by mid-century.

In the Lower Neuse sub-basin, future flood exposure remains widespread due to the sub-basin's low-lying geography and combined riverine, coastal, and tidal flood influences. All five counties in the Lower Neuse are projected to have greater exposure by mid-century. Approximately 35% of the sub-basin's land area and more than 34,000 residents are projected to be exposed to flooding during a mid-century 1% AEP event.

Future flood exposure increases across the basin, though implications vary by sub-basin. The Upper Neuse continues to have the largest absolute number of exposed residents, the Middle Neuse shows broad increases across all counties, and the Lower Neuse continues to have extensive land exposure and high relative exposure. These patterns help explain why sub-basin-specific flood resilience approaches are needed.

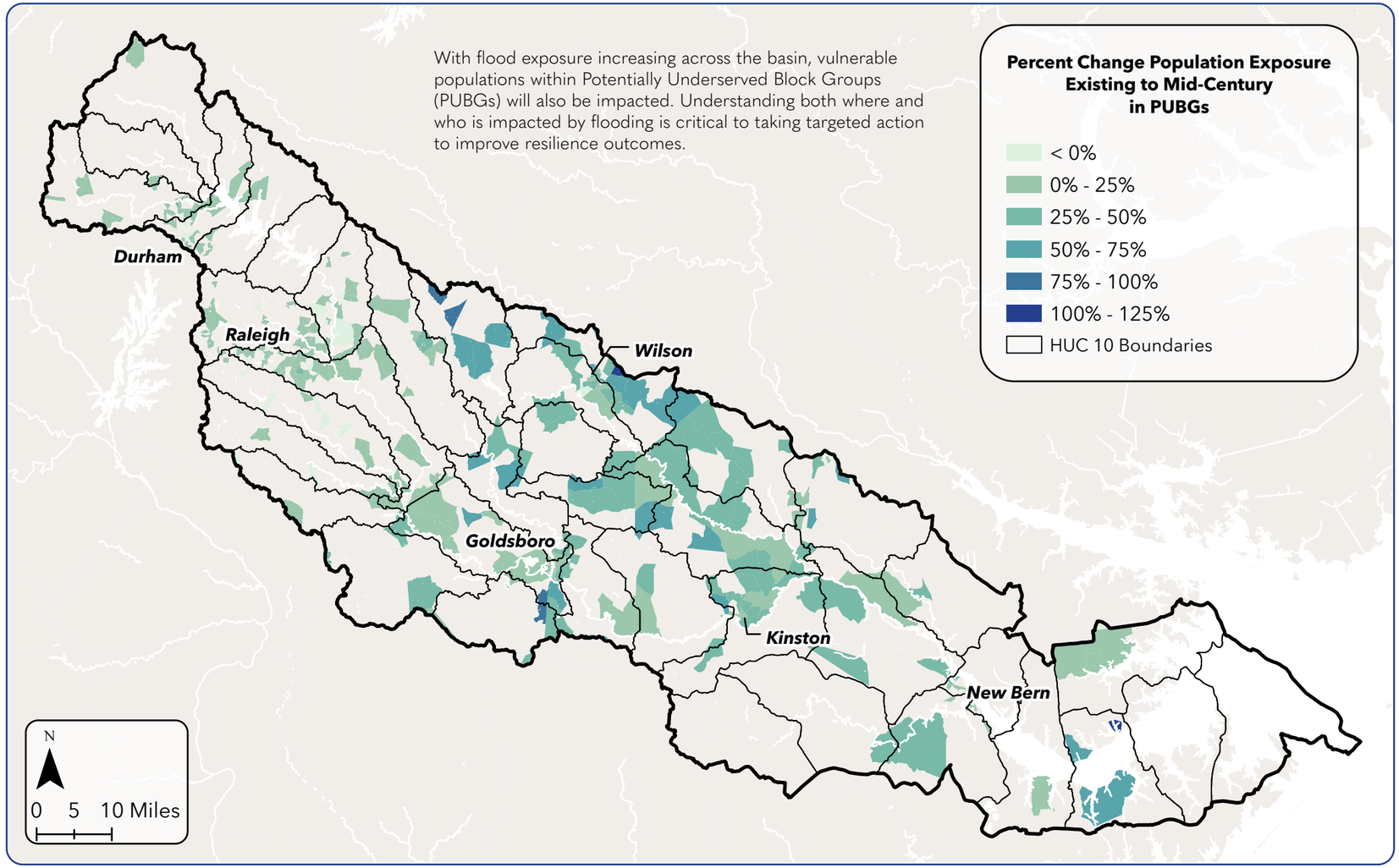
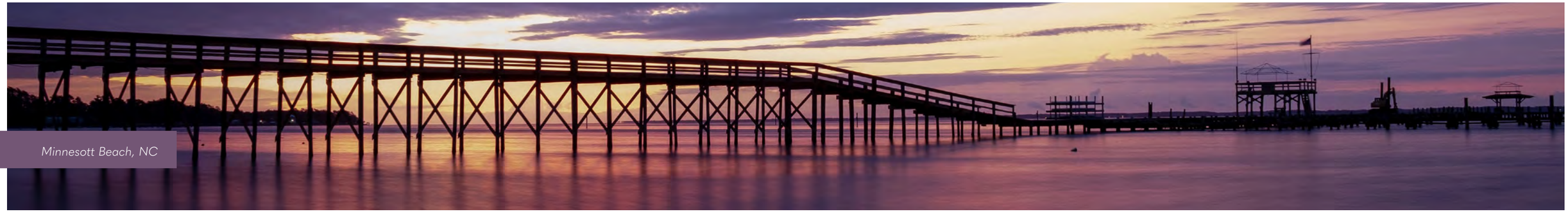


Figure 7: Change in population exposure from existing to mid-century within potentially underserved block groups (PUBGs).



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.

Flood exposure may cause repeated roadway inundation and exposed critical facilities, increasing the potential for service disruptions during flood events. Roadway exposure is already widespread in portions of the Upper and Middle Neuse, where riverine flooding and heavy rainfall can combine to affect transportation corridors. In the Lower Neuse, vulnerability is compounded by the interaction of riverine, coastal, and tidal flooding processes. Water and transportation infrastructure have notable exposure under current conditions. Current conditions demonstrate clearly how 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 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 flood event.

Figure 8 shows average annualized loss (AAL) for structures under current conditions by HUC10 and helps illustrate how building damages vary across the basin. Within the Lower Neuse, AAL across all buildings is notably higher from coastal flooding than from riverine flooding. AAL results across the basin reflect varying but clear patterns of vulnerability.

Average Annualized Loss

Average Annualized Loss (AAL) is a metric used to measure flood risk. It is difficult to predict exactly where and when flooding disasters will occur in the future. Instead, experts use flood probabilities to calculate the cost of damage (in dollars) that a property or region is expected to experience per year, over a long period of time.

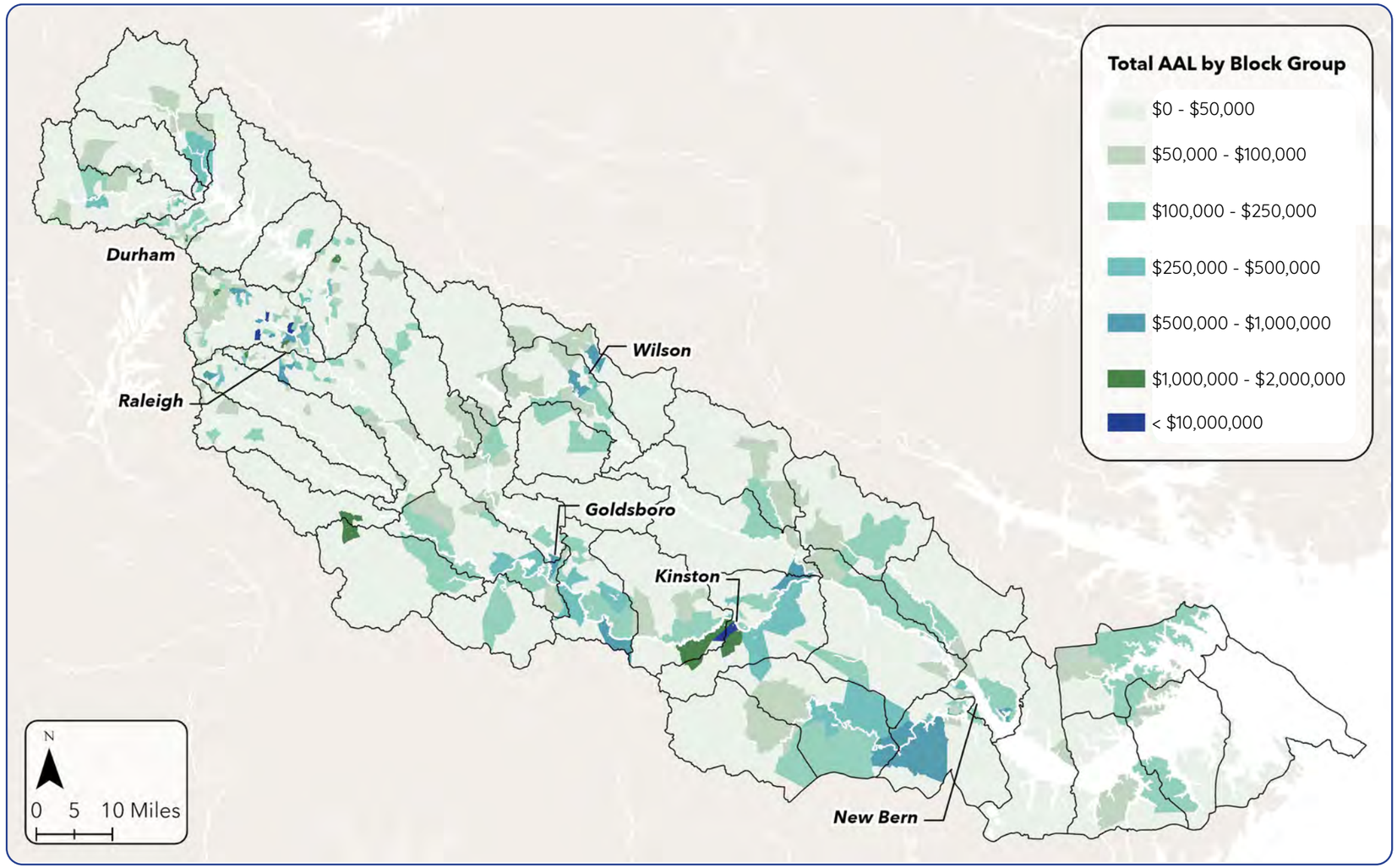


Figure 8. Total average annualized loss (AAL) for structures under current conditions by HUC10.

Future Conditions - Vulnerability

Flood vulnerability is expected to increase across the Neuse River Basin with expanded exposure affecting a greater share of residents, residential structures, critical facilities, and infrastructure systems. Increased exposure increases the potential for flooding to cause disruptions to housing, mobility, utility service, emergency response, and other essential community functions.

In the Middle Neuse, counties are projected to experience an almost 50% increase in residential building exposure and a 30% increase in exposure of vulnerable populations. In the Lower Neuse, exposure increases for the total population; the percentage of exposure for PUBGs is projected to rise from approximately one-quarter under current conditions to almost one-third by mid-century.

Land exposure and damages also increase, particularly in the Lower and Upper Neuse. In the Lower Neuse, flooded land area increases from approximately 31% to 35%, with portions of Carteret and Pamlico Counties exceeding 50% inundation by mid-century. Damages similarly increase from approximately $159 million to about $268 million. In the Upper Neuse, residential exposure increases to more than 5,700 homes by mid-century.

Total damages also increase from approximately $590 million to $774 million. Residential buildings account for more than 45% of projected damages for the Upper Neuse.

Figure 9 shows building damages by occupancy class under existing and mid-century 1% AEP conditions for each sub-basin. Commercial and residential structures in the Upper Neuse account for the highest damages in the basin, while the Lower Neuse shows substantial increases in damages as coastal and riverine while the Lower Neuse shows substantial increases in damages as exposure expands. Future flooding in the Neuse River Basin is expected to have growing implications across sectors, serving as motivation for the development of this Action Strategy.

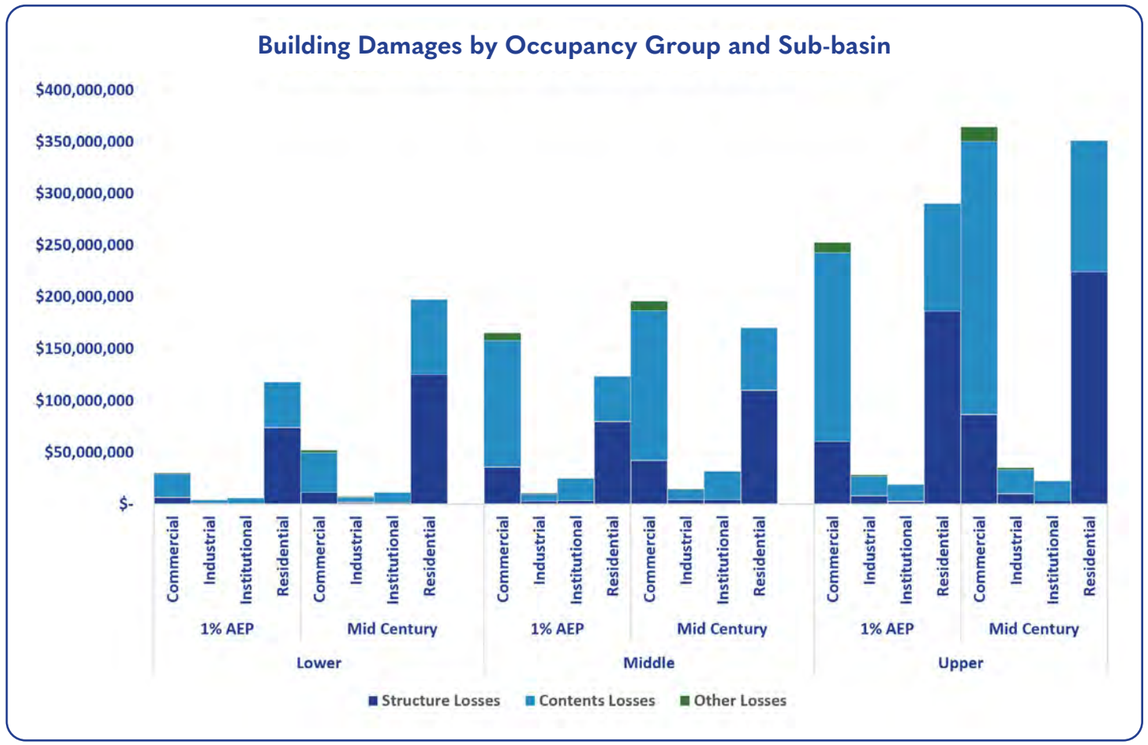


Figure 9. Building damages by occupancy group and sub-basin.

Table 1 shows how counties rank by percent exposure for population, PUBGs, critical facilities, roadways, and land area under existing and mid-century conditions. It is important to note that the rankings are based on percent exposure within each county and exposure category. A rank of 1 indicates the highest percent exposure among Neuse River Basin counties. Nash County provides one example of shifting relative exposure, with its rank increasing for population, PUBG, critical facility, and roadway exposure as compared to current conditions.

Table 1. County rankings by percent exposure for various categories under existing and mid-century conditions.

	Population Percent Exposure		PUBG Percent Exposure		Critical Facilities Percent Exposure		Roadway Percent Exposure		Land Area Percent Exposure	
County Name	Existing	Mid-Century	Existing	Mid-Century	Existing	Mid-Century	Existing	Mid-Century	Existing	Mid-Century
Beaufort	17	17	18	18	15	16	5	7	12	11
Carteret	7	9	20	20	1	1	2	2	1	1
Craven	2	2	2	2	2	2	9	10	3	3
Duplin	22	22	19	19	15	16	20	21	22	22
Durham	11	12	10	11	5	6	11	15	11	12
Edgecombe	21	21	20	20	15	16	23	13	18	16
Franklin	18	18	17	16	15	16	19	17	19	19
Granville	16	16	12	14	12	12	13	18	15	15
Greene	10	8	8	8	14	15	17	16	10	10
Harnett	23	23	20	20	15	16	21	23	23	23
Johnston	9	10	6	6	10	9	12	12	7	9
Jones	5	5	4	3	3	4	1	1	9	8
Lenoir	6	6	7	7	11	10	7	8	6	6
Nash	14	11	13	9	15	14	15	6	13	13
Onslow	19	19	20	20	15	16	22	22	20	20
Orange	13	13	14	13	7	8	6	11	17	17
Pamlico	1	1	1	1	4	3	4	4	2	2
Person	15	15	15	15	15	16	8	14	16	18
Pitt	8	7	11	10	13	13	18	19	4	4
Sampson	20	20	16	17	15	16	14	9	21	21
Wake	12	14	9	12	9	11	16	20	14	14
Wayne	3	3	3	4	6	5	10	5	5	5
Wilson	4	4	5	5	8	7	3	3	8	7

Implications for the Neuse River Basin Action Strategy

Both current and future flood risk and vulnerability findings inform the Neuse RBAS by identifying where 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 E) were used to develop strategic, vulnerability assessment based actions to be considered alongside locally prioritized actions, which were developed by Neuse River Basin communities. The results of this analysis demonstrate that in order for the Neuse RBAS to be effective, it needs to include a variety of action types that address the range of different flood risk conditions across the basin.

ACTION REVIEW, CREATION, ADJUSTMENT, AND SELECTION

This Neuse RBAS 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. This RBAS documents a refined and prioritized action set, summarizes the evaluation of actions against metrics to identify high priority actions, and highlights key funding, capacity, and technical assistance needs to help move actions toward implementation.

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

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 and submitted as part of Local Action Plans in the Blueprint Tool. 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

Action Prioritization Process

Action Inventory Development and Screening

An initial inventory of 1,235 resilience actions was compiled from previously developed local, regional, and state planning documents, including Hazard Mitigation Plans, Resilience Plans, Watershed Plans, Stormwater Master Plans, Comprehensive Plans and other flood and watershed-related studies. Actions were then screened for their relevance to flood resilience, feasibility, and consistency with Blueprint Program objectives. Actions that lacked a clear and measurable outcome, fell outside the program scope, or had already been completed were removed. This process narrowed down the inventory to 758 actions, which were uploaded to the Blueprint Tool as a starting dataset for local government review. Local governments could select actions from this pre-identified inventory, modify existing actions, or create new actions for inclusion in their Local Action Plans. The screening process was intended to establish a defensible and actionable starting dataset.

Priority Action Identification

Following Local Action Plan development, 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 (Table 2). This review resulted in 113 Priority Actions with a total estimated cost of $880,000,000.

High Priority Action Selection

Priority Actions were then screened using three metrics: local buy-in, feasibility and capacity, and potential impact and benefit. This review differentiated actions based on their local support, technical readiness, and the magnitude of flood resilience benefits. This process recognized that different jurisdictions have unique needs and that actions were in various stages of development. 29 High Priority Actions were selected based on this screening.

Representative Action Selection

Finally, 17 Representative Actions were selected from among the High Priority Actions. Representative Actions were selected to illustrate 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 (e.g. assessment, planning, design, construction, etc.)

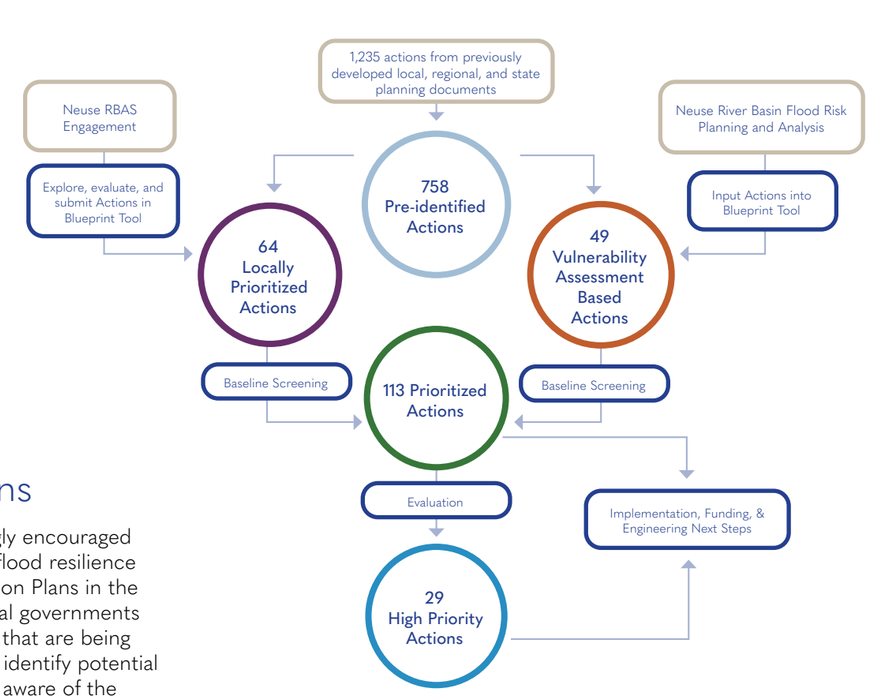


Figure 10: Evaluation framework to review and prioritize actions

APPENDIX H:

Priority Action List - Each Priority Action includes information on the action type, location, and sub-basin.

Local Action Plans

Local governments are strongly encouraged to continuously update their flood resilience actions within their Local Action Plans in the Blueprint Tool. Therefore, local governments can stay updated on projects that are being pursued and implemented to identify potential co-benefits, and DEQ can be aware of the potential technical and financial needs of communities throughout the basin. Projects prioritized through Local Action Plans are eligible for Blueprint funding.

PRIORITY ACTION LIST

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Sarah Lynn Streambank Stabilization Project	Floodplain Restoration	$47,330	Wake County	Upper Neuse
Jerry Jordan Stream Restoration	Floodplain Restoration	$568,618	Wake County	Upper Neuse
State Farmers Market Stream Restoration and Stormwater Management	Floodplain Restoration	"Feasibility Study Underway"	Wake County	Upper Neuse
NCSU Beef Unit Floodplain Restoration and Farm Resiliency Project	Floodplain Restoration	$145,000	Wake County	Upper Neuse
Max Littlefield Stream Restoration	Floodplain Restoration	$62,500	Wake County	Upper Neuse
Crabtree Creek Flood Control Site #1-Sorrels Grove Embankment Stabilization	New and Existing Dam Structures	$415,000-$1,000,000	Wake County	Upper Neuse
Crabtree Creek Site #13 - Shelley Lake Embankment Stabilization	New and Existing Dam Structures	$400,000-$1,000,000	Wake County	Upper Neuse
Agricultural Dam Prioritization Plan	Stormwater, Water Quality, Floodplain Regulations	$150,000-$300,000	Wake County	Upper Neuse
Parks & Recreation Master Plan - Land Acquisition	Stormwater, Water Quality, Floodplain Regulations	$2,000,000	Town Of Butner	Upper Neuse
Local Library Maintenance of FEMA Flood-related documents	Stormwater, Water Quality, Floodplain Regulations	$1,000-$10,000	Town Of Butner	Upper Neuse
Communication and Education	Stormwater, Water Quality, Floodplain Regulations	$20,000-$50,000	Town Of Butner	Upper Neuse
Rose Lane Safe Access Project	Roadway Elevation/ Road Crossing Modification	$23,000,000	City Of Raleigh	Upper Neuse

Table 2: Priority Action List

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
South Street-Blount Street Infrastructure Improvement	Critical Infrastructure	$50,000,000	City Of Raleigh	Upper Neuse
Acquisition of Flood-Prone Multi-Family Properties	Acquisition/Demolition	$19,598,176	City Of Raleigh	Upper Neuse
Eden Pond Dam Removal	New and Existing Dam Structures	$2,000,000-$4,000,000	City Of Raleigh	Upper Neuse
West Street Extension Drainage Improvements	Critical Infrastructure	$11,600,000	City Of Raleigh	Upper Neuse
Innovative Floodproofing at City-Owned Facilities	Dry Floodproofing	$1,000,000-$1,250,000	City Of Raleigh	Upper Neuse
Active Lake Level Management along Crabtree Creek	Storm Water Management Activities	$1,000,000	City Of Raleigh	Upper Neuse
Leesville & Millbrook Rd Flood Mitigation Project	Critical Infrastructure	$20,000,000	City Of Raleigh	Upper Neuse
Upper Longview Dam Repair	New and Existing Dam Structures	$6,000,000-$8,000,000	City Of Raleigh	Upper Neuse
Powell Drive Park Dam	Critical Infrastructure	$4,000,000	City Of Raleigh	Upper Neuse
Flood Emergency Preparedness Kits for Repetitive Loss Areas	Miscellaneous	$10,000-$50,000	City Of Raleigh	Upper Neuse
Acquisition of Vacant Properties in the Floodplain	Miscellaneous	$500,000-$1,000,000	City Of Raleigh	Upper Neuse
Citywide Watershed Master Plan for CRS Credit	Stormwater, Water Quality, Floodplain Regulations	$50,000-$1,000,000	City Of Raleigh	Upper Neuse
Flood Early Warning System Expansion	Miscellaneous	$100,000-$500,000	City Of Raleigh	Upper Neuse
Capital Boulevard/ Atlantic Avenue Stream Restoration Project	Miscellaneous	$43,000,000-$45,000,000	City Of Raleigh	Upper Neuse

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Pigeon House Branch Connector Stream Restoration	Miscellaneous	$30,000,000-$40,000,000	City Of Raleigh	Upper Neuse
Carnage Middle School Stream Bank Repair	Miscellaneous	$2,000,000-$3,500,000	City Of Raleigh	Upper Neuse
Dix Park Rocky Branch Creek and Grove Project	Miscellaneous	$15,000,000-$18,000,000	City Of Raleigh	Upper Neuse
Upper Durant Lake Wetland Conversion Project	Miscellaneous	$10,000,000-$12,000,000	City Of Raleigh	Upper Neuse
Echo Creek Watershed Study	Miscellaneous	$50,000-$200,000	Town Of Garner	Upper Neuse
Reedy Creek Watershed Study	Miscellaneous	$50,000-$200,000	Town Of Garner	Upper Neuse
Flood Monitoring and Response Plan	Miscellaneous	$10,000-$50,000	Town Of Garner	Upper Neuse
Drainage Improvements and GSI	Miscellaneous	$700,000-$4,000,000	Town Of Garner	Upper Neuse
Public Outreach on SFHA	Miscellaneous	$5,000-$20,000	Town Of Garner	Upper Neuse
Buck Branch Watershed Study	Miscellaneous	$50,000-$200,000	Town Of Garner	Upper Neuse
Acquisition at 1696 US-15 (Creedmoor)	Acquisition/Demolition	$623,967	Granville County, Town Of Butner, Town Of Stem, Town Of Stovall, City OfOxford, City Of Creedmoor	Upper Neuse
East Durham Warehouse Demolition and Acquisition	Acquisition/Demolition	$56,326,670	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill	Upper Neuse
Wastewater Treatment Plant Relocation	Relocation	$2,695,461	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill	Upper Neuse
Stormwater Assessment for Affordable Housing Project	Stormwater, Water Quality, Floodplain Regulations	$120,000	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill	Upper Neuse

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Relocation and/or increase 4 server boxes located in the basement of the Johnston County courthouse	Critical Infrastructure	$5,000	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
Replace bridge No. 40 located on US 70 Business (Market St.) over Neuse River	Roadway Elevation/ Road Crossing Modification	$59,000,000	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
Floodproofing Orange County Board of Elections	Wet Floodproofing	$21,824	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County	Upper Neuse
Relocation of Hillsborough Pumping Station	Critical Infrastructure	$10,000,000	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County	Upper Neuse
Elevate/Floodproof Eno River Mill	Structural Elevation	$23,171,082	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County	Upper Neuse
Chessway Drive Culvert	Critical Infrastructure	$1,720,000	Town Of Morrisville	Upper Neuse
Garden Square Lane Culvert	Critical Infrastructure	$1,300,000	Town Of Morrisville	Upper Neuse
Goldsboro Water Treatment Plan	Levee/Dike/Berm	$1,000,000-$2,000,000	City Of Goldsboro	Middle Neuse
Big Ditch Restoration Project	Miscellaneous	$4,000,000-$8,000,000	City Of Goldsboro	Middle Neuse
City of Goldsboro Wastewater Treatment Plant	Critical Infrastructure	$10,000,000	City Of Goldsboro	Middle Neuse

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Town of Seven Springs Proposed Levee	Levee/Dike/Berm	$25,000,000-$50,000,000	City Of Goldsboro	Middle Neuse
Howell's Branch and Stoney Creek Crossing	Stormwater Management Activities	$4,000,000	City Of Goldsboro	Middle Neuse
Stormwater Storage	Miscellaneous	$2,000,000-$3,000,000	City Of Goldsboro	Middle Neuse
US 70 Kinston Bypass - Construct new bridge crossing of the Neuse River	Roadway Elevation/ Road Crossing Modification	$106,261,767	City Of Kinston	Middle Neuse
Heritage Street Culvert Upgrade	Stormwater Management Activities	$4,000,000	City Of Kinston	Middle Neuse
Adkin Branch Crossings	Stormwater Management Activities	$6,000,000	City Of Kinston	Middle Neuse
Mitigate High AAL Structures	Miscellaneous	$15,000,000-$25,000,000	City Of Kinston	Middle Neuse
Early Warning System for Flooding along Tick Bite Road	Miscellaneous	$50,000	City Of Kinston	Middle Neuse
Buckhorn Lake Dam Feasibility Study	Miscellaneous	$5,000,000-$20,000,000	City Of Wilson, Town Of Stantonsburg	Middle Neuse
Resiliency Action for Mid-Century 1% Storm Event	Miscellaneous	$1,000,000-$2,000,000	City Of Wilson, Town Of Stantonsburg	Middle Neuse
Town of Stantonsburg Roadway Hydraulics Study	Miscellaneous	$100,000-$250,000	City Of Wilson, Town Of Stantonsburg	Middle Neuse
I-587/US 264 Toisnot Swamp Crossing Improvements	Roadway Elevation/ Road Crossing Modification	$4,000,000	City Of Wilson, Town Of Stantonsburg	Middle Neuse
Wastewater Treatment Plant Relocation	Critical Infrastructure	$20,000,000	Town Of Hookerton	Middle Neuse
Flood mitigation along Loop Rd	Miscellaneous	$1,000,000-$2,000,000	Town Of Hookerton	Middle Neuse
Road Inundation along Main St	Miscellaneous	$40,000-$60,000	Town Of Hookerton	Middle Neuse
Town of Farmville Residential Flood Mitigation	Structural Elevation	$608,487	Town Of Grifton, Town Of Farmville	Middle Neuse

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Town of Grifton Residential Flood Mitigation	Wet Floodproofing	$686,143	Town Of Grifton, Town Of Farmville	Middle Neuse
Stormwater Management Plans	Stormwater, Water Quality, Floodplain Regulations	$50,000	Nash County, Town Of Whitakers, Town Of Middlesex, Town Of Bailey	Middle Neuse
Middle Sub-basin Analysis of Bridges and Road Embankments	Stormwater Management Activities	$500,000	Middle Neuse Jurisdictions	Middle Neuse
Swift Creek and Tributaries Snag and Drag	Debris Removal	$3,400,000	Pitt County	Middle Neuse
Grifton Police Department	Relocation	$2,700,000	Pitt County	Middle Neuse
Seek Funding to facilitate implementation of Flood Mitigation Alternatives and Water Quality Recommendations	Stormwater, Water Quality, Floodplain Regulations	$200,000-$100,000,000	City Of Greenville	Middle Neuse
Pollock St & Liberty St Stormwater Improvements	Stormwater Management Activities	$1,000,000	City Of New Bern	Lower Neuse
Front St & Hancock St Stormwater Improvements	Stormwater Management Activities	$500,000	City Of New Bern	Lower Neuse
Green Park Terrace Culvert Replacement	Stormwater Management Activities	$350,000	City Of New Bern	Lower Neuse
Hazel Ave Culvert Replacement	Stormwater Management Activities	$500,000	City Of New Bern	Lower Neuse
Christopher Ave Culvert Replacement Project	Stormwater Management Activities	$500,000	City Of New Bern	Lower Neuse
Improvement Area 6 - Aber Nath Rd and Trent Shores Dr	Stormwater Management Activities	$750,000	Town Of Trent Woods	Lower Neuse
Improvement Area 2 - Trent Wood Dr and EdgeHill Rd	Stormwater Management Activities	$1,200,000	Town Of Trent Woods	Lower Neuse
Improvement Area 1 - Pine Crest Rd and Moye Rd	Stormwater Management Activities	$1,500,000	Town Of Trent Woods	Lower Neuse
Improvement Area 5 -Wedgewood Dr and Canterbury Rd	Stormwater Management Activities	$1,400,000	Town Of Trent Woods	Lower Neuse

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Improvement Area 4 - Darby Rd & Drainage Channel to Wedgewood Dr	Stormwater Management Activities	$1,000,000	Town Of Trent Woods	Lower Neuse
Maple Cypress Aerial Waterline	Critical Infrastructure	$1,200,000	Craven County	Lower Neuse
Marsh Still and Living Shoreline , Chery Branch-Minnesott Beach Ferry Terminal	Living Shoreline	$335,907	Craven County	Lower Neuse
Marsh Sill and Living Shoreline, Brinson Memorial Elementary School	Living Shoreline	$271,701	Craven County	Lower Neuse
Shoreline Dr	Critical Infrastructure	$2,343,212	Craven County	Lower Neuse
Crop buying facility	Critical Infrastructure	$1,000,000	Craven County	Lower Neuse
Elevation of Weyerhaeuser Road	Roadway Elevation/ Road Crossing Modification	$113,254,074	Craven County	Lower Neuse
Adams Creek Rd and Belangia Intersection Elevation	Roadway Elevation/ Road Crossing Modification	$36,220,797	Craven County	Lower Neuse
Cherry Branch-Minnesott Beach Ferry Terminal	Critical Infrastructure	$1,000,000	Craven County	Lower Neuse
Targeted Repetitive Flooding Drainage Assessment	Stormwater, Water Quality, Floodplain Regulations	$100,000-$500,000	Craven County	Lower Neuse
Taylor Farm Road and Smith Farm Road Nature-Based Solutions	Stormwater, Water Quality, Floodplain Regulations	$100,000-$500,000	Craven County	Lower Neuse
Marsh Sill and Living Shoreline, Vernon Blades Park, Town of Bridgeton	Living Shoreline	$350000-$400000	Craven County	Lower Neuse
Trenton Floodplain Preservation	Floodplain Restoration	$2,213,000	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

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Pollocksville Floodplain Preservation	Floodplain Restoration	$1,184,000	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
Arapahoe Floodplain Preservation	Floodplain Restoration	$415,000	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
River Bend Floodplain Preservation	Floodplain Restoration	$1,361,000	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
Ernul Floodplain Preservation	Floodplain Restoration	$708,000	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
Havelock Floodplain Preservation	Floodplain Restoration	$364,000	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
Mills Branch at Rowes Corner - Enlarge Culvert	Critical Infrastructure	$5,000	Craven County, City Of New Bern	Lower Neuse

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
Pollocksville Rescue Squad/Emergency Services - Dry Floodproofing	Dry Floodproofing	~$10,000	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
Bridgeton Rescue/EMS - Dry Floodproofing	Dry Floodproofing	~$10,000	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
Florence/Whortonsville Fire Dept - Dry Floodproofing	Dry Floodproofing	~$10,000	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
South River-Merrimon Fire & EMS - Dry Floodproofing/Structural Elevation	Utility Elevation	$50,000	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
Weyerhaeuser Company/ Streets Ferry Heliport - Structural Elevation	Utility Elevation	$50,000	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
Trenton EMS - Dry Floodproofing	Dry Floodproofing	~$10,000	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

Action Name	Action Type	Cost Estimate	Jurisdiction(s)	Sub-basin
North Prong Bay River Homes - Acquisition/ Demolition	Acquisition/Demolition	$3,834,703	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse
Bridgeton Coastal Homes - Structural Elevation	Structural Elevation	$6,793,376	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse
Coastal New Bern Homes - Structural Elevation	Structural Elevation	$6,136,419	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse
Northwest Creek, Fairfield Harbour Homes - Structural Elevation	Structural Elevation	$11,303,659	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse
River Bend Community - Structural Elevation	Structural Elevation	$8,437,156	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse
Homes on/near Oaks Rd, New Bern - Structural Elevation	Structural Elevation	$4,700,567	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse
NC 304-, Hobucken Homes - Structural Elevation	Structural Elevation	$5,410,216	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County	Lower Neuse

NEUSE RIVER BASIN ACTION STRATEGY

Neuse River Greenway in Raleigh, NC

WHAT IS AN ACTION?

In the context of this Action Strategy, 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 are organized into five main categories within the Blueprint Tool: Building Level Mitigation, Channel Modification, Infrastructure & Control Structures, Nature Based Solutions, Policy & Planning, and others. Below, the action categories and action types are described. Action types featured in this Neuse RBAS reflect a variety of both flood mitigation best practices expected and approaches to addressing region-specific flooding concerns. Updates to the Neuse RBAS may result in the inclusion of additional action types as novel approaches and technologies continue to emerge.

Building Level Mitigation

ACTION TYPES

- Relocation
- Utility Elevation
- Acquisition/Demolition/ Buyouts
- 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/Buyouts (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 Geographic Information System (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. Local governments have noted that current state statutes limit their ability to adopt many policies that would help prevent development that can increase future flood risk and damages.

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?

Effective action selection depends on how well each action aligns with the conditions of the area it is intended to serve. For the Neuse RBAS, location refers to the physical, environmental, and policy context of a place, including the flood hazards it faces and the constraints that may affect which actions are feasible. Vulnerability refers to the people, structures, infrastructure, services, and natural systems most likely to be affected by those hazards. These two factors help explain why the same action may be a priority for one community but less effective or infeasible in another.

As flood risk changes across the Neuse River Basin, the mix of resilience actions needed to address that risk may also change. In some cases, communities may need additional policy or decision-making flexibility to respond proactively to changing conditions. Future updates to the RBAS may also provide opportunities to further expand action types to include emerging financial, policy, or structural approaches to increasing flood resilience.

The sub-basin sections that follow use location and vulnerability characteristics to help connect risk and vulnerability findings to the selection of High Priority and Representative Actions identified for the Upper, Middle, and Lower Neuse sub-basins.

PRIORITIZED BASIN ACTIONS

Aerial of Falls Lake

Prioritized Basin Actions

This section builds on the action evaluation framework described in the Action Review, Creation, Adjustment, and Selection section. It summarizes the location and vulnerability characteristics of each sub-basin and explains how those characteristics informed the selection of Priority Actions, High Priority Actions, and Representative Actions. Additional detail on flood risk and vulnerability findings is provided in the Flood Risk Planning and Analysis section.

Each sub-basin section identifies recommended critical needs based on the vulnerability assessment, followed by tables listing Priority Actions and High Priority Actions. As shown in Figure 11, 29 High Priority Actions were selected from the 113 Priority Actions using screening metrics. 17 Representative Actions were then selected from the High Priority Actions to illustrate a balanced range of flood resilience solutions across the basin. Some Representative Actions align with the recommended critical needs, while others highlight additional locally supported or technically appropriate approaches. Descriptions, maps, and supporting details for each Representative Action are included within the relevant sub-basin section.

This structure is intended to show how basin-wide analysis, local input, and action screening translate into sub-basin-specific flood resilience priorities.

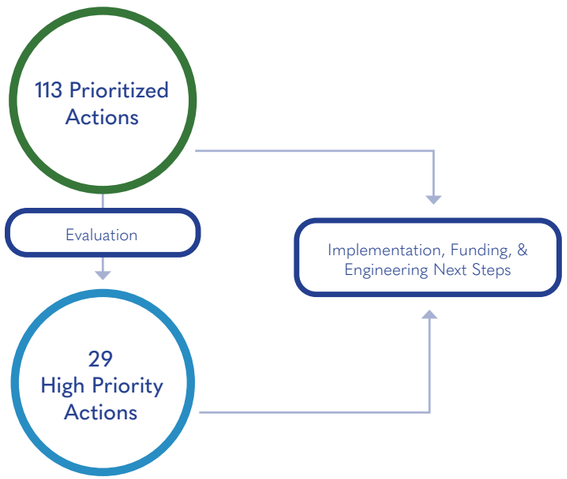
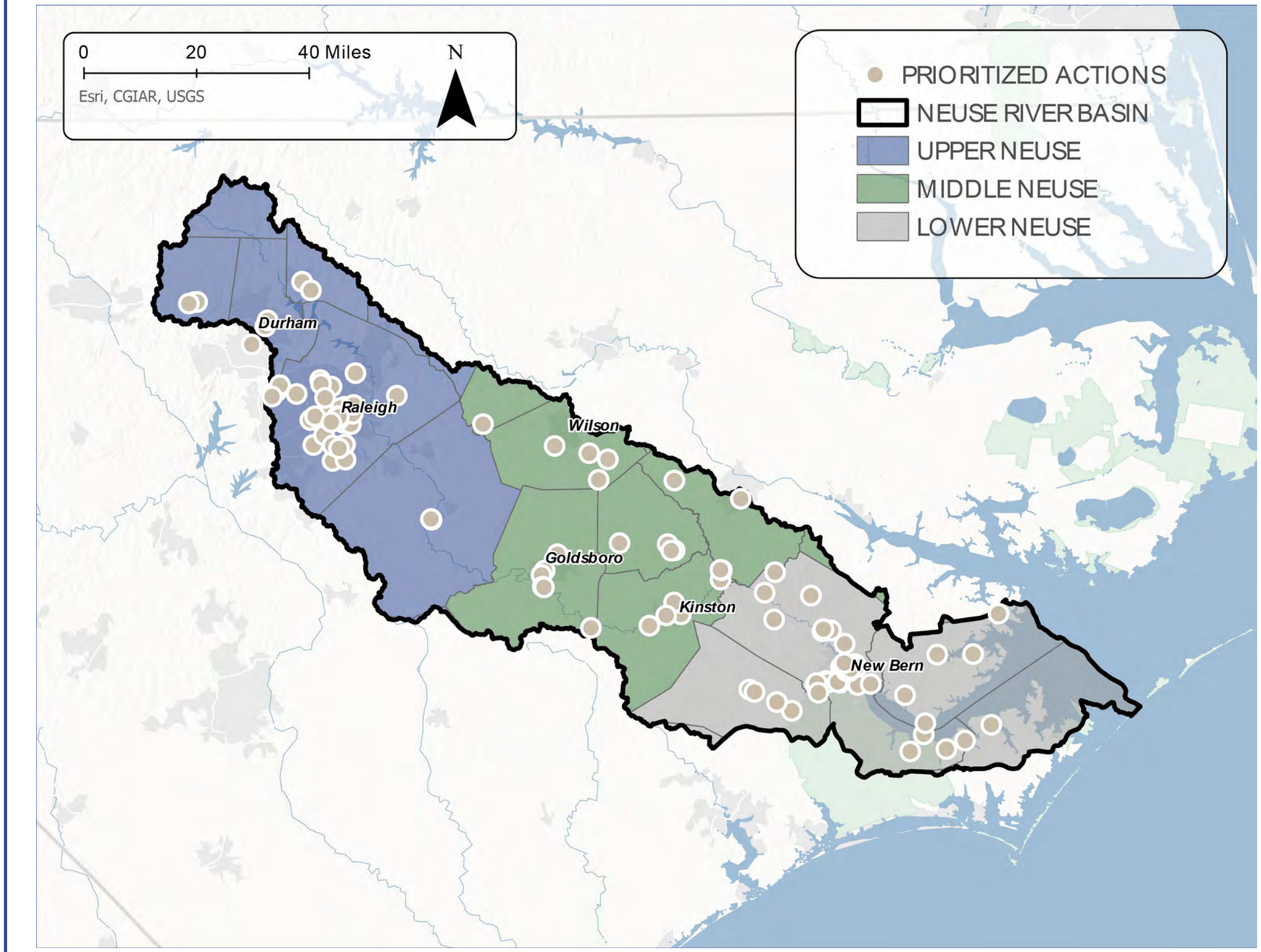


Figure 11: Evaluation framework for selecting High Priority Actions



UPPER NEUSE SUB-BASIN

Flood risk in the Upper Neuse sub-basin is largely driven by the concentration of population, development, and critical infrastructure, resulting in the largest absolute impacts across the basin. Although floodplain extents are comparatively limited, exposure is already substantial and continues to grow under future conditions, particularly for residents and residential structures. Rapid conversion of agricultural and open lands to residential and other types of development may further increase runoff, reduce natural storage, and expand flood exposure in growing parts of the sub-basin.

Risk in the sub-basin is further shaped by strong dependence on interconnected systems, where impacts to water, energy, and transportation infrastructure can extend beyond directly flooded areas and contribute to broader disruptions. The sections that follow describe how these conditions influence flood risk and vulnerability within the Upper Neuse sub-basin, including key drivers of exposure and system impacts. This is complemented by a summary of priority and representative actions that illustrate how different types of flood mitigation, ranging from infrastructure improvements to nature-based and policy approaches, can be applied to address the dominant sources of risk and support more resilient outcomes in this highly developed part of the basin.

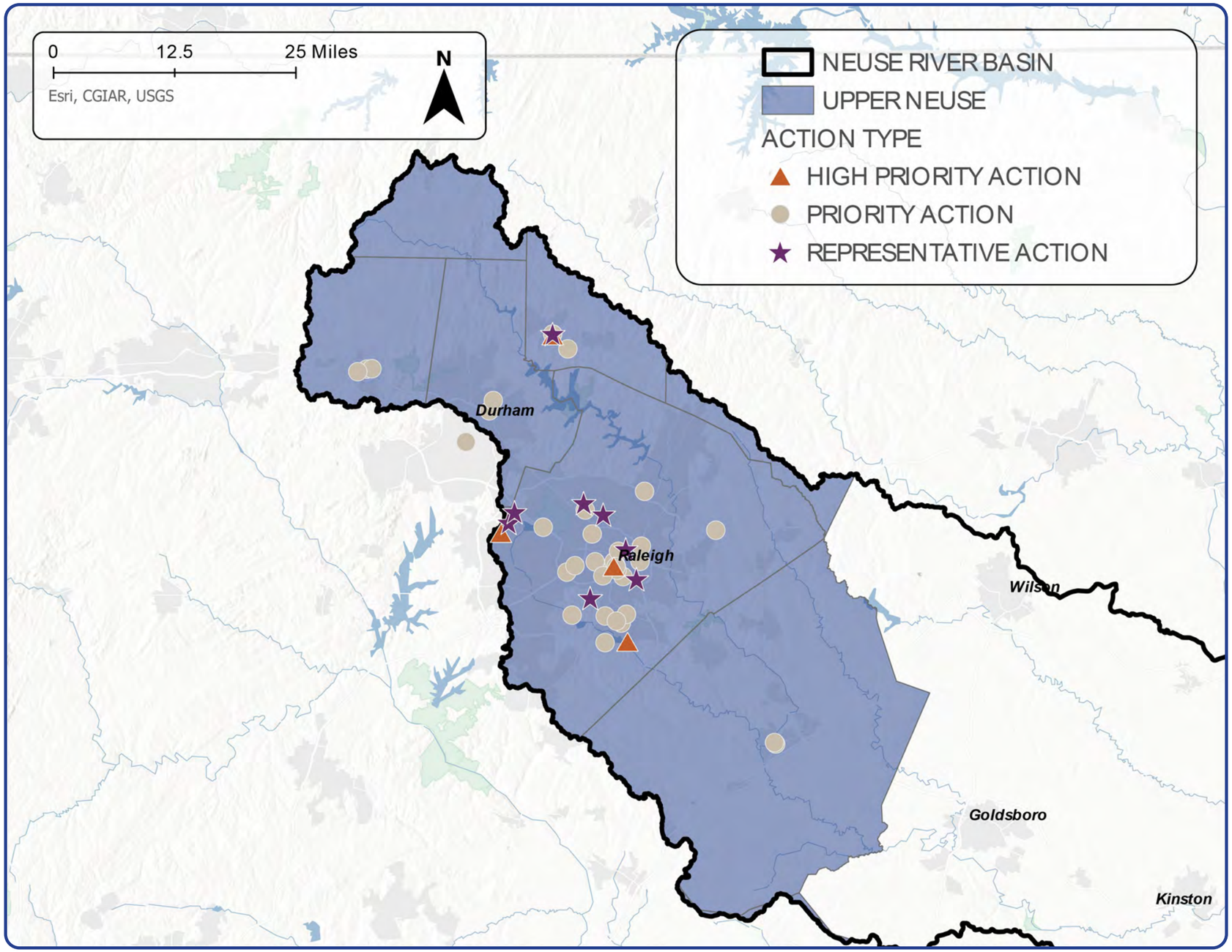
Location Characteristics

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 leads 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.

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.



Upper Neuse Representative Actions Descriptions

The 47 Priority Actions submitted within the Upper Neuse sub-basin area focused on improvements and projects to stormwater infrastructure, roadway flooding mitigation, dam and embankment rehabilitation, watershed studies and planning, and increasing floodproofing in urban areas. 12 High Priority Actions were selected from each of the jurisdictions that submitted a Local Action Plan using the Blueprint Tool, including Wake County, the City of Raleigh, and the Towns of Butner, Garner, and Morrisville.

From these High Priority Actions, 6 were chosen to be shown as Representative Actions. These 12 Representative Actions illustrate examples of the following action types: Floodplain Restoration, Critical Infrastructure, Roadway Elevation/Road Crossing Modification, New and Existing Dam Structures, Stormwater Management Activities, and Stormwater, Water Quality, Floodplain Regulations. One of the Representative Actions "Crabtree Creek Flood Control Cooperative Actions" recommends considering three individual actions from Wake County and the City of Raleigh to be implemented together to compound beneficial impacts.

Recommended Critical Needs

- Targeted stormwater and culvert upgrades in developed areas
- Floodproofing and protection of critical facilities and infrastructure
- Roadway access improvements at flood-prone crossings
- Floodplain restoration and open space preservation
- Watershed-scale planning for shared flood sources and infrastructure systems

Representative Actions

- Capital Boulevard/Atlantic Avenue Stream Restoration Project
- Garden Square Lane Culvert
- NCSU Beef Unit Floodplain Restoration and Farm Resiliency Project
- Parks & Recreation Master Plan – Land Acquisition
- Rose Land Safe Access Project
- Crabtree Creek Flood Control Cooperative Actions

Priority Action List

**High priority actions are highlighted in blue.*

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
NCSU Beef Unit Floodplain Restoration and Farm Resiliency Project	Floodplain Restoration	$145,000	Wake County
Crabtree Creek Flood Control Site #1-Sorrels Grove Embankment Stabilization	New and Existing Dam Structures	$415,000-$1,000,000	Wake County
Crabtree Creek Site #13 - Shelley Lake Embankment Stabilization	New and Existing Dam Structures	$400,000-$1,000,000	Wake County
Parks & Recreation Master Plan - Land Acquisition	Stormwater, Water Quality, Floodplain Regulations	$2,000,000	Town Of Butner

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Communication and Education	Stormwater, Water Quality, Floodplain Regulations	$20,000-$50,000	Town Of Butner
Rose Lane Safe Access Project	Roadway Elevation/ Road Crossing Modification	$23,000,000	City Of Raleigh
Innovative Floodproofing at City-Owned Facilities	Dry Floodproofing	$1,000,000-$1,250,000	City Of Raleigh
Active Lake Level Management along Crabtree Creek	Stormwater Management Activities	$1,000,000	City Of Raleigh
Capital Boulevard/Atlantic Avenue Stream Restoration Project	Miscellaneous	$43,000,000-$45,000,000	City Of Raleigh
Drainage Improvements and GSI	Miscellaneous	$700,000-$4,000,000	Town Of Garner
Chessway Drive Culvert	Critical Infrastructure	$1,720,000	Town Of Morrisville
Garden Square Lane Culvert	Critical Infrastructure	$1,300,000	Town Of Morrisville
Sarah Lynn Streambank Stabilization Project	Floodplain Restoration	$47,330	Wake County
Jerry Jordan Stream Restoration	Floodplain Restoration	$568,618	Wake County
State Farmers Market Stream Restoration and Stormwater Management	Floodplain Restoration	"Feasibility Study Underway"	Wake County
Max Littlefield Stream Restoration	Floodplain Restoration	$62,500	Wake County
Agricultural Dam Prioritization Plan	Stormwater, Water Quality, Floodplain Regulations	$150,000-$300,000	Wake County
Local Library Maintenance of FEMA Flood-related documents	Stormwater, Water Quality, Floodplain Regulations	$1,000-$10,000	Town Of Butner
South Street-Blount Street Infrastructure Improvement	Critical Infrastructure	$50,000,000	City Of Raleigh
Acquisition of Flood-Prone Multi-Family Properties	Acquisition/Demolition/ Buyouts	$19,598,176	City Of Raleigh

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Eden Pond Dam Removal	New and Existing Dam Structures	$2,000,000-$4,000,000	City Of Raleigh
West Street Extension Drainage Improvements	Critical Infrastructure	$11,600,000	City Of Raleigh
Leesville & Millbrook Rd Flood Mitigation Project	Critical Infrastructure	$20,000,000	City Of Raleigh
Upper Longview Dam Repair	New and Existing Dam Structures	$6,000,000-$8,000,000	City Of Raleigh
Powell Drive Park Dam	Critical Infrastructure	$4,000,000	City Of Raleigh
Flood Emergency Preparedness Kits for Repetitive Loss Areas	Miscellaneous	$10,000-$50,000	City Of Raleigh
Acquisition of Vacant Properties in the Floodplain	Miscellaneous	$500,000-$1,000,000	City Of Raleigh
Citywide Watershed Master Plan for CRS Credit	Stormwater, Water Quality, Floodplain Regulations	$50,000-$1,000,000	City Of Raleigh
Flood Early Warning System Expansion	Miscellaneous	$100,000-$500,000	City Of Raleigh
Pigeon House Branch Connector Stream Restoration	Miscellaneous	$30,000,000-$40,000,000	City Of Raleigh
Carnage Middle School Stream Bank Repair	Miscellaneous	$2,000,000-$3,500,000	City Of Raleigh
Dix Park Rocky Branch Creek and Grove Project	Miscellaneous	$15,000,000-$18,000,000	City Of Raleigh
Upper Durant Lake Wetland Conversion Project	Miscellaneous	$10,000,000-$12,000,000	City Of Raleigh
Echo Creek Watershed Study	Miscellaneous	$50,000-$200,000	Town Of Garner
Reedy Creek Watershed Study	Miscellaneous	$50,000-$200,000	Town Of Garner
Flood Monitoring and Response Plan	Miscellaneous	$10,000-$50,000	Town Of Garner
Public Outreach on SFHA	Miscellaneous	$5,000-$20,000	Town Of Garner
Buck Branch Watershed Study	Miscellaneous	$50,000-$200,000	Town Of Garner

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Acquisition at 1696 US-15 (Creedmoor)	Acquisition/Demolition/ Buyouts	$623,967	Granville County, Town Of Butner, Town Of Stem, Town Of Stovall, City OfOxford, City Of Creedmoor
East Durham Warehouse Demolition and Acquisition	Acquisition/Demolition/ Buyouts	$56,326,670	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill
Wastewater Treatment Plant Relocation	Relocation	$2,695,461	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill
Stormwater Assessment for Affordable Housing Project	Stormwater, Water Quality, Floodplain Regulations	$120,000	Durham County, City Of Durham, Town Of Morrisville, City Of Raleigh,Town Of Chapel Hill
Relocation and/or increase 4 server boxes located in the basement of the Johnston County courthouse	Critical Infrastructure	$5,000	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
Replace bridge No. 40 located on US 70 Business (Market St.) over Neuse River	Roadway Elevation/ Road Crossing Modification	$59,122,991	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
Floodproofing Orange County Board of Elections	Wet Floodproofing	$21,824	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County
Relocation of Hillsborough Pumping Station	Critical Infrastructure	$10,000,000	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County
Elevate/Floodproof Eno River Mill	Structural Elevation	$23,171,082	Town Of Hillsborough, Town Of Chapel Hill, City Of Mebane, Town OfCarrboro, City Of Durham, Orange County

Lake Crabtree in Morrisville, NC

Capital Boulevard/ Atlantic Avenue Stream Restoration Project

Jurisdiction:

City of Raleigh

Cost:

$43,000,000-$45,000,000

Primary Flood Type:

Riverine, Urban and Stormwater

Target Impact:

Compound/Multi-Hazards, Preventative Improvements & Maintenance

Implementation Type:

Major Infrastructure

Sub-basin:

Upper Neuse

Action Category:

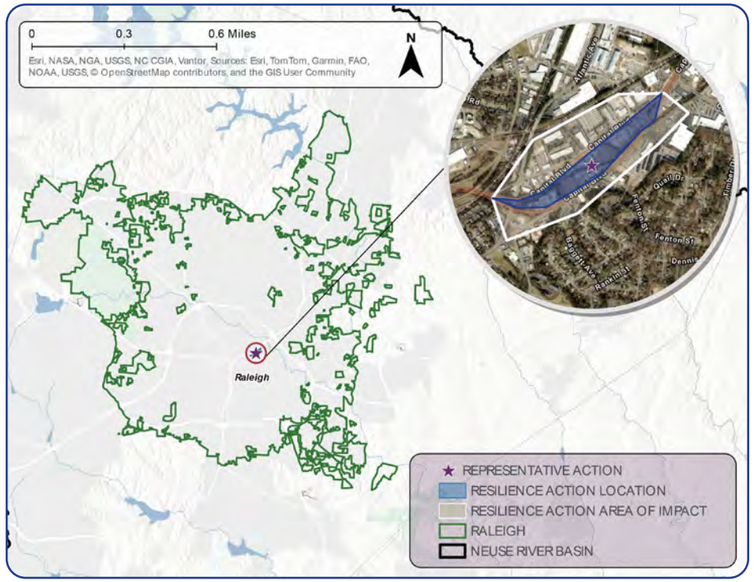
Other

Action Type:

Miscellaneous

Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized



This stream restoration action was included in the City of Raleigh's Local Action Plan. The North Carolina Department of Transportation (NCDOT) is advancing a bridge replacement project and the realignment of Capital Boulevard. As part of these projects, the City would like to take advantage of the opportunity to include floodplain expansion and stream restoration. The City proposes acquiring nine parcels in the floodplain and floodway between the divided lanes, removing the existing structures and impervious surface, and realigning and restoring up to 2,500 linear feet of Pigeon House Branch, which runs through the proposed project area. The restored stream and associated greenspace are in close proximity to a connection point with the Crabtree Creek Greenway.

The project, particularly the property acquisition, is time-sensitive due to the NCDOT bridge project timeline. Property acquisition and stormwater design and permitting are proposed to occur between 2026 and 2029 with construction beginning around 2030.

This project represents a unique opportunity to align transportation, stormwater and floodplain management, and greenway objectives with anticipated water quality and flood mitigation benefits. Furthermore, the project will enhance flood resilience along the key US-1/Capital Boulevard corridor with high potential to mitigate or alleviate flood damage and roadway flooding.

Garden Square Lane Culvert

Jurisdiction:

Town of Morrisville

Cost:

$1,300,000

Primary Flood Type:

Urban and Stormwater, Riverine

Target Impact:

System Failures

Implementation Type:

Major Infrastructure

Sub-basin:

Upper Neuse

Action Category:

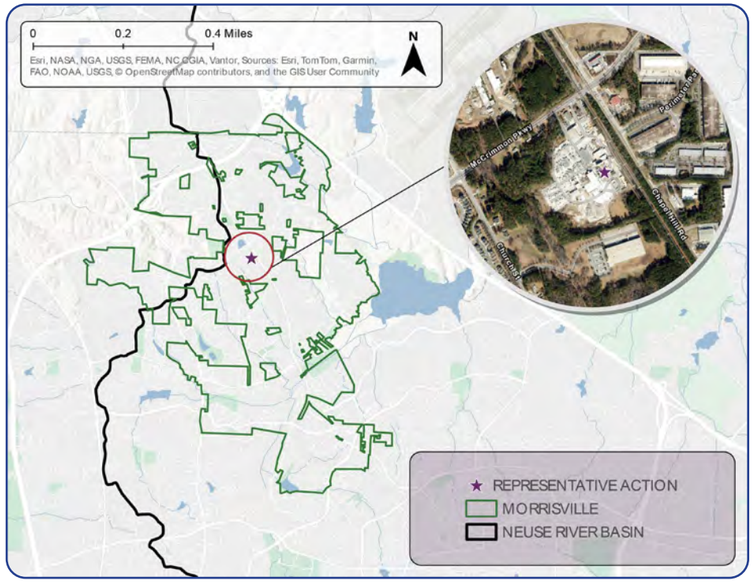
Infrastructure and Control Structures

Action Type:

Critical Infrastructure

Locally Prioritized or Vulnerability Assessment-Based Action:

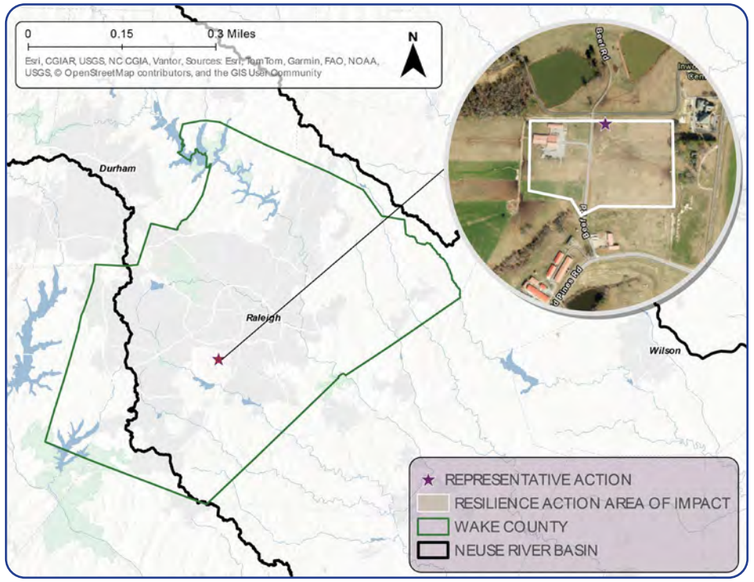
Locally Prioritized



This action was submitted as part of the Town of Morrisville's adopted Stormwater Master Plan. It includes hydraulic modeling of proposed construction on Garden Square Lane, which includes replacing smaller box culverts with larger box culverts as well as potentially improving the drainage channel. This improvement will enhance infrastructure to reduce flood impacts to nearby residential structures and prevent roadway overtopping during the 100-year storm. Initial modeling indicates that this action would alleviate backwater effects and protect both roadway access and surrounding properties, as well as to help protect a population of 32,000 people from a 1% AEP flood event. By increasing conveyance capacity and reducing backwater conditions, the project would help stormwater move through the system more efficiently and reduce the likelihood that floodwaters will spread into homes, roadways, and other vulnerable areas. Maintaining passable road access during major storm events also strengthens community resilience by supporting emergency response, evacuation, and post-storm recovery.

Raleigh, NC

NCSU Beef Unit Floodplain Restoration and Farm Resiliency Project



Jurisdiction:

Wake County

Cost:

$145,000

Primary Flood Type:

Riverine

Target Impact:

Changing Hazards, Disconnected Floodplains

Implementation Type:

Nature-based Restoration

Sub-basin:

Upper Neuse

Action Category:

Nature Based Solutions

Action Type:

Floodplain Restoration

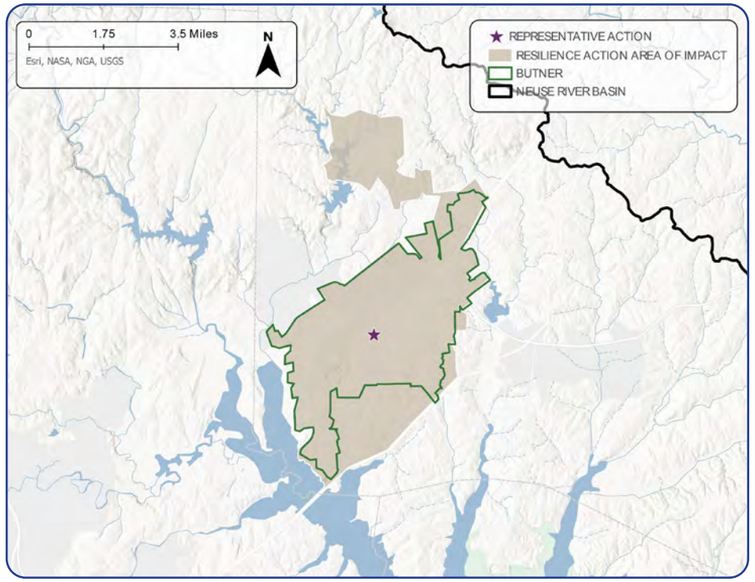
Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

This action was submitted by Wake County as part of the Wake County Action Plan. It is a three-phased project that is already partially funded. This project involves stream restoration along Yates Branch combined with bio-swales, cisterns, a headwater wetland, a dry detention basin and regenerative stormwater conveyances. These proposed project elements help slow and control water on site, which can reduce downstream degradation and lead to less flooding. By restoring floodplain function and using distributed nature-based practices, the project improves the landscape's ability to absorb, detain, and manage stormwater before it contributes to downstream flood risk.

In addition to contributing to flood risk reduction, the stream restoration will support a critical ecological benefit for the Neuse River. The stream contributes part of the water supply for a pond that is used to breed and release endangered native aquatic life (e.g., mussels and catfish) in the Neuse River Basin. Restoring stream quality and natural flow patterns will support the long-term functioning of this critical habitat. Furthermore, this Located at NC State, this action can also be an educational tool for students to learn about stream water ecology. Wake Soil and Water has already funded part of the project and is seeking additional funding.

Parks and Recreation Master Plan – Land Acquisition



Jurisdiction:

Town of Butner

Cost:

$2,000,000

Primary Flood Type:

Riverine, Urban and Stormwater

Target Impact:

Changing Hazards, Disconnected Floodplains

Target Impact:

Changing Hazards, Disconnected Floodplains

Sub-basin:

Upper Neuse

Action Category:

Policy and Planning

Action Type:

Stormwater, Water Quality, Floodplain Regulations

Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

As part of the Town of Butner's Plan, the need for an updated Parks and Recreation Master Plan was identified. In the highly urbanized Upper Neuse sub-basin, it is 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 uniquely vulnerable, flood-prone lands. Through a Parks and Recreation department Master Plan action for the Town of Butner, the Town can identify parcels that are vulnerable to flooding and create an acquisition strategy. If managed effectively, acquired, flood-prone lands can still provide fruitful recreational opportunities for residents and visitors.

This action would reduce long-term flood exposure while preserving natural floodplain functions and expanding community recreational space. By converting vulnerable parcels into open space or recreation areas, the Town can reduce future damage to structures. It can also strategically maintain areas where floodwaters can spread, slow, and be stored more safely. This approach also supports long-term resilience by pairing land management with public access, habitat preservation, and more intentional stewardship of flood-prone areas.

Blue Jay Point at Falls Lake

Rose Lane Safe Access Project

Jurisdiction:
City of Raleigh

Cost:
$23,000,000

Primary Flood Type:
Riverine

Target Impact:
PUGB/Equity, Community Isolation, High Frequency

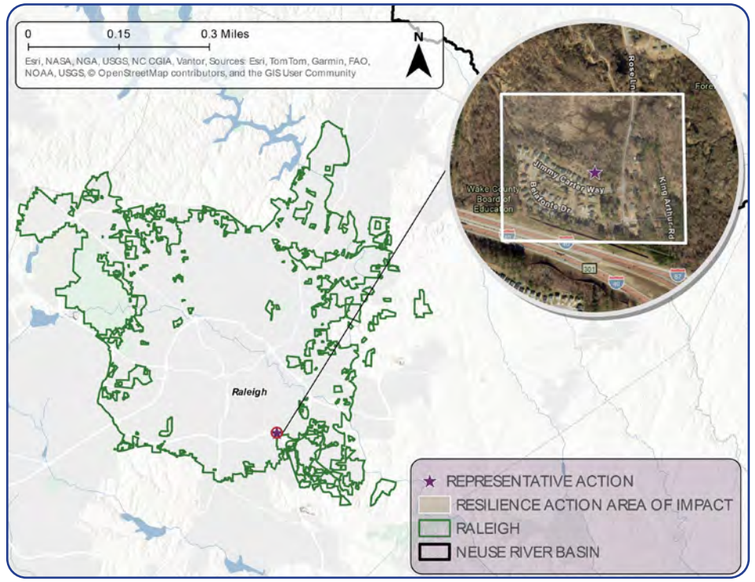
Implementation Type:
Major Infrastructure

Sub-basin:
Upper Neuse

Action Category:
Infrastructure and Control Structures

Action Type:
Roadway Elevation/Road Crossing Modification

Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized



This action was advanced by the City of Raleigh's Action Plan. The Rose Lane Safe Access Project is intended to improve reliable ingress and egress for 54 homes on Rose Lane, Jimmy Carter Way, Belafonte Drive, and King Arthur Road in a historically disadvantaged area of Raleigh. The neighborhood currently depends on Rose Lane as its only access route, but the bridge over Crabtree Creek overtops with flood waters by approximately 1.5 to 2 feet during a 2-year storm flood, limiting residents' ability to enter or leave the area during flood conditions. The project would address this vulnerability either by creating a secondary access road or modifying Rose Lane to reduce flooding and maintain access during and after heavy rain events.

This project is important for flood risk reduction because it addresses a frequent access disruption along a flood-prone crossing. It will help residents evacuate, emergency responders reach the neighborhood, and daily travel resume more quickly after storms. In addition to reducing flood-related isolation, the project offers co-benefits by improving public safety, strengthening transportation resilience, supporting emergency response, and advancing a cost-effective solution with minimal negative impacts. Continued coordination with Wake County Public School System and other partners will help determine the final design and implementation path.

Crabtree Creek Flood Control Cooperative Actions

Jurisdiction:
Wake County and City of Raleigh

Cost:
$2,000,000-$3,500,000

Primary Flood Type:
Riverine, Urban and Stormwater

Target Impact:
Changing Hazards, Preventative Improvements & Maintenance

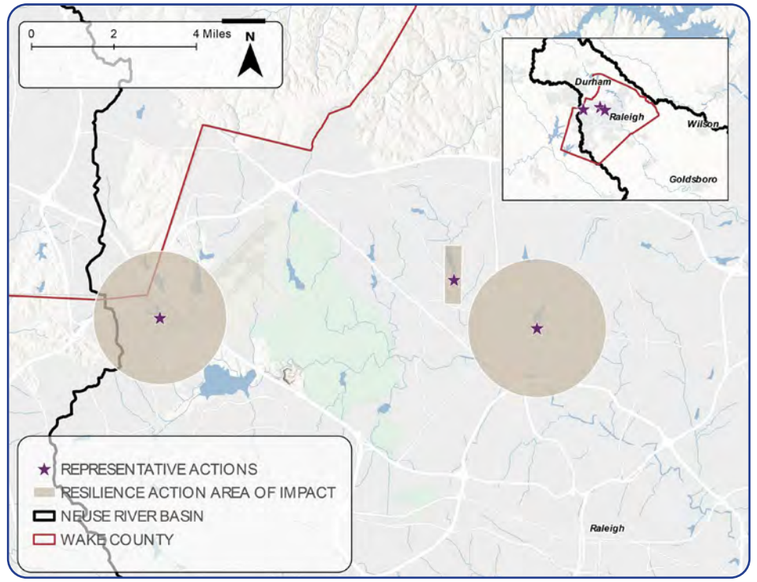
Implementation Type:
Regional Studies/Plans

Sub-basin:
Upper Neuse

Action Category:
Infrastructure & Control Structures

Action Type:
New and Existing Dam Structures and Stormwater Management Activities

Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized



The Crabtree Creek Flood Control Cooperative Actions bring together three related flood control projects across Wake County and the City of Raleigh: vegetation management, dam maintenance, and a study of potential dam improvements. These actions recognize that Crabtree Creek is a shared hazard source that crosses jurisdictional boundaries, meaning that flood risk reduction is most effective when neighboring communities coordinate around common goals. By addressing channel conditions, maintaining existing flood control infrastructure, and evaluating future dam improvements together, the action creates a more integrated approach to managing flooding along the creek corridor.

This action is important for flood risk reduction because it focuses on improving how water moves through and is managed within the Crabtree Creek system, while also reducing the likelihood that deferred maintenance or localized blockages will worsen flood impacts. Coordinating these projects across jurisdictions can increase efficiency, reduce duplication, and support solutions that provide benefits beyond a single community. In addition to reducing flood risk, the action can improve long-term infrastructure reliability, support emergency preparedness, protect public and private property, and strengthen collaboration among local governments facing a common flooding challenge.

MIDDLE NEUSE SUB-BASIN

Flood risk in the Middle Neuse sub-basin is largely defined by how exposure is changing over time. While current impacts are moderate relative to other parts of the basin, projected increases in flood extent and development intersect to drive substantial growth in population, building, and infrastructure exposure under future conditions.

These conditions place increasing pressure on critical systems, particularly water infrastructure and transportation networks, where rising exposure heightens the potential for service disruption and reduced access to emergency and other critical services during flood events.

The sections that follow describe the patterns and drivers of flood risk and vulnerability across the Middle Neuse sub-basin, with emphasis on areas experiencing rapid change. This is followed by a summary of Priority and Representative Actions that illustrate how a variety of actions can help manage risk and reduce future impacts.

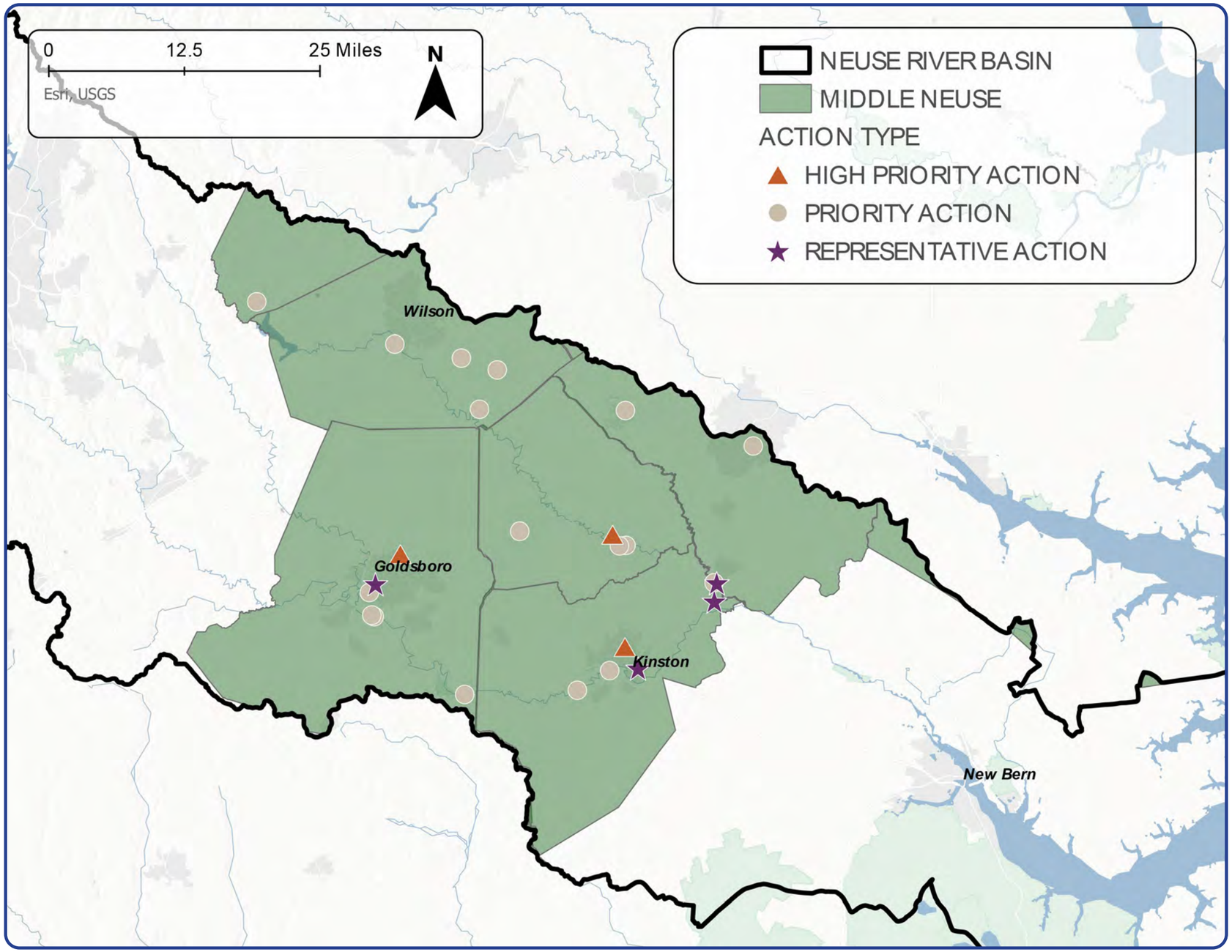
Location Characteristics

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 (e.g., 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.



Middle Neuse High Priority and Representative Actions

The 25 Priority Actions included for the Middle Neuse sub-basin area primarily focused on improvements and projects to riverine flooding and floodplain management, transportation crossing and road elevations, wastewater and utility infrastructure, hydraulic studies, and stormwater system improvements. The eight High Priority Actions in the Middle Neuse focus on reducing flood risk for Pitt County, the City of Goldsboro, the City of Kinston, and the Town of Hookerton. 5 Representative Actions were chosen from the High Priority Actions to illustrate the following action types: Building Relocation, Stormwater Management Activities, and Debris Removal.

Recommended Critical Needs

- Transportation upgrades at flood-prone roads, bridges, and crossings
- Stormwater and drainage improvements in growing communities
- Protection or relocation of exposed critical facilities and utilities
- Floodplain restoration and nature-based drainage improvements
- Early warning and preparedness for recurrent access disruptions

Middle Neuse Representative Actions

- Big Ditch Restoration Project
- Grifton Police Department
- Adkin Branch Crossings
- Early Warning System for Flooding along Tick Bite Road
- Swift Creek and Tributaries Snag and Drag

Priority Action List

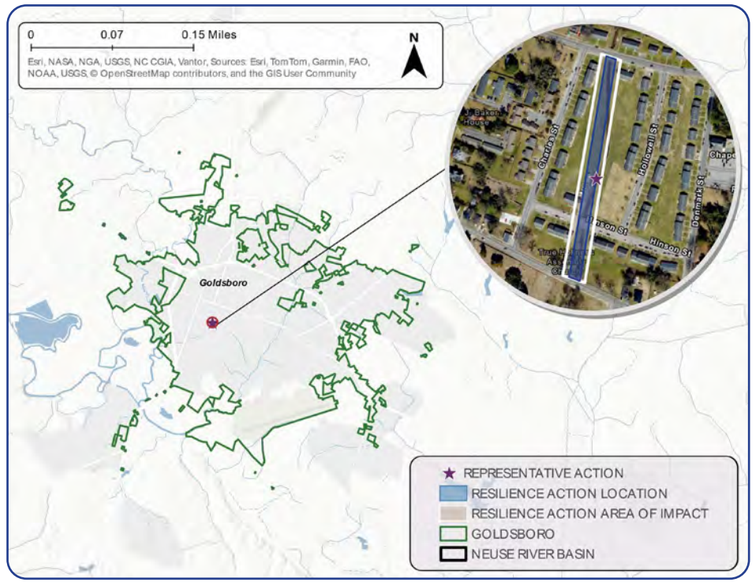
**High priority actions are highlighted in blue.*

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Big Ditch Restoration Project	Miscellaneous	$4,000,000-$8,000,000	City Of Goldsboro
Howell's Branch and Stoney Creek Crossing	Stormwater Management Activities	$4,000,000	City Of Goldsboro
Heritage Street Culvert Upgrade	Stormwater Management Activities	$4,000,000	City Of Kinston
Adkin Branch Crossings	Stormwater Management Activities	$6,000,000	City Of Kinston
Early Warning System for Flooding along Tick Bite Road	Miscellaneous	$50,000	City Of Kinston
Flood mitigation along Loop Rd	Miscellaneous	$1,000,000-$2,000,000	Town Of Hookerton
Swift Creek and Tributaries Snag and Drag	Debris Removal	$3,400,000	Pitt County
Grifton Police Department	Relocation	$2,700,000	Pitt County
Goldsboro Water Treatment Plan	Levee/Dike/Berm	$1,000,000-$2,000,000	City Of Goldsboro

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
City of Goldsboro Wastewater Treatment Plant	Critical Infrastructure	$10,000,000	City Of Goldsboro
Town of Seven Springs Proposed Levee	Levee/Dike/Berm	$25,000,000-$50,000,000	City Of Goldsboro
Stormwater Storage	Miscellaneous	$2,000,000-$3,000,000	City Of Goldsboro
US 70 Kinston Bypass - Construct new bridge crossing of the Neuse River	Roadway Elevation/ Road Crossing Modification	$106,261,767	City Of Kinston
Mitigate High AAL Structures	Miscellaneous	$15,000,000-$25,000,000	City Of Kinston
Buckhorn Lake Dam Feasibility Study	Miscellaneous	$5,000,000-$20,000,000	City Of Wilson, Town Of Stantonsburg
Resiliency Action for Mid-Century 1% Storm Event	Miscellaneous	$1,000,000-$2,000,000	City Of Wilson, Town Of Stantonsburg
Town of Stantonsburg Roadway Hydraulics Study	Miscellaneous	$100,000-$250,000	City Of Wilson, Town Of Stantonsburg
I-587/US 264 Toisnot Swamp Crossing Improvements	Roadway Elevation/ Road Crossing Modification	$4,000,000	City Of Wilson, Town Of Stantonsburg
Wastewater Treatment Plant Relocation	Critical Infrastructure	$20,000,000	Town Of Hookerton
Road Inundation along Main St	Miscellaneous	$40,000-$60,000	Town Of Hookerton
Town of Farmville Residential Flood Mitigation	Structural Elevation	$608,487	Town Of Farmville
Town of Grifton Residential Flood Mitigation	Wet Floodproofing	$686,143	Town Of Grifton
Stormwater Management Plans	Stormwater, Water Quality, Floodplain Regulations	$50,000	Nash County, Town Of Whitakers, Town Of Middlesex, Town Of Bailey
Middle Sub-basin Analysis of Bridges and Road Embankments	Stormwater Management Activities	$500,000	Middle Neuse Jurisdictions
Seek Funding to facilitate implementation of Flood Mitigation Alternatives and Water Quality Recommendations	Stormwater, Water Quality, Floodplain Regulations	$200,000-$100,000,000	City Of Greenville

Cliffs of the Neuse State Park

Big Ditch Restoration Project



Jurisdiction:
City of Goldsboro

Cost:
$4,000,000-$8,000,000

Primary Flood Type:
Riverine

Target Impact:
Changing Hazards, Disconnected Floodplains

Implementation Type:
Nature-based Restoration

Sub-basin:
Middle Neuse

Action Category:
Other

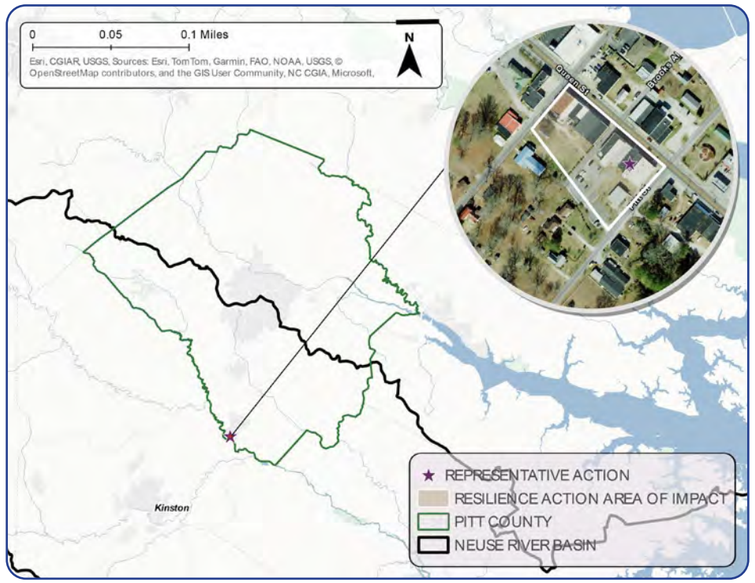
Action Type:
Miscellaneous

Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

This action was submitted by the City of Goldsboro as a part of the City's Local Action Plan. Big Ditch is a hardened channelized urban stream that moves stormwater runoff to the Neuse River, but remains disconnected from the natural floodplain. Increasingly, urbanization in Goldsboro is leading to more impervious surfaces, sending more water into the channel. The channel frequently overtops during moderate and heavy rainfall events, transporting sediment downstream and directing flood waters into nearby residential areas and roadways due to the channels already limited capacity. The existing armored, concrete-lined trapezoidal channel further increases flow velocities, which has degraded downstream ecological restoration efforts.

This project proposed to restore the floodplain and incorporate natural infrastructure along Big Ditch to enhance stormwater management by increasing infiltration and reducing flow velocities. Reestablishing floodplain connectivity would allow stormwater to spread slowly, and soak into the ground rather than moving rapidly through the channel. Slowing water into and in the channel will decrease both the volume and velocity of runoff ultimately entering the Neuse River. The project's natural stream restoration features, such as vegetated buffers and stabilized banks, will improve water quality by capturing sediment and debris before they are transported downstream.

Grifton Police Department



Jurisdiction:
Pitt County

Cost:
$2,700,000

Primary Flood Type:
Riverine

Target Impact:
Changing Hazards

Implementation Type:
Major Infrastructure

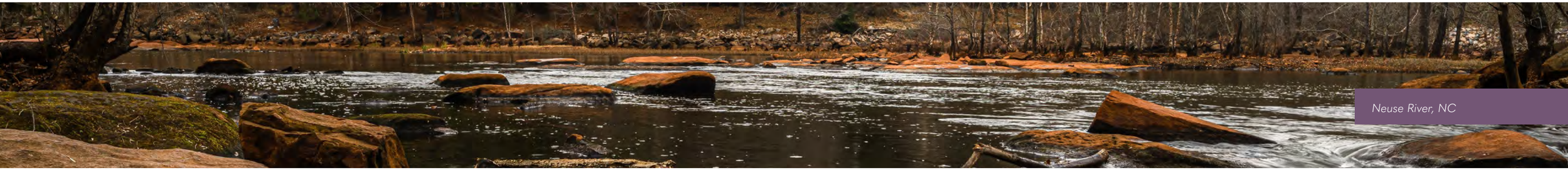
Sub-basin:
Middle Neuse

Action Category:
Building Level Mitigation

Action Type:
Relocation

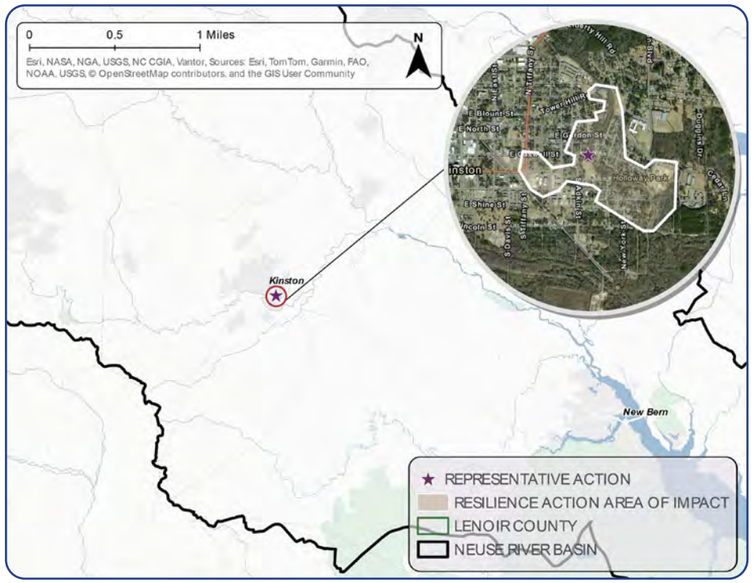
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

This action showcases a building level mitigation action submitted by Pitt County from the Pitt County Drainage and Infrastructure Improvement plan. The Grifton Police Department building is currently located within the floodplain. During major storm events, the building floods, making it both unsafe to be in as well as difficult to access. As a critical emergency response provider, the Police Department needs to maintain its operations during flood emergencies. This action proposes relocating the Police Department Building out of the floodplain and to a more suitable location that will continue to be safe and accessible. Moving the facility out of the floodplain would reduce the chance that police operations are interrupted at the same time residents may need road closures, evacuations, welfare checks, or emergency coordination. The relocation also shifts a critical public safety function from a repeatedly exposed site to a more dependable location, improving the community's ability to respond during flood events and recover afterward.



Neuse River, NC

Adkin Branch Crossing



Jurisdiction:

City of Kinston

Cost:

$6,000,000

Primary Flood Type:

Riverine

Target Impact:

Preventative Improvements & Maintenance

Implementation Type:

Major Infrastructure

Sub-basin:

Middle Neuse

Action Category:

Infrastructure and Control Structures

Action Type:

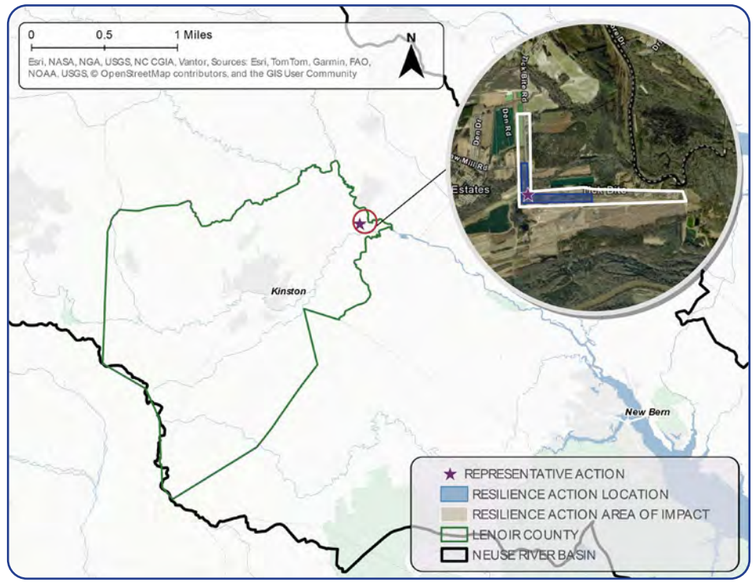
Storm Water Management Activities

Locally Prioritized or Vulnerability Assessment-Based Action:

Vulnerability Assessment-Based

This action is a vulnerability-based flood resilience action to help improve water movement through upsizing culverts. The feasibility study proposed as part of this action would analyze the benefits of upsizing three culverts along Adkin Branch – on Lincoln Street, E. Caswell Street, and E. Gordon Street in the City of Kinston. Upsizing culverts, especially ones in succession, can have system wide benefits for moving water less disruptively by each node in the system moving water more efficiently. Because these crossings sit along the same drainage path, improving them together can help prevent one undersized culvert from simply shifting flood pressure to the next downstream location. The study will also help the City identify where targeted culvert upgrades could reduce roadway ponding, protect nearby properties, and improve neighborhood connectivity during intense rainfall events.

Early Warning System for Flooding along Tick Bite Road



Jurisdiction:

City of Kinston

Cost:

$50,000

Primary Flood Type:

Riverine

Target Impact:

Growing Exposure

Implementation Type:

Quick Wins/Low Complexity

Sub-basin:

Middle Neuse

Action Category:

Other

Action Type:

Miscellaneous

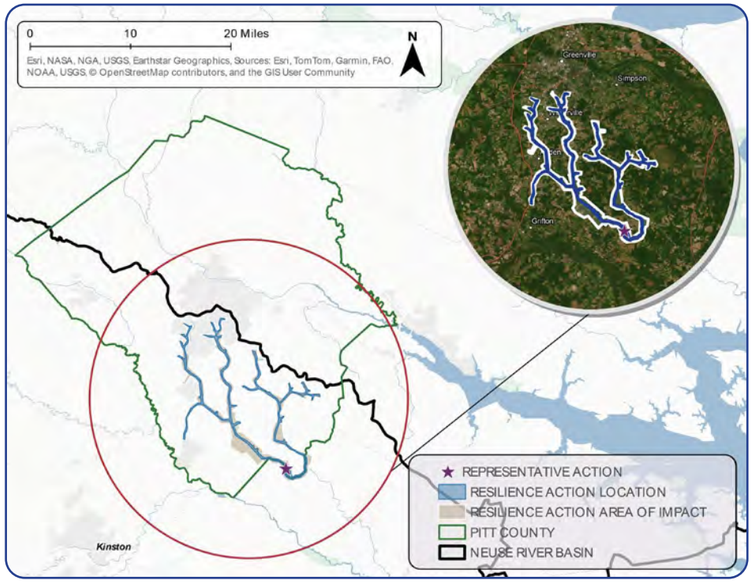
Locally Prioritized or Vulnerability Assessment-Based Action:

Vulnerability Assessment-Based Action

This action was developed based upon vulnerability assessment results for Lenoir County. The Middle Neuse Sub-basin needs emergency response support to ease evacuation, as transportation and access failures due to flooding impact a growing number of people. 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.

Pitt County Courthouse

Swift Creek and Tributaries Snag and Drag



Jurisdiction:
Pitt County

Cost:
$3,400,000

Primary Flood Type:
Riverine

Target Impact:
Compound/Multi-Hazard, System Failures

Implementation Type:
Major Infrastructure

Sub-basin:
Middle Neuse

Action Category:
Channel Modification

Action Type:
Debris Removal

Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

The Swift Creek and Tributaries Snag and Drag action was submitted as part of Pitt County's Drainage and Infrastructure Improvements. Pitt County, like many other local governments in the Neuse River Basin, faces challenges in ensuring that waterways maintain their flow capacity due to clogs caused by debris build up over time. Swift Creek is one of the main sources of flooding in the county, some of which could be alleviated by removing debris that causes blockages in the flow of water through the creek. Over time, this waterway has been inundated with natural and man-made debris that has prevented the stream from moving water efficiently. This action would help improve flow through the creek, helping water drain out of the surrounding communities and roadways faster. By restoring and maintaining channel conveyance, the project can reduce localized backups and lower the likelihood that floodwaters will remain trapped near homes, roads, and other vulnerable areas. Keeping the creek and its tributaries clear of major obstructions also supports faster post-storm drainage, improves access for emergency response, and strengthens overall flood resilience in surrounding communities.

City of Goldsboro, NC

LOWER NEUSE SUB-BASIN

Flood risk in the Lower Neuse sub-basin is influenced by the interaction of downstream riverine flooding, coastal processes, and development patterns in low-lying communities. Compared with the Upper and Middle Neuse, the Lower Neuse has fewer exposed residents and assets in absolute terms, but it has some of the highest relative exposure in the basin across population, land area, and infrastructure.

These conditions make the Lower Neuse an important focus area for actions that reduce repeated disruption, protect critical services, maintain access, and support adaptation in communities where flooding can be widespread or persistent. The sub-basin also includes natural systems that provide flood mitigation benefits and should be considered alongside built infrastructure when identifying appropriate actions.

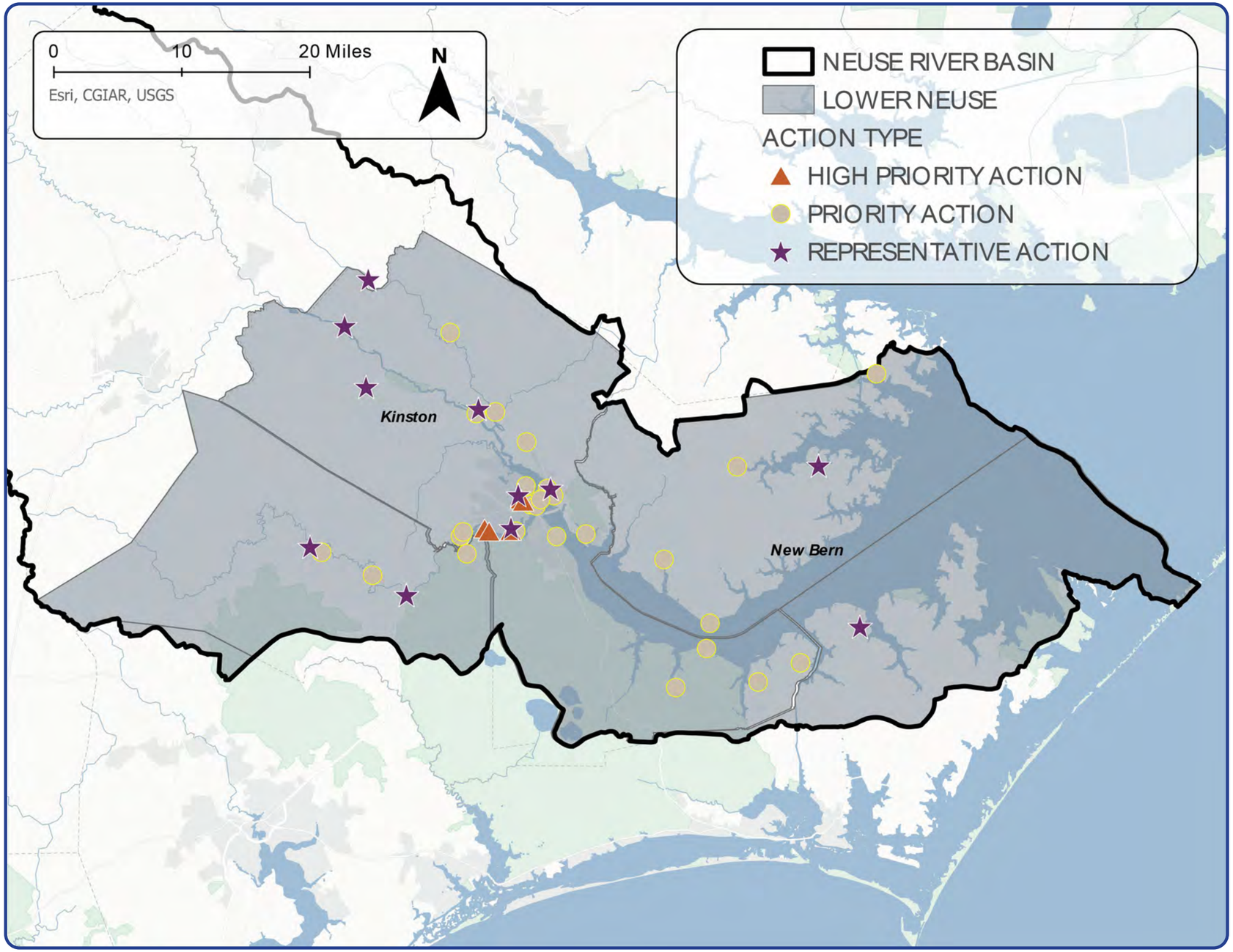
The sections that follow describe the location and vulnerability characteristics that influence flood risk across the Lower Neuse sub-basin. This is followed by a summary of Priority and Representative Actions that illustrate how stormwater improvements, critical infrastructure protection, structure-level mitigation, access improvements, and coastal and floodplain resilience approaches can help reduce impacts in this part of the 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.



Lower Neuse High Priority and Representative Actions

The Lower Neuse sub-basin includes 41 Priority Actions focused on floodplain and open space preservation, living shorelines and coastal restoration, structural elevation and floodproofing, and risk reduction for emergency facilities and critical infrastructure. Of these, 15 were identified as High Priority Actions. These High Priority Actions include locally prioritized actions submitted through the Blueprint Tool by Craven County, the City of New Bern, and the Town of Trent Woods, as well as vulnerability assessment based actions identified for other jurisdictions throughout the sub-basin.

Six of the 15 High Priority Actions were selected as Representative Actions. These actions illustrate a range of action types, including Stormwater Management Activities, Debris Removal, Critical Infrastructure, Dry Floodproofing, Structural Elevation, and Stormwater, Water Quality, and Floodplain Regulations. Two of the selected Representative Actions, Lower Neuse Dry Floodproofing Actions and Lower Neuse Structural Elevation Actions, group multiple structure-level mitigation actions across the sub-basin. These grouped actions should be considered together where implementation can increase flood resilience benefits for emergency services and other vulnerable facilities.

Recommended Critical Needs

- Protection of emergency services, utilities, and critical facilities
- Evacuation route and access improvements in low-lying communities
- Stormwater, drainage, culvert, and conveyance upgrades
- Structure-level mitigation for repeatedly flooded homes and facilities
- Coastal and floodplain nature-based solutions
- Long-term resilience planning for small, rural, and coastal communities

Lower Neuse Representative Actions

- Hazel Ave Culvert Replacement
- Improvement Area #4 – Darby Rd & Drainage Channel to Wedgewood Dr
- Maple Cypress Aeiral Waterline
- Targeted Repetitive Flooding Drainage Assessment
- Lower Neuse Dry Floodproofing Actions
- Lower Neuse Structural Elevation Actions

Priority Action List

**High priority actions are highlighted in blue.*

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Green Park Terrace Culvert Replacement	Stormwater Management Activities	$350,000	City Of New Bern
Hazel Ave Culvert Replacement	Stormwater Management Activities	$500,000	City Of New Bern
Christopher Ave Culvert Replacement Project	Stormwater Management Activities	$500,000	City Of New Bern
Improvement Area 2 - Trent Wood Dr and EdgeHill Rd	Stormwater Management Activities	$1,200,000	Town Of Trent Woods
Improvement Area 1 - Pine Crest Rd and Moye Rd	Stormwater Management Activities	$1,500,000	Town Of Trent Woods
Improvement Area 5 -Wedgewood Dr and Canterbury Rd	Stormwater Management Activities	$1,400,000	Town Of Trent Woods
Improvement Area 4 - Darby Rd & Drainage Channel to Wedgewood Dr	Stormwater Management Activities	$1,000,000	Town Of Trent Woods
Maple Cypress Aerial Waterline	Critical Infrastructure	$1,200,000	Craven County
Targeted Repetitive Flooding Drainage Assessment	Stormwater, Water Quality, Floodplain Regulations	$100,000-$500,000	Craven County
Pollocksville Rescue Squad/ Emergency Services - Dry Floodproofing	Dry Floodproofing	~$10,000	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
Bridgeton Rescue/EMS - Dry Floodproofing	Dry Floodproofing	~$10,000	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
Florence/Whortonsville Fire Dept - Dry Floodproofing	Dry Floodproofing	~$10,000	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
South River-Merrimon Fire & EMS - Dry Floodproofing/ Structural Elevation	Utility Elevation	$50,000	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
Weyerhaeuser Company/ Streets Ferry Heliport - Structural Elevation	Utility Elevation	$50,000	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

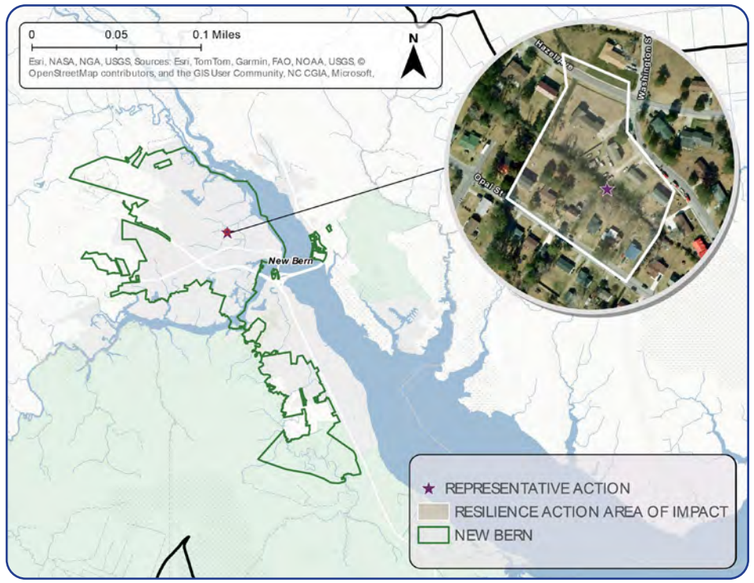
Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Trenton EMS - Dry Floodproofing	Dry Floodproofing	~$10,000	City Of New Bern, Town Of Pollocksville, Pamlico County, Town Of Trenton,Town Of Beaufort, Town Of Bridgeton, Town Of Vanceboro, Craven County, Carteret County, Jones County
Pollock St & Liberty St Stormwater Improvements	Stormwater Management Activities	$1,000,000	City Of New Bern
Front St & Hancock St Stormwater Improvements	Stormwater Management Activities	$500,000	City Of New Bern
Improvement Area 6 - Aber Nath Rd and Trent Shores Dr	Stormwater Management Activities	$750,000	Town Of Trent Woods
Marsh Still and Living Shoreline , Chery Branch-Minnesott Beach Ferry Terminal	Living Shoreline	$335,907	Craven County
Marsh Sill and Living Shoreline, Brinson Memorial Elementary School	Living Shoreline	$271,701	Craven County
Shoreline Dr	Critical Infrastructure	$2,343,212	Craven County
Crop buying facility	Critical Infrastructure	$1,000,000	Craven County
Elevation of Weyerhaeuser Road	Roadway Elevation/ Road Crossing Modification	$113,254,074	Craven County
Adams Creek Rd and Belangia Intersection Elevation	Roadway Elevation/ Road Crossing Modification	$36,220,797	Craven County
Cherry Branch-Minnesott Beach Ferry Terminal	Critical Infrastructure	$1,000,000	Craven County
Taylor Farm Road and Smith Farm Road Nature-Based Solutions	Stormwater, Water Quality, Floodplain Regulations	$100,000-$500,000	Craven County
Marsh Sill and Living Shoreline, Vernon Blades Park, Town of Bridgeton	Living Shoreline	$350000-$400000	Craven County

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Trenton Floodplain Preservation	Floodplain Restoration	$2,213,000	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
Pollocksville Floodplain Preservation	Floodplain Restoration	$1,184,000	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
Arapahoe Floodplain Preservation	Floodplain Restoration	$415,000	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
River Bend Floodplain Preservation	Floodplain Restoration	$1,361,000	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
Ernul Floodplain Preservation	Floodplain Restoration	$708,000	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
Havelock Floodplain Preservation	Floodplain Restoration	$364,000	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
Mills Branch at Rowes Corner - Enlarge Culvert	Critical Infrastructure	$5,000	Craven County, City Of New Bern
North Prong Bay River Homes - Acquisition/Demolition	Acquisition/Demolition	$3,834,703	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County
Bridgeton Coastal Homes - Structural Elevation	Structural Elevation	$6,793,376	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County

Action Name	Action Type	Cost Estimate	Jurisdiction(s)
Coastal New Bern Homes - Structural Elevation	Structural Elevation	$6,136,419	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County
Northwest Creek, Fairfield Harbour Homes - Structural Elevation	Structural Elevation	$11,303,659	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County
River Bend Community - Structural Elevation	Structural Elevation	$8,437,156	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County
Homes on/near Oaks Rd, New Bern - Structural Elevation	Structural Elevation	$4,700,567	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County
NC 304-, Hobucken Homes - Structural Elevation	Structural Elevation	$5,410,216	Town Of Bridgeton, Craven County, Town Of Bayboro, City Of New Bern,Pamlico County

City of New Bern, NC

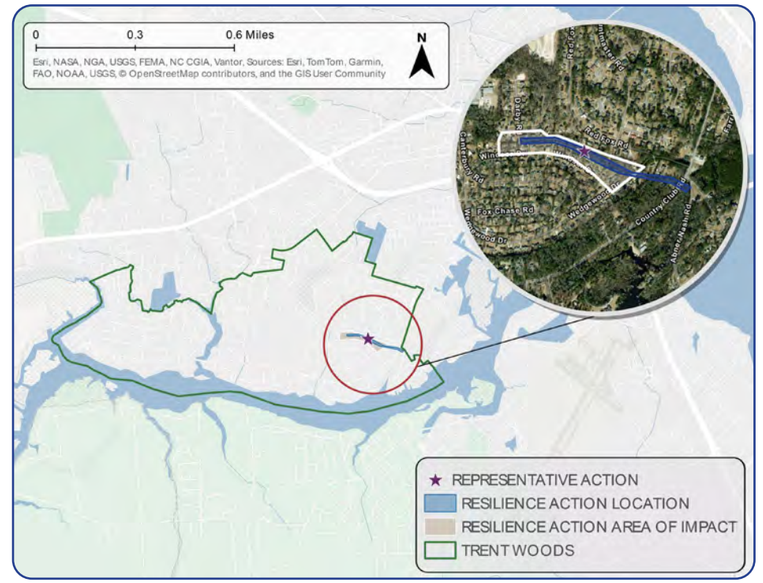
Hazel Avenue Culvert Replacement



Jurisdiction:
City of New Bern
Cost:
$500,000
Primary Flood Type:
Urban and Stormwater
Target Impact:
System Failures
Implementation Type:
Major Infrastructure
Sub-basin:
Lower Neuse
Action Category:
Infrastructure & Control Structures
Action Type:
Storm Water Management Activities
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

The Hazel Avenue Culvert Replacement was submitted as part of the City of New Bern's Citywide Stormwater Improvement Projects. This action is intended to upsize an existing, deteriorated culvert. Culverts that are undersized contribute to water backing up the pipe network, moving into roadways and homes, and threatening critical infrastructure. Investing in culvert improvements is a targeted way to make a stormwater infrastructure system more effective at moving water efficiently. By alleviating an existing blockage, or pinch point in the flood relief system, this culvert project has the potential to alleviate localized flooding.

Improvement Area #4 – Darby Road and Drainage Channel to Wedgewood Drive

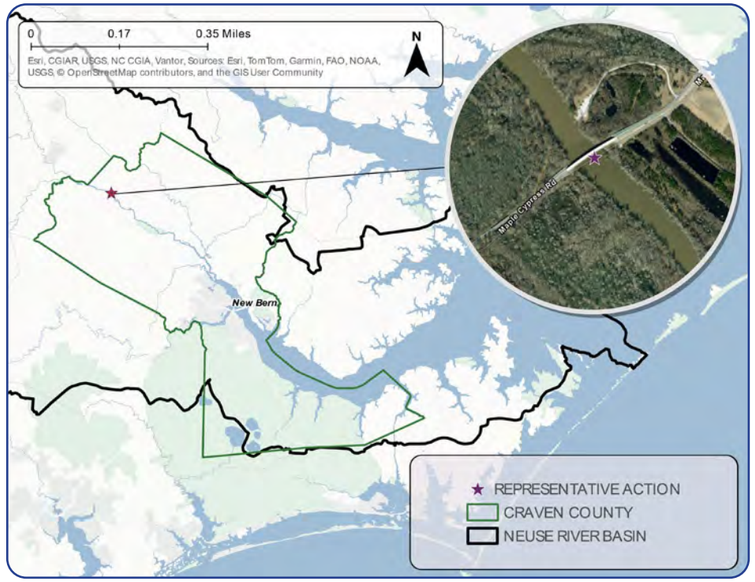


Jurisdiction:
Town of Trent Woods
Cost:
$1,000,000
Primary Flood Type:
Urban and Stormwater
Target Impact:
Preventative Improvements & Maintenance
Implementation Type:
Major Infrastructure
Sub-basin:
Lower Neuse
Action Category:
Infrastructure & Control Structures
Action Type:
Stormwater Management Activities
Locally Prioritized or Vulnerability Assessment-Based Action:
Locally Prioritized

This project was advanced to the Action Strategy by the Town of Trent Woods through the 2023 Stormwater Master Plan. The drainage improvements are proposed along the west side of Darby Road, between Stratford Road, Red Fox Road, and Windsor Drive. Additionally, this project would upsize the culvert under Darby Drive and install pipe across Stratford Road. When combined, these associated projects contribute to streamlining the flow between roadside drainage improvements and under road culverts. A connected stormwater management system helps move water through critical areas more efficiently and less disruptively, helping to promote flood resiliency.

Croatan National Forest

Maple Cypress Aerial Waterline



Jurisdiction:

Craven County

Cost:

$1,200,000

Primary Flood Type:

Coastal/Tidal

Target Impact:

High Frequency of Flood Exposure

Implementation Type:

Major Infrastructure

Sub-basin:

Lower Neuse

Action Category:

Infrastructure and Control Structures

Action Type:

Critical Infrastructure

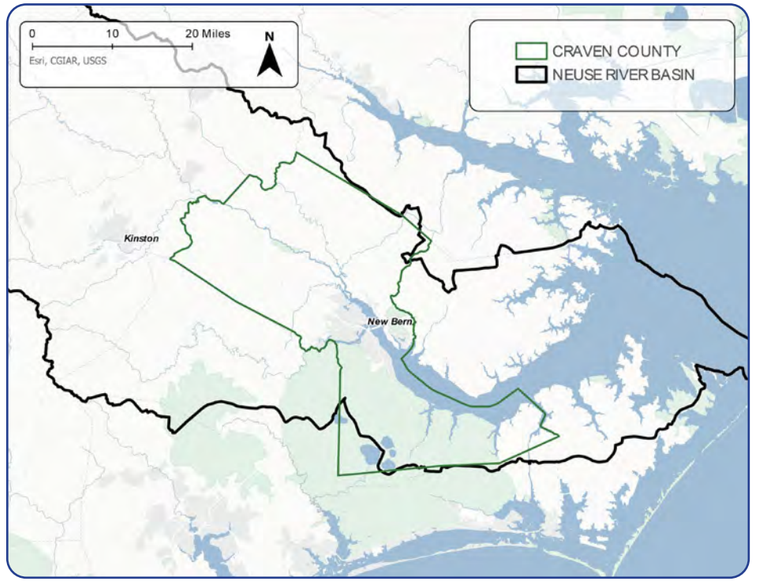
Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

This action was submitted as part of the Craven County Local Action Plan and aims to protect critical water supply infrastructure from future flood 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 during flood events. 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; service would be lost until repairs could be completed. The proposed action consists of relocating the water line by directional boring approximately 1,400 linear feet beneath wetlands and minor drainage features. Water infrastructure, like this line, is susceptible to corrosion, particularly from salt water and should be considered during implementation. 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 damage to the water line and allow them to direct their focus on other emergency response needs.

Targeted Repetitive Flood Drainage Assessment



Jurisdiction:

Craven County

Cost:

$100,000-$500,000

Primary Flood Type:

All Flood Types

Target Impact:

Growing Exposure, Preventative Improvements & Maintenance

Implementation Type:

Major Infrastructure

Sub-basin:

Lower Neuse

Action Category:

Infrastructure and Control Structures

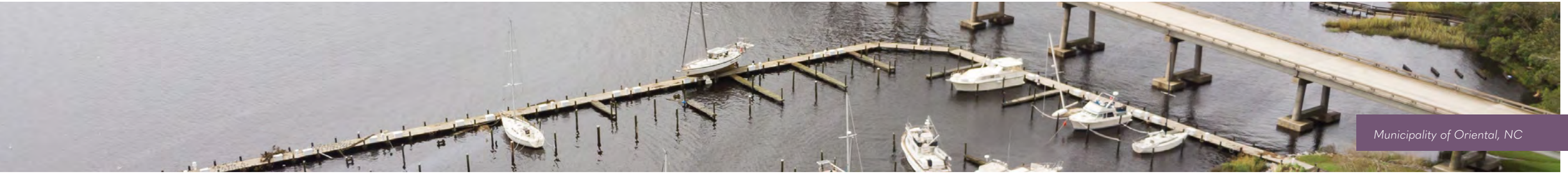
Action Type:

Critical Infrastructure

Locally Prioritized or Vulnerability Assessment-Based Action:

Locally Prioritized

This action is a seed action to set regular assessments of and improvement for drainage infrastructure across Craven County. This assessment would focus on sites that are known to experience flooding or have a high probability of flooding. Based on the regular assessments, this action builds in the implementation of improvements that may include infiltration swales, culvert pipe replacements, retention facilities, and other options as appropriate to a given location. Projects will emphasize natural or nature-based solutions to help restore or improve natural ecological functions. This action recognizes the need to plan for improvements based on greatest risk and invest in solutions that will have flood risk reduction benefits and ecological co-benefits, where possible.



Municipality of Oriental, NC

Lower Neuse Dry Floodproofing Actions

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

Cost:

$40,000-$60,000

Primary Flood Type:

All Flood Types

Target Impact:

Growing Exposure, Preventative Improvements & Maintenance

Implementation Type:

Major Infrastructure

Sub-basin:

Lower Neuse

Action Category:

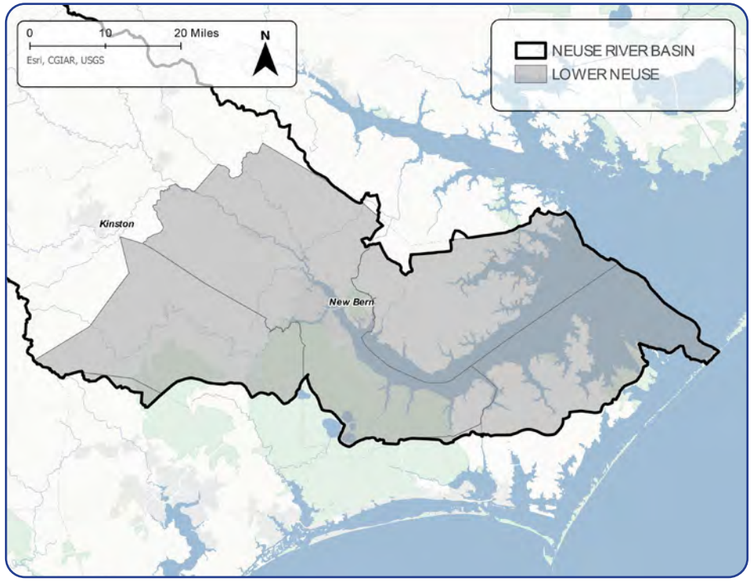
Building Level Mitigation

Action Type:

Dry Floodproofing

Locally Prioritized or Vulnerability Assessment-Based Action:

Vulnerability Assessment Based



The Lower Neuse Dry Floodproofing Actions combine four similar, building-level mitigation projects into a single action focused on protecting critical emergency service facilities from current and future flood impacts. The combined action includes dry floodproofing improvements for the Pollocksville Rescue Squad/Emergency Services facility, the Bridgeton EMS facility, the Florence/Whortonsville Fire Department, and the Trenton EMS facility. Each facility supports emergency response capacity in flood-prone communities and has been identified as vulnerable under one or more current or future flood scenarios. This makes dry floodproofing a consistent and scalable approach across the group.

These projects will allow emergency medical services, fire response, and emergency operations to remain functional before, during, and after flood events. Dry floodproofing helps reduce the likelihood of facility damage, service disruption, equipment loss, and delayed response times when communities are most dependent on emergency support. By combining the four projects into one action, the region can pursue a more efficient implementation strategy, apply consistent design and feasibility considerations, and strengthen the resilience of a distributed emergency response network serving multiple flood-vulnerable communities.

Lower Neuse Structural Elevation Actions

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

Cost:

$100,000-$200,000

Primary Flood Type:

Coastal/Tidal

Target Impact:

Growing Exposure, Preventative Improvements & Maintenance

Implementation Type:

Major Infrastructure

Sub-basin:

Lower Neuse

Action Category:

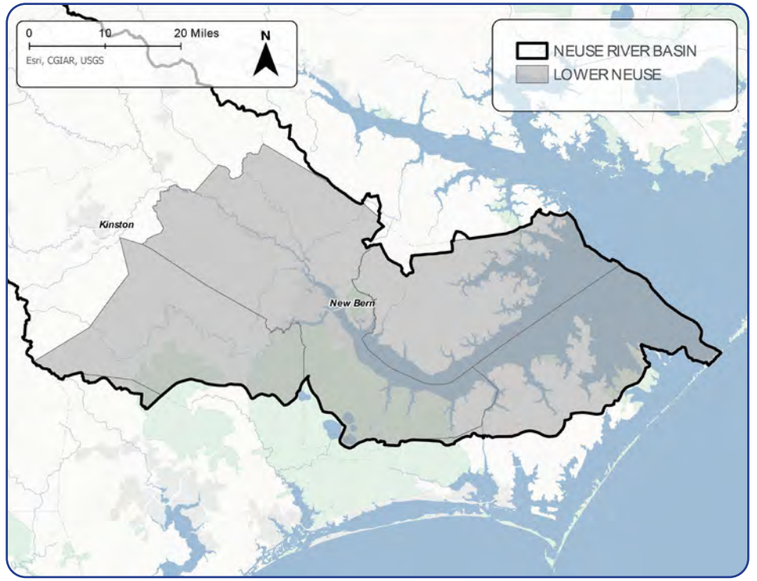
Building Level Mitigation

Action Type:

Structural Elevation

Locally Prioritized or Vulnerability Assessment-Based Action:

Vulnerability Assessment Based



The Lower Neuse Structural Elevation Actions combine multiple building-level mitigation projects into one action focused on elevating critical emergency service facilities that are vulnerable to current and future flood conditions. One identified facility is the South River-Merrimon Fire & EMS facility in Beaufort, which provides emergency medical services and/or emergency operations support and is at risk under multiple modeled scenarios. A second emergency service facility has also been identified as vulnerable under frequent, extreme, and future flood scenarios. Because both projects use structural elevation to address comparable risks to emergency service operations, they can be advanced together as a single coordinated action.

These elevation actions will help improve flood resilience in the Lower Neuse because emergency medical services, fire response, and emergency operations must remain accessible and functional during flood events. Combining the actions into one structural elevation strategy supports the development of a consistent, scalable approach to feasibility, design, and funding, while strengthening the reliability of the emergency response network across flood-prone areas of the sub-basin.

REVIEW OF FUNDING SOURCES

North Carolina communities face growing challenges from flooding, aging infrastructure, rapid development, and extreme weather. A wide ecosystem of federal, state, regional, and private funding sources exists to address these risks, 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 key funding takeaways, highlighting 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 leveraging a variety of potential funding sources – including opportunities that are not directly focused on flood resilience – to align 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

Federal Emergency Management Agency (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.

It is important to note that while the Blueprint Program uses advisory flood maps for risk and vulnerability assessment, FEMA programs reference regulatory floodplains.

HUD Community Development Block Grants

The U.S. Department of Housing and Urban Development (HUD) administers CDBG Disaster Recovery (CDBG DR) and CDBG Mitigation (CDBG MIT) programs following major disasters. These funds support:

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.

National Oceanic and Atmospheric Administration (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.

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.

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.

Town of Angier, NC

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.

Streamflow Rehabilitation Assistance Program (StRAP)

The Streamflow Rehabilitation Assistance Program (StRAP) also provides funds to organizations working on projects that help reduce flooding, restore streams, and protect the integrity of drainage infrastructure across North Carolina's waterways.

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. The Blueprint also encourages leveraging programs such as the North Carolina Department of Agriculture's Agricultural Development and Farmland Preservation fund to undertake actions focused on working lands that can have flood resilience co-benefits.

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 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

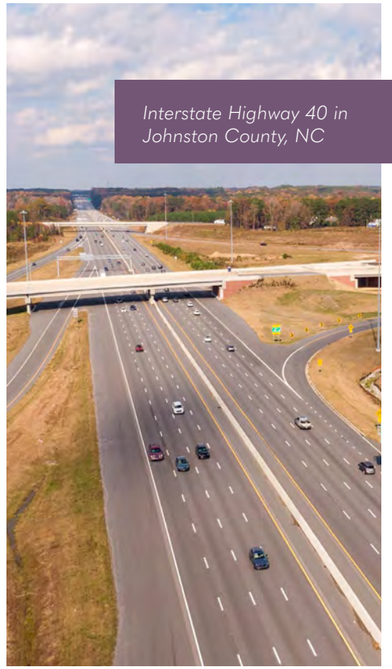
Local governments, regional planning organizations, and nonprofit partners provide essential complementary resources that can fill match requirements, support early-stage planning, or implement smaller scale resilience solutions.

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), in coordination with NCDOT, can incorporate resilience components into transportation improvement programs, often unlocking federal dollars for culverts, bridges, greenways, and road related stormwater improvements.

Nongovernmental Organizations and Philanthropy

Nongovernmental 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

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

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

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.

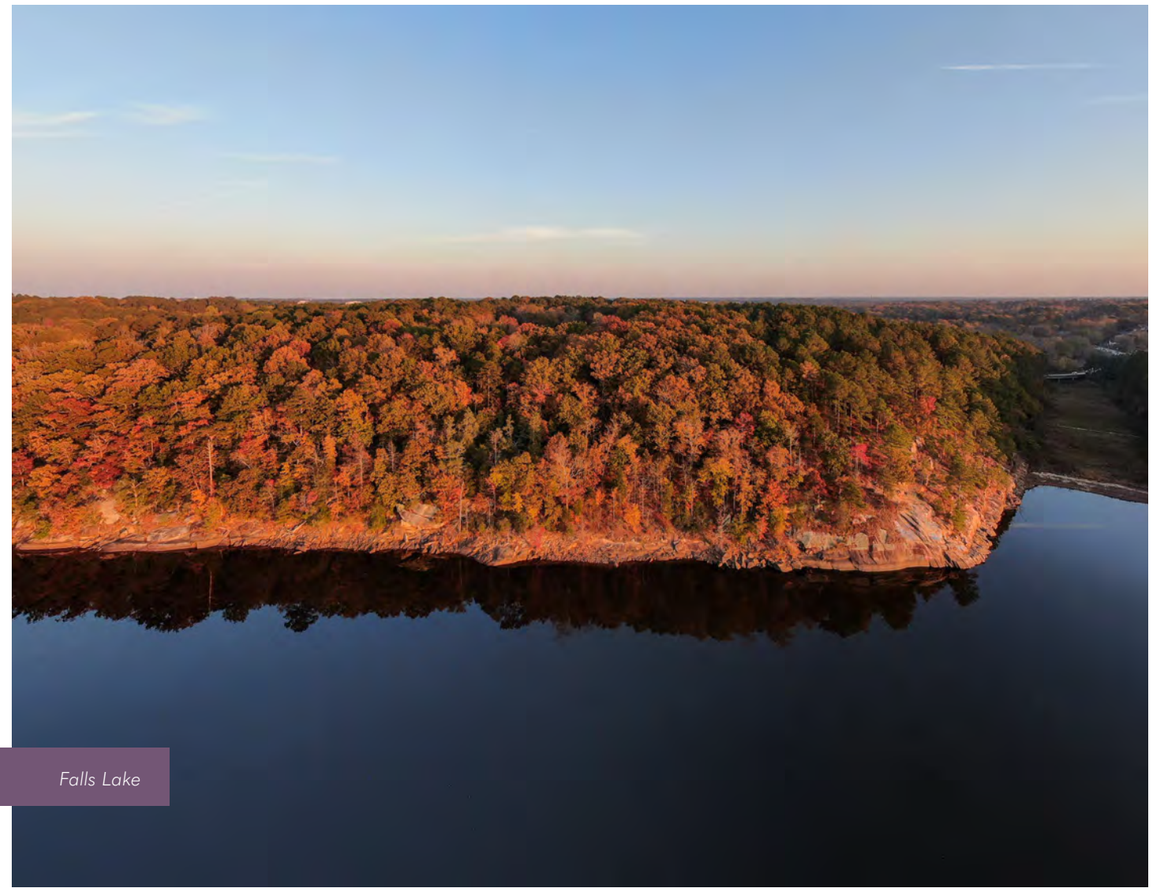
Aligning local project needs with the right funding source—while leveraging multi-agency partnerships and taking full advantage of the Flood Resiliency Blueprint—positions communities to make transformative progress in reducing flood risks and improving watershed health.

ACTION STRATEGY TAKE-AWAYS

The Neuse RBAS 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 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. RBAGs 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, DEQ 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, DEQ 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)[MF58.1]. 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. For many actions, implementation may begin with project development rather than construction. Natural infrastructure, hybrid infrastructure, stormwater, roadway, and floodplain projects often require additional screening, field verification, community and landowner coordination, technical analysis, alternatives evaluation, permitting review, cost refinement, conceptual design, and benefit documentation before they are ready for final design or construction. Recognizing these early-phase activities as important implementation steps can help communities move from planning-level concepts to fundable, permittable, constructible, and maintainable projects, particularly where local capacity is limited. 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, DEQ 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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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

APPENDIX A:
Data Collection Report

APPENDIX B:
Stakeholder Engagement Report

APPENDIX C:
Blueprint Capacity Results Spreadsheet

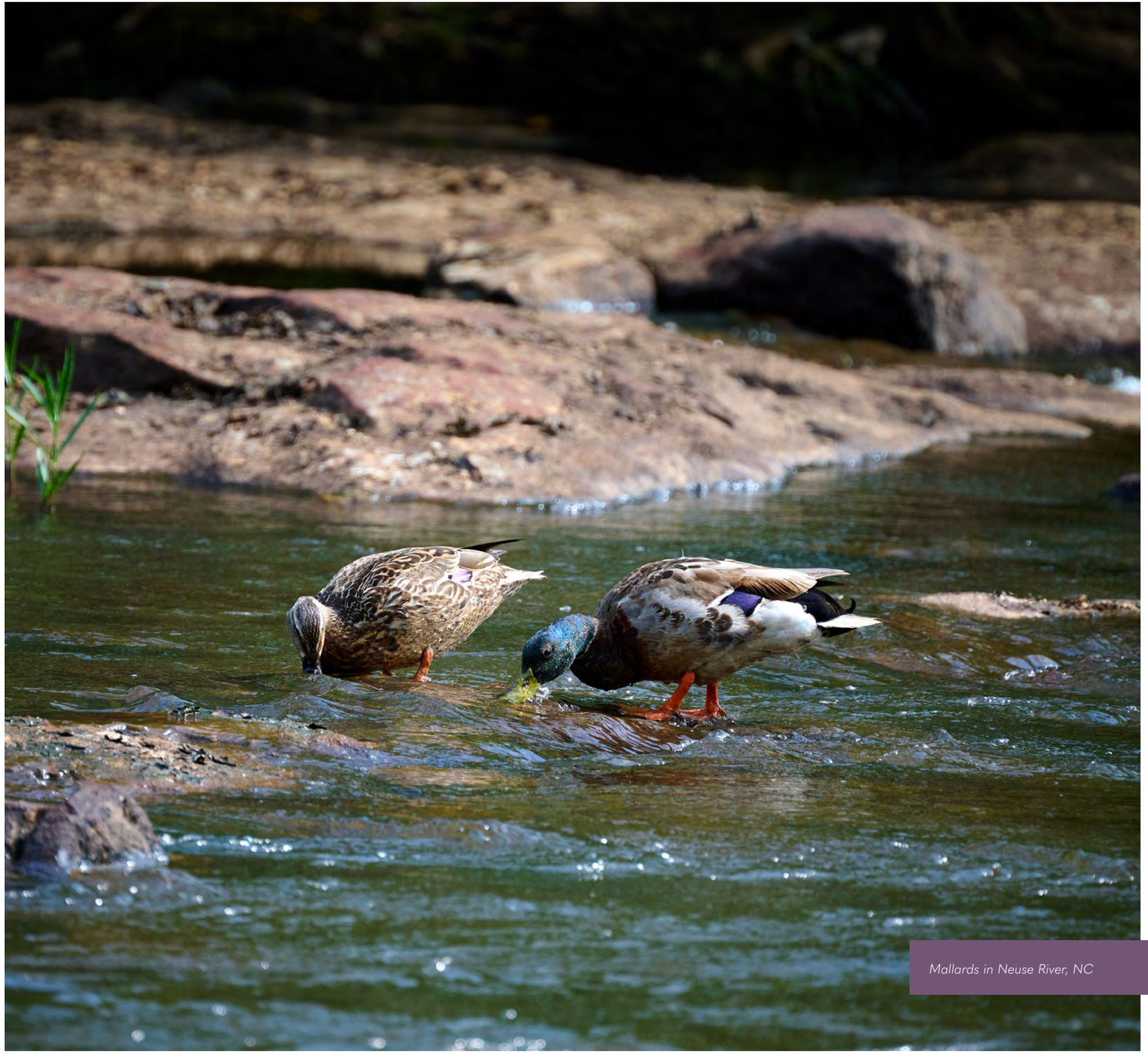
APPENDIX D:
Gap Analysis Report

APPENDIX E:
Flood Risk and Vulnerability Analysis Report

APPENDIX F:
Actions Prioritizing Report and Spreadsheets

APPENDIX G:
Funding Data Sheets

APPENDIX H:
Detailed Prioritized Resiliency Actions Profiles



Mallards in Neuse River, NC