

**Report to the North Carolina General Assembly  
Joint Legislative Commission on Governmental Operations  
and the Fiscal Research Division**



***Statewide Flood Resiliency Blueprint Implementation Report***

**July 1, 2025**

**Department of Environmental Quality  
Division of Mitigation Services**

**Pursuant to SL 2021-180 Section 5.9(c) and SL 2022-75 Section 22.(b)**

## **Key Milestones**

Over the past year, the North Carolina Flood Resiliency Blueprint has made significant progress. In addition to the completion of Phase I of the Blueprint, DEQ and the Blueprint team released the first version of the Online Decision Support Tool, started five River Basin Action Strategies, and funded over \$25 million for projects to help improve resiliency across the state. A user-friendly [overview of the program](#), among other resources, is available on the [Blueprint website](#).

## **Background**

To better equip the state and its communities to manage current and future flood risk, the North Carolina General Assembly passed Section 5.9(c) of Session Law 2021-180 in 2021, which directed the North Carolina Department of Environmental Quality (NCDEQ) Division of Mitigation Services (DMS) to develop the North Carolina Flood Resiliency Blueprint (Blueprint). The General Assembly provided additional guidance on the Blueprint's development in Section 22 of Session Law 2022-75. These laws also directed DMS to provide an annual status update to the Joint Legislative Commission on Governmental Operations and the Fiscal Research Division.

Prior status reports submitted to the North Carolina General Assembly are available online for each of the following years: [2022](#), [2023](#), and [2024](#).

The Blueprint is a statewide initiative designed to bring together and build upon all the relevant existing resources and knowledge in the state to create one unified effort to increase community resiliency to flooding. Simply put, the goal of the Blueprint is to make North Carolina more resilient to flooding—that is, reduce the likelihood and extent of flooding, reduce the damage and disruption from flooding, and increase communities' ability to resume or quickly maintain pre-storm activities. To meet this goal, the Blueprint has developed a statewide flood planning framework and decision-support tool that enables state, tribal, regional, and local entities and their stakeholders to identify, prioritize, and direct resources to implement effective flood resiliency strategies based on the best available science and understanding of likely future conditions. Through the development and implementation of river basin-specific flood resiliency strategies, the Blueprint serves as the backbone of North Carolina's flood planning process.

## **Vision**

The vision for the North Carolina Flood Resiliency Blueprint was developed through the legislation and extensive communication with interagency staff, peer and non-peer states involved in flood mitigation and resiliency, municipalities, communities on the front line of flood events, academics, non-profits, climate and flood resiliency experts, legislators, and other stakeholders. The Blueprint is not envisioned as a static tool or set of reports but rather as a dynamic process incorporating new information as it becomes available.

The Blueprint will provide a standardized, basin-wide flood resiliency approach applicable to all 17 North Carolina river basins. This process will better inform how and where resources should be directed and will assist in identifying flood resiliency projects and strategies. The Blueprint and its components will provide multi-scale modeling, scenario exploration systems, guidance documents, and an interactive online decision support tool to increase decision-makers' ability to identify, prioritize, and implement flood resilience actions to protect communities and economies from flood damage and flood risk. It will help link and build on existing data, strategies, projects, plans, and efforts underway by local, regional, tribal, state, and federal entities, academia, businesses, and nonprofits, and will incorporate local knowledge. Additional features of the Blueprint's vision are to maximize the return on the state's investment while also seeking positive co-benefits across social, environmental, and economic dimensions. By investing in a more flood-resilient state now, North Carolina will protect and improve the

lives and livelihoods of North Carolinians, secure and build upon its thriving economy, expand tourism, support agriculture, forestry, and other working land businesses, fortify transportation infrastructure, protect critical aspects of the military mission, and steward natural resources.

## **Status Update**

The Blueprint has been developed in three distinct phases. Phase I of the Flood Resiliency Blueprint focused on research and evaluation, conducting gap analysis, and developing key recommendations for a structured, comprehensive framework designed to help local communities more easily begin or advance their planning and mitigation efforts. Phase II built off of the gaps identified in Phase I to develop the data and tools needed to support flood resilience planning at multiple geographic scales. Phase III applies the process defined in Phase I and the data and tools developed in Phase II to develop River Basin Action Strategies in six target river basins.

In FY2024-25, Phase I was completed, resulting in the draft Flood Resiliency Blueprint, the Draft Neuse River Basin Action Strategy, and over 30 supporting technical documents. During this period, there was also significant development and testing of the Blueprint Tool, which was released in April 2025. Training is ongoing as functionality is enhanced and new data is integrated.

Additionally, in Fall 2024, DEQ awarded contracts to eight vendors to support Phase III of the Blueprint—the development of five new River Basin Action Strategies (RBAS). This phase directly builds upon the work completed in Phases I and II. The Flood Resiliency Blueprint framework is now being applied to develop strategic plans for the river basins prioritized in the Blueprint legislation: the Cape Fear, French Broad, Lumber, Tar-Pamlico, and White Oak River basins. This phase will also update the draft Neuse River Basin Strategy to incorporate the latest modeling and scientific data.

Finally, in 2024 and 2025, DEQ hired six time-limited staff members to support the six targeted river basins. In addition to playing a critical role in developing the river basin action strategies, these staff provide direct assistance to local governments, support local planning processes and project development, and deliver training on the Blueprint Tool. These staff are currently funded for only 18 months, yet their ongoing role is critical to the future success of the Blueprint and to building flood resiliency in the basins they serve.

Work completed to date for the Blueprint in FY 2024-25 is described below.

**Flood Resiliency Blueprint Phase I:** Phase I has successfully been completed. This initial phase of the Blueprint was critical for future success because it built a critical foundation of shared knowledge, tools, and networks among the experts and stakeholders working on flood resiliency in North Carolina. It included nine months of comprehensive research and analysis, community outreach, stakeholder engagement, and feedback provided by the Principal and Technical Advisory Groups. The Blueprint team, advised by outreach and engagement activities, conducted literature reviews and landscape analyses of statewide and local datasets, planning efforts, research, and regional-scale modeling related to flooding and flood resilience. With this information, the Blueprint team conducted a comprehensive gap analysis and developed an initial set of recommendations to determine how to best develop the Blueprint and enhance resiliency.

The key deliverables in Phase I included the requirements for developing the online decision support tool, the draft Neuse River Basin Action Strategy, and the draft North Carolina Flood Resiliency Blueprint process document. The process of creating these consisted of four tasks, which built on each other toward the key deliverables. Each of the four tasks includes several publicly available subtask reports, of which 31 are accessible to view and download from the [Blueprint Website](#).

Phase I – Task 1: Perform outreach and engagement activities; conduct a data and literature review

Phase I – Task 2: Develop gap analysis based, in part, on data and literature review (Task 1)

Phase I – Task 3: Develop recommendations for the requirements of the Blueprint’s online decision-support tool applications, based, in part, on a data and literature review (Task 1) and gap analysis (Task 2).

Phase I – Task 4: Development of key deliverables: Draft NC Flood Resiliency Blueprint and Neuse River Basin Action Strategy.

The Draft North Carolina Flood Resiliency Blueprint was completed in March 2024 and can be accessed through the Blueprint Website and the following link: [Draft North Carolina Flood Resiliency Blueprint](#) (PDF). The Draft Neuse River Basin Action Strategy was completed in July 2024 and will be revised in 2025 with the aid of improved data and modeling and utilizing the Blueprint Tool.

Phase I was completed in October 2024. Work completed in FY 2024-25 included:

- Convening of the Principal Advisory Group
- The sixth convening of the Neuse Regional Advisory Groups
- The completion of 31 technical subtask reports available on the [Blueprint website](#)
- The completion of the Neuse River Basin Action Strategy in July 2024

**Flood Resiliency Blueprint Phase II:** Starting in late 2023, the second phase of the Blueprint builds on the research, gap analysis, and process developed in Phase I. There are two components of Phase II: (1) hydrologic and hydraulic (H&H) model improvements and (2) the development of a web-based decision support tool known as the NC Flood Resiliency Blueprint Tool (Blueprint Tool).

*Model Improvements:* According to a 2022 study from North Carolina State University, across the nation, 68 percent of flood damage reports were outside of the high-risk flood zones mapped by the Federal Emergency Management Agency (FEMA). This discrepancy illustrates the need for improved flood risk information to support flood resilience decision making.

In FY 2024-25, DEQ partnered with NCEM to build upon and enhance the effectiveness of existing modeling tools through the Blueprint program. The improved models will provide more accurate estimates of current flood risks and be used to project future flood risk to support long-term strategic planning.

DEQ has invested \$4,404,055.18 in model improvements, model runs, and QA/QC for the Neuse, Cape Fear, Lumber, White Oak, and Tar Pamlico basins. These outputs of these H&H models serve as the backbone for the Blueprint Tool.

**Table 1:** H&H Model Improvement and QA/QC Schedule

Model Improvement Task	Projected Completion	Vendor
Neuse Basin	June 30, 2025	AECOM
Cape Fear, Lumber, and White Oak Basin	August 15, 2025	AECOM
Tar-Pamlico Basin	August 15, 2025	ESP
Model Improvement QA/QC	August 15, 2025	Dewberry

*NC Flood Resiliency Online Decision Support Tool (Blueprint Tool)*: The Blueprint Tool is a web-based decision support tool designed to be a resource for communities, local governments, and other partners for the planning and implementation of resilience actions. This Tool is a publicly accessible, data- and model-driven, GIS-enabled web application designed to aid flood planning and implementation statewide. The Blueprint Tool is first of its kind, differing from other flood resiliency-related, web-based decision support tools, in that it will:

- Assess impacts from multiple future conditions modeling scenarios
- Provide detailed profiles for community hazards, actions, and funding
- Provide quantifiable programmatic metrics based on community profiles
- Estimate impacts on structures, population, environment, infrastructure, and economy
- Identify and match potential funding sources for each resiliency action
- Explore, rank, and categorize mitigation resilience actions
- Build scalability – all the above can be performed at the community, regional, basin, and state-wide scale

The Tool will rely on detailed flood modeling (described above) to provide users with the functions needed to build flood resiliency in their communities. The improved models exceed FEMA regulatory standards and allow DEQ to develop flood depth projections and expected impacts for future scenarios, including increased precipitation and impervious surfaces.

Similar to Phase I, the second phase of the Blueprint places stakeholder engagement at the center of the development process. The software development team is working closely with DEQ staff as well as advisory groups. The Blueprint team uses an agile development process that includes iterative development, continuous integration, testing, and collaboration to ensure that the Tool meets the Blueprint's the needs of potential users.

Beginning in April 2024 until the release of the Tool in April 2025, over 200 stakeholders and subject matter experts were invited to participate in periodic testing of the tool. Their engagement and feedback has been invaluable. The organizations that the Testers represent can be reviewed in Appendix B.

The Blueprint Tool was made public in April 2025 (<https://frbt.deq.nc.gov/home>). The first training session took place on April 8th at the North Carolina/South Carolina Joint State Floodplain Managers Conference in Wrightsville Beach. From April through June 2025, DEQ has conducted multiple trainings focused on contractors and advisory group members, who will play a key role in supporting and training local governments in flood resilience planning going forward. Additionally, the Blueprint team is developing supplemental training resources, including user manuals, recorded sessions, and in-tool video help clips.

Over the next few months, improved flood and risk modeling will be integrated into the tool with its corresponding data as updates become available (see Table 1). By prioritizing data development and adopting a “train-the-trainers” approach, DEQ aims to enable local users to begin utilizing the Blueprint Tool to support both local and basin-wide planning efforts by Fall 2025.

**Flood Resiliency Blueprint Phase III:** In Fall 2024, DEQ launched Phase III of the Blueprint– the development of data-driven River Basin Action Strategies (RBAS) in the Cape Fear, French Broad, Lumber, Neuse, Tar-Pamlico, and White Oak River basins. This phase directly builds on the achievements of earlier phases, applying the Flood Resiliency Blueprint framework, and leveraging the Blueprint Tool and associated models, to develop strategic plans.

DEQ awarded contracts to eight vendors to support Phase III of the Blueprint in November 2024. Four vendors have been awarded work under these contracts, with work currently underway in five basins.

**Table 2 – Phase III - River Basin Action Strategies Schedule**

<b>Milestones</b>	<b>Tar-Pamlico, White Oak, Cape Fear, Lumber</b>	<b>French Broad</b>	<b>Updated Neuse</b>
Kickoff	January 2025	June 2025	July 2025
Establish advisory groups, identify Community Partners, draft outreach and engagement plan	Completed Winter 2025	Summer 2025	Partially Complete
Complete Basin Wide Data Collection and Gap Analysis	Completed Spring, 2025	Fall 2025	Partially Complete
Draft Vulnerability Analysis	Fall 2025	Summer 2026	Partially Complete
Draft River Basin Action Strategy	Winter 2026	Fall 2026	Spring 2026
Final River Basin Action Strategy and supporting materials	Spring 2026	Winter 2026	Spring 2026

Through the development of the RBAS, DEQ and its partners will conduct detailed flood risk assessments for current and future conditions, prioritize resilience actions (projects), and identify funding strategies to support project implementation. This work is made possible by the cutting-edge Blueprint Tool and model upgrades identified in Blueprint development and implemented by the Blueprint program.

The Blueprint identified extensive outreach and strategic collaboration with state and regional entities, communities and local governments as a critical component of the successful development of the RBAS. To meet the need, DEQ has engaged eight consultant teams to work alongside Blueprint staff and local experts to provide direct technical support tailored to each basin. The relationships built between DEQ and state agencies and communities through close collaboration on RBAS development will result in more effective resilience efforts that are directly responsive to the needs and concerns of community members. These relationships can also be built upon in the long-term to increase flood resilience through future initiatives.

### **Budget**

Administrative expenses totaling \$737,826.37 were paid in FY24-25. Programmatic expenses totaling \$2,895,297.44 were paid in FY24-25 for activities supporting Phase I, Phase II, and Phase III. **Table** identifies expenditures for the Blueprint to date. **Table 4** shows expenses and encumbrances by task.

**Table 3.** Current expenditures for Flood Resiliency Blueprint

<b>Funding Availability</b>	<b>Programmatic</b>	<b>Administrative</b>
Initial Funding	\$19,400,000.00	\$600,000.00
S.L. 2023-134 (6 limited time positions)		\$1,481,859.00
<b>Total Budget</b>	<b>\$19,400,000.00</b>	<b>\$2,081,859.00</b>
<b>Program Expenditures</b>	Phase I, II & III	Administrative

21-22 Expenditures	\$ 38,847.86	\$ 38,847.86
22-23 Expenditures	\$ 121,662.39	\$ 121,662.39
23-24 Expenditures	\$ 6,331,964.62	\$ 162,698.48
24-25 Expenditures (through 5/29/2025)	\$ 2,895,297.44	\$ 737,826.37
<b>Total Expenditures</b>	<b>\$ 9,387,772.31</b>	<b>\$ 1,061,035.10</b>
<b>SUMMARY</b>		
Total Expenditures	\$ 9,387,772.31	\$ 1,061,035.10
Encumbrance	\$ 7,770,742.29	
Unobligated/Remaining	\$ 1,780,450.30	\$ 1,020,823.90

**Table 4.** Blueprint expenditures and obligations by task

	<b>Contractor</b>	<b>Obligated or Expended</b>
<b><u>Blueprint Phase I</u></b>		
Phase I Contract	AECOM	\$ 1,885,000.00
Phase I - Amendment 1	AECOM	\$ 251,756.00
<b><u>Blueprint Phase II</u></b>		
Phase II Original	AECOM	\$ 4,081,926.00
Phase II Amendment 1	AECOM	\$ 185,525.00
Phase II Amendment 2 (no cost)	AECOM	\$ -
Phase II Amendment 3	AECOM	\$ 1,749,090.00
Model Improvements - Neuse	AECOM	\$ 586,000.00
Model Improvements - Tar Pamlico	ESP	\$ 1,130,164.00
Model Improvements - Lumber, Cape Fear, White Oak	AECOM	\$ 2,600,056.00
Model Improvements - QA/QC	Dewberry	\$ 768,595.70
<b><u>Blueprint Phase III - River Basin Action Strategies</u></b>		
Additional Support/Modeling/Feasibility Phase 3	Arcadis	\$ 9,818.00
RBAS Tar-Pamlico	AtkinsRealis	\$ 1,108,352.00
RBAS Lumber	AtkinsRealis	\$ 983,667.00
RBAS Cape Fear/White-Oak	Summit Engineering	\$ 1,350,000.00
RBAS French Broad	Brown and Caldwell	\$ 879,600.00
Admin		\$ 600,000.00

<b>Total</b>		<b>\$18,219,549.70</b>
<b>Remaining</b>		<b>\$1,780,450.30</b>



## **Appendix A – Blueprint Phase I Advisory Group Members**

As the NC Flood Resiliency Blueprint moves into the final stages of Phase II and begins to apply the planning processes and Blueprint Tool in Phase III, it intends to maintain the Principal Advisory Group in its current capacity. Moving forward, the broad expectation is that the Principal Advisory Group will meet quarterly, with meetings held in-person, online, or hybrid, depending on convenience. Additional touch points or meetings may be called on short notice based on feedback needs. While the Technical Advisory Groups in their current form will no longer be necessary, regional, river-basin-based Technical Advisory Groups will be created to develop River Basin Action Strategies. The regional Technical Advisory Groups will work with the Blueprint Team during the planning process to ensure the resulting strategy meets the intent of the represented communities.

### **Advisory Group Member List**

- **Principal Advisory Group**
- **Technical Advisory Groups:**
  - **Governance**
  - **Partnership and Funding**
  - **When/Where: Hazard Identification**
  - **Who/What: Vulnerability, Risk, Impact**
  - **How: Resilience, Mitigation, Reduction**
  - **Tool Development, Acceptance**
- **Neuse Regional Advisory Group**

**Table 5.** The **Principal Advisory Group** provides advisory input and feedback to DEQ on the policy, process, engagement, modeling, tools, and support to implement the Blueprint.

Organization Type	Organization
County	Mecklenburg County
DEQ	NC DEQ/Secretary's Office
DEQ	NC DEQ/Division of Mitigation Services
DEQ	NC DEQ/ Division of Energy, Mineral, and Land Resources
EJ Partner	Secretary's Environmental Justice and Equity Advisory Board
Federal	USACE/Wilmington District
Federal	USGS
Federal	USGS
Federal	USGS
Municipality	NC Association of Floodplain Managers
Municipality	NC League of Municipalities
NGO	NC Farm Bureau
NGO	Conservation Trust for NC
NGO	Hispanic Federation
NGO	Conservation Trust for NC
NGO	Golden Leaf
NGO	NC Foundation for Soil & Water Conservation
NGO	The Nature Conservancy
NGO	NC Foundation for Soil & Water Conservation
NGO	American Flood Coalition
NGO	Environmental Defense Fund
State	NC State Climate Office
State	NC Office of Recovery and Resilience
State	NC Department of Information Technology
State	NC Department of Public Safety/Emergency Management
State	NC Department of Agriculture and Consumer Services/Division of Soil & Water Conservation
State	Governor's Office
State	NC Department of Information Technology/Center for Geographic Information & Analysis
State	NC Department of Public Safety/Emergency Management
Tribal	NC Commission of Indian Affairs

**Table 6.** The **Governance** TAG provides advisory input and feedback to DEQ on existing and proposed policies, processes, and programs at the Federal, State, Tribal, and/or other local levels that will impact the rollout and operations of the Blueprint.

Organization Type	Organization
DEQ	NC DEQ/ Division of Coastal Management
DEQ	NC DEQ/ Division of Energy, Mineral, and Land Resources
Federal	FEMA Region IV
Municipality	NC League of Municipalities
NGO	NC Foundation for Soil & Water Conservation
NGO	Robeson County Church and Community Center
NGO	North Carolina Coastal Federation Eastern North Carolina Sentinel Landscape
NGO	Environmental Defense Fund
NGO	American Flood Coalition
State	NC Department of Agriculture and Consumer Services
State	NC Department of Public Safety/Office of Recovery & Resiliency
State	NC Department of Commerce
State	NC Department of Public Safety/Floodplain Mapping Program
University	Duke University
University	Duke University
University	UNC Policy Collaboratory
University/Tribal	UNC American Indian Center

**Table 7.** The **Partnership/Funding** TAG advises DEQ on funding and financial partnership opportunities to support the implementation of Blueprint projects. The group also advises DEQ on the criteria and modeling used to calculate benefits and prioritization.

Organization Type	Organization
COG	NC Association of Regional Councils of Government
County	NC Association of County Commissioners
DEQ	NC DEQ/ Office of Secretary
DEQ	NC DEQ/ Division of Water Infrastructure
DEQ	NC DEQ/ Division of Water Infrastructure
Federal	FEMA Region IV
NGO	The Conservation Fund
NGO	Golden Leaf Foundation
NGO	The Pew Charitable Trusts
State	NC Department of Public Safety/Office of Recovery & Resiliency
University	NC Water Resources Research Institute

**Table 1. When/Where:** The **Hazard Identification** TAG provides input to DEQ on data and modeling used to calculate and display flood probability and extent. This work includes consideration of deterministic and probabilistic riverine, lacustrine, dam and levee-induced, urban, stormwater, and coastal and/or riverine confluence flooding.

Organization Type	Organization
DEQ	NC DEQ/ Division of Water Resources
DEQ	NC DEQ/ Division of Coastal Management
Federal	NOAA
Federal	USGS South Atlantic Water Science Center
Federal	USACE
NGO	Environmental Defense Fund
NGO	The Nature Conservancy
NGO	American Flood Coalition
NGO	MDC Rural Forward Director
State	NC Department of Transportation/ Hydraulics Unit
State	NC Department of Public Safety/Floodplain Mapping Program
University	University of North Carolina-Chapel Hill Institute of Marine Science

**Table 9. Who/What:** - The **Vulnerability/Risk/Impact** TAG advises DEQ on data and modeling to calculate and display present and future vulnerabilities and impacts to people and receptors. Populations include historically marginalized communities, and Tribes. Receptors include, e.g., environment, structures, infrastructure, and commerce. The group also provides input and feedback to DEQ on criteria and modeling utilized for risk and equity ranking and rating.

Organization Type	Organization
COG	Land of Sky Regional Council
DEQ	NC DEQ/ Division of Energy, Mineral and Land Resources
DEQ	NC DEQ/ Division of Waste Management
DEQ	NC DEQ/ Division of Waste Management
DEQ	NC DEQ/ State Energy Office
Municipality	City of Fayetteville/ Stormwater Management Program
NGO	NC State University
NGO	NC Black Alliance
NGO	Conservation Trust for NC
State	NC Department of Health and Human Services
State	NC Department of Agriculture and Consumer Services/Forest Service
State	NC Department of Health and Human Services
State	NC Department of Public Safety/Emergency Management
State	NC Chamber of Commerce
State	NC Department of Agriculture/Division of Soil and Water Conservation
University	NC State Climate Office
University	North Carolina A&T University
University	University of North Carolina

**Table 2. How:** The **Resilience/Mitigation/Reduction** TAG provides input to DEQ on data and modeling to best calculate and display present and future loss avoidance to people and receptors. The group also advises DEQ on criteria and modeling used for ranking and prioritizing mitigation strategies and projects.

<b>Organization Type</b>	<b>Organization</b>
<b>COG</b>	<b>Lumber River</b>
<b>DEQ</b>	<b>NC DEQ/ Division of Mitigation Services</b>
<b>Federal</b>	<b>USDA</b>
<b>Federal</b>	<b>FEMA Region IV</b>
<b>Federal</b>	<b>USACE - Wilmington District</b>
<b>NGO</b>	<b>NC Conservation Network</b>
<b>NGO</b>	<b>Hispanic Federation</b>
<b>NGO</b>	<b>Carolina Wetlands Association</b>
<b>NGO</b>	<b>NC Coastal Federation</b>
<b>NGO</b>	<b>NC Foundation for Soil &amp; Water Conservation</b>
<b>NGO</b>	<b>Environmental Defense Fund</b>
<b>State</b>	<b>NC Department of Public Safety/ Emergency Management Division</b>
<b>State</b>	<b>NC Department of Public Safety/ Office of Recovery and Resiliency</b>
<b>State</b>	<b>NC Department of Natural and Cultural Resources/ Natural Heritage Program</b>
<b>State</b>	<b>NC Department of Insurance</b>
<b>Tribal</b>	<b>Eastern Band of Cherokee Indians</b>
<b>University</b>	<b>NC State University</b>
<b>University</b>	<b>Duke University</b>
<b>University</b>	<b>University of North Carolina - Wilmington</b>
<b>University</b>	<b>University of North Carolina - Chapel Hill</b>

**Table 3.** The **Tool Development/Acceptance** TAG provides input and feedback to DEQ on the business case and functional requirements of Blueprint tools, websites, and applications.

<b>Organization Type</b>	<b>Organization</b>
<b>County</b>	<b>Pender County</b>
<b>County</b>	<b>New Hanover County</b>
<b>DEQ</b>	<b>NC DEQ/ Division of Energy, Mineral, and Land Resources</b>
<b>DEQ</b>	<b>NC DEQ/ Division of Coastal Management</b>
<b>DEQ</b>	<b>NC DEQ/ Division of Energy, Mineral, and Land Resources</b>
<b>Municipality</b>	<b>City of Wilmington</b>
<b>Municipality</b>	<b>City of Asheville</b>
<b>Municipality</b>	<b>Charlotte-Mecklenburg/ Stormwater Services</b>
<b>NGO</b>	<b>NC Coastal Federation</b>
<b>NGO</b>	<b>NC Conservation Network</b>
<b>State</b>	<b>NC Department of Information Technology</b>
<b>State</b>	<b>NC Department of Commerce</b>

**Table 4.** The **Neuse Regional Advisory Group** provides input to DEQ on Neuse River Basin-specific needs, including those from historically marginalized communities, and how to best use the information from Blueprint at a River Basin level. This group should be representative of the Basin and is intended to serve as a pilot that will help define how future basins are incorporated into the Blueprint process.

<b>Organization Type</b>	<b>Organization</b>
<b>COG</b>	<b>Upper Coastal Plain COG</b>
<b>COG</b>	<b>Eastern Carolina COG (In Neuse)</b>
<b>COG</b>	<b>Mid-Carolina COG (In Neuse)</b>
<b>County</b>	<b>Wake County</b>
<b>DEQ</b>	<b>NC DEQ/ Division of Mitigation Services</b>
<b>DEQ</b>	<b>NC DEQ/ Division of Coastal Management</b>
<b>Municipality</b>	<b>City of New Bern/ Water Resources Administration</b>
<b>Municipality</b>	<b>City of Kinston/ Public Services</b>
<b>NGO</b>	<b>Neuse Regional Sewer and Water Authority</b>
<b>NGO</b>	<b>GPI</b>
<b>NGO</b>	<b>NC Farm Bureau</b>
<b>NGO</b>	<b>Southeast Drainage Commission</b>
<b>NGO</b>	<b>The Nature Conservancy</b>
<b>NGO</b>	<b>NC FIELD</b>
<b>NGO</b>	<b>Sound Rivers, Inc.</b>
<b>State</b>	<b>NC Department of Transportation/Public Involvement</b>

## **Appendix B – Blueprint Phase II Stakeholders**

**As of 6/20/2024**

The second phase of the Blueprint included several methods of engagement, including:

- The Blueprint 101 Workshop for the Sprint Review User Group and Biweekly Sprint Review Meetings
- Beta Test Workshop and Beta Test
- Version 1 Test Workshop and Version 1 Test
- Methodology Meetings

It should be noted that a small number of subject matter experts were asked to participate in discussions between DEQ and the vendor on the development of functional methodologies (see **Table** ) for inclusion in the Blueprint Tool. These subject matter experts were selected based on their specialized knowledge, extensive experience in flood resilience and mitigation, and/or proven track record in developing and implementing similar tools and methodologies.

### **Sprint Review User Group**

As of June 20th, 2024, the Blueprint team has held eleven Sprint Review meetings. During these meetings, a select group of subject matter experts and stakeholders from the Phase I Technical Advisory Groups (see **Table 5**) were asked to review various facets of ongoing Blueprint Tool efforts and provide feedback. The Sprint Review User Group will continue to collaborate with the Blueprint Team on the development of the Tool throughout the duration of Phase II.

**Table 5.** Sprint Review User Group Member Organizations

<b>Organization Type</b>	<b>Organization</b>
NGO	NC Farm Bureau
NGO	American Flood Coalition
NGO	Environmental Defense Fund
COG	NC Association of Regional Councils of Government
Municipality	Town of Ayden
Municipality	City of Greensboro
State	NC Department of Public Safety/ Floodplain Mapping Program
State	NC Department of Agriculture/ Division of Soil & Water Conservation
State	NC Department of Public Safety/ Emergency Management*

\*The Sprint Review User Group included two representatives from the NC Department of Public Safety/ Emergency Management.

## NC Flood Resiliency Blueprint Tool Testing

A Beta version of the North Carolina Flood Resiliency Blueprint Tool was released and tested over a two-week period in the late Spring 2024 and Version 1 was tested between September 2024 and January 2025. The Blueprint Team invited over 200 individuals across a wide variety of organizations relevant to flood resiliency and end-user groups (i.e., local, county, and regional governments) to participate in the NC Flood Resiliency Tool testing. 56 individuals participated in the Beta Test and 50 participated in the Version 1 testing, representing over 30 unique organizations listed in the table below.

**Table 6.** Beta Test Participant Organizations

Organization Type	Organization
Municipality	City of Wilmington/ Long Range Planning
Municipality	NC Association of State Floodplain Managers
County	NC Association of County Commissioners
County	Wake County/ Water Resources
COG	Eastern Carolina Council of Governments
COG	Land of Sky Regional Council
State	NC Department of Commerce
State	NC Department of Health and Human Services
State	NC Department of Information Technology
State	NC Department of Information Technology/ Center for Geographic Information & Analysis
State	NC Department of Natural and Cultural Resources/ Natural Heritage Program
State	NC Department of Public Safety/ Emergency Management Division
State	NC Department of Public Safety/ Office of Recovery and Resiliency
State	NC Department of Transportation/ Hydraulics Unit
State	NC General Assembly
State	NC Governor's Office
State	NC Office of State Budget and Management
DEQ	NC DEQ/ Division of Coastal Management
DEQ	NC DEQ/ Division of Mitigation Services
DEQ	NC DEQ/ Division of Waste Management
DEQ	NC DEQ/ Division of Water Infrastructure
DEQ	NC DEQ/ NC Drought Management Advisory Council
Federal	National Oceanic and Atmospheric Administration
Peer State	Louisiana Coastal Protection and Restoration Authority
NGO	American Flood Coalition
NGO	Environmental Defense Fund
NGO	NC Coastal Federation
NGO	NC Conservation Network
NGO	NC Inclusive Disaster Recovery Network
NGO	NC Inclusive Disaster Recovery Network/MDC Rural Forward
NGO	The Nature Conservancy





## Appendix C – Phase 1 Deliverables

### Summary of Phase I Scope and Deliverables

**Error! Reference source not found.15** is an outline of Phase 1 Deliverables. Phase I was completed in September 2024. The documents referenced below are available on the Blueprint website [Reports Repository](#).

**Table 75.** Blueprint Phase I Development Deliverables

Category	Task	Status
Subtask Reports	Task 1: Data and Literature Reviews	<u>Completed and Publicly Available</u> <ul style="list-style-type: none"> <li>• <b>Subtask 1.1</b> - Literature Review and Data Collection Inventory</li> <li>• <b>Subtask 1.3</b> - Outreach and Engagement Plan</li> <li>• <b>Subtask 1.4</b> - Catalogue of Government and Organization Watershed Planning Efforts in the Neuse River Basin</li> <li>• <b>Subtask 1.5</b> - Peer State Flood Resiliency Programs</li> <li>• <b>Subtask 1.7</b> - Review of Statewide Planning Efforts with Flood Resilience Recommendations</li> <li>• <b>Subtask 1.10</b> - Blueprint Recommendation Process</li> </ul>
	Task 2: Gap Analysis	<u>Completed and Publicly Available</u> <ul style="list-style-type: none"> <li>• <b>Subtask 2.1</b> - Flood Risk Resiliency Types and Sources of Flooding Inventory Gap Analysis</li> <li>• <b>Subtask 2.3</b> - Neuse River Basin Literature Review Expansion</li> <li>• <b>Subtask 2.4</b> - Hydrologic and Hydraulic Modeling Gap Analysis</li> <li>• <b>Subtask 2.5</b> - Future Flood Hazards Gap Analysis</li> <li>• <b>Subtask 2.6</b> - Flood Risk Reduction Project Funding Analysis</li> <li>• <b>Subtask 2.7</b> - Existing Inventory of Toolkit Flood Resilience Strategies</li> <li>• <b>Subtask 2.8</b> - Nature-Based Solutions Gap Analysis</li> <li>• <b>Subtask 2.9</b>: Project Restrictions Analysis</li> <li>• <b>Subtask 2.10</b>: Identification of Existing Recommendations</li> <li>• <b>Subtask 2.11</b> - Identification and Evaluation of Online Flood Mitigation Decision-Making Support Tools</li> </ul>

		<ul style="list-style-type: none"> <li>• <b>Subtask 2.12</b> - Artificial Intelligence and Machine Learning Tools to Support the Development of the Blueprint</li> <li>• <b>Subtask 2.13</b> - Nature-Basin Solutions Existing Opportunities Gap Analysis</li> <li>• <b>Subtask 2.14</b> - Identification of Vulnerable and Under-resources Communities in the Neuse Basin</li> </ul>
	Task 3: Recommendations/ Decision Framework	<u>Complete and Publicly Available Reports</u> <ul style="list-style-type: none"> <li>• <b>Subtask 3.1, 3.2, &amp; 3.13</b> - Flood Resiliency Blueprint Tool Recommendations</li> <li>• <b>Subtask 3.3</b> - Recommendations for Integrating Federal, State, and Regional Flood Resiliency Efforts</li> <li>• <b>Subtask 3.5, 3.6, &amp; 3.7</b> - Recommendations: Open Access H&amp;H Modeling, Storm Frequencies, and Climate Forecast Models Support Tools</li> <li>• <b>Subtask 3.9, 3.10, &amp; 3.14</b> - Recommendations: Standardized Statewide Datasets</li> <li>• <b>Subtask 3.11</b> - Recommendations for the Utilization of Artificial Intelligence in Machine Learning to Inform Blueprint</li> <li>• <b>Subtask 3.15</b> - Recommendations for Developing and Maintaining Local Stormwater Management Programs</li> </ul>
	Task 4: Online Decision Support Tool Requirements Analysis	<u>Completed and Publicly Available</u> <ul style="list-style-type: none"> <li>• <b>Subtask 4.1</b> - Flood Resiliency Blueprint Tool Requirements</li> <li>• <b>Subtask 4.2, 4.2, &amp; 4.3</b> - Flood Resiliency Blueprint Tool Storyboards, Wireframes, and Mockups</li> </ul>

<p>Draft Neuse River Basin Flood Resiliency Action Strategy</p>	<p>The Draft Neuse River Basin Action Strategy is a written, basin-specific flood resiliency plan with actionable recommendations for the Neuse River Basin. The first iteration of the Action Strategy will be referred to as the Preliminary Neuse River Basin Action Strategy to emphasize its draft form. The Strategy will undergo refinement in 2025 based on stakeholder input, additional modeling, contributions from the decision support tool, and additional vulnerability analysis and risk assessment. The three phases of the Action Strategy will involve preliminary strategy development, refinement of the preliminary strategy throughout a year of community engagement and feedback, and recommendations for a five-year review.</p> <ul style="list-style-type: none"> <li>• Released a Preliminary Draft to advisory groups for feedback in December 2023</li> <li>• Reviewed the Preliminary Draft during a joint PAG and TAG engagement meeting</li> <li>• Held three Neuse River Basin Flood Resiliency Action Strategy Workshops in the basin's upper, middle, and lower portions.</li> <li>• Completed the vetting of preidentified actions: <ul style="list-style-type: none"> <li>○ Policy, Plans, &amp; Program</li> <li>○ Projects</li> </ul> </li> <li>• In Progress: refining the Action Strategy, which includes incorporating workshop input and findings as well as addressing TAG/PAG comments from the December 2023 Draft</li> </ul>
<p>Draft North Carolina Flood Resiliency Blueprint process document</p>	<p>The Draft North Carolina Flood Resiliency Blueprint process document serves as a manual for conducting flood resiliency planning at the river basin level. This document draws on information and lessons learned from the pilot basin and considers stakeholder input and data. It is intended to be a high-level comprehensive document establishing how flood resiliency planning efforts will be developed moving forward. During FY 2023-24, the Blueprint...</p> <ul style="list-style-type: none"> <li>• Incorporated applicable findings from subtask reports to the information and recommendations provided in the draft Blueprint process document</li> <li>• Shared a draft of the Blueprint document with advisory groups in December 2024</li> <li>• Reviewed the document during a joint PAG and TAG engagement meeting</li> <li>• Incorporated stakeholder feedback into the draft Blueprint</li> <li>• Published the Draft North Carolina Flood Resiliency Blueprint process document in March 2024</li> <li>• Made the Draft publicly available to view or download (PDF) on the Blueprint Website</li> </ul>

## **Appendix D – Phase 2 - Blueprint Tool Functionality Details**

North Carolina is fortunate in that there are numerous and diverse efforts related to flood resiliency across the state. These efforts often carry unique perspectives and methods for assessing and subsequently addressing flood risk in North Carolina communities. Recognizing the value of these previous and ongoing efforts, the Blueprint Tool leverages and enhances various datasets, models, and methods from high-quality and respected sources (e.g., other state agencies, peer state agencies, etc.). For example, the Blueprint Tool will include a financial and technical needs capacity assessment for communities participating in the Blueprint planning process. This assessment will leverage a modified version of the capability assessment administered during the existing hazard mitigation planning process, supported by the NC Emergency Management Division's Hazard Mitigation Plan Tool. The aim is to determine the capacity of each basin to participate in the Blueprint planning processes and implement funded actions to better prioritize vulnerable, underserved, and under-resourced communities. By incorporating and enhancing several existing efforts to best suit the goals of the Tool, the Blueprint ensures that it maximizes the use of the state's investment by preventing the duplication of existing or ongoing efforts.

Despite the valuable work that has been and continues to be done across the state, Phase I of the Blueprint identified several areas where gaps existed in available methodologies, data, models, etc. To address these gaps, Phase II of the Blueprint includes several unique methodologies and approaches developed by the Blueprint Team in coordination with select stakeholders and subject matter experts. For example, researchers from NC State University's Department of Biological and Agricultural Engineering are working with the Blueprint team to develop a novel web-based function for the Blueprint Tool that will enable users to identify opportunity areas and assess the impact of implementing afforestation, water farming, flood storage wetlands, and stream restoration/floodplain expansion actions.

Given the wide variety of methods and actions, the Blueprint Tool will provide users with varying degrees of functionality when investigating flood resiliency actions. The Tool will provide users with planning-level outputs that can be leveraged outside of the Blueprint framework in several ways. For example, the Blueprint Tool users can apply their findings and output reports from the Tool in grant applications to demonstrate the project's regional perspective and impact. The Tool is designed to include six "functional" methodologies (**Table 17**) and provide users with varying degrees of functionality to investigate over 30 flood resiliency actions identified and evaluated during Phases I and II of the Blueprint. These flood resiliency actions are categorized in **Table 86**.

**Table 86.** Flood Resiliency Action Categories and Number of Actions Included in the Blueprint Tool

<b>Action Category</b>	<b>Number of Actions</b>
Nature-Based Solutions	11
Building Level Mitigation	7
Infrastructure	4
Policy & Planning	4
Floodplain Restoration	3
Channel Improvement	3
Detention/Runoff	3
Other	2

**Table 17.** The Blueprint Tool's Functional Methodologies

Functional Methodology	Description
Funding Sources	Searches and matches funding data profiling federal, state, non-profit, philanthropic, and local opportunities with data profiling mitigation and resilient actions. The results, per action, will be ranked with the funding source most applicable to the proposed action.
Community Capacity	Strategically integrates the NC Division of Emergency Management's Capability Assessment, a component of the hazard mitigation planning process established by the Federal Emergency Management Agency, into the Blueprint planning processes. The assessment and resulting data will enable the Blueprint to determine the capacity of each basin to participate in the Blueprint planning processes and implement funded actions, assisting in the prioritization of vulnerable, underserved, and under-resourced communities.
Project Complexity	Designed to support the NC Flood Resiliency Blueprint Tool's Flood Risk Management Module as a comprehensive framework that assesses the intricate nature of implementing flood mitigation initiatives funded and developed through the Blueprint. The methodology integrates critical dimensions such as financial, regulatory, political, social, environmental, monitoring-maintenance-and-success metrics, and financial and technical capacity to provide a structured approach to project evaluation.
Flood Risk Scores	Provides a numerical measure of the flood risk for a property or asset using objective-based and repeatable calculations as well as automated geospatial tools. Scores can be tracked at the individual property level and used as a factor in prioritizing various mitigation alternatives. Risk scores can be aggregated into a range of geographic regions (e.g., communities, counties, watersheds) and facilitate goal setting and progress tracking for flood mitigation plans at various spatial scales.
Ranking Actions	Builds off a related system used by the Regions Innovating for Strong Economies & Environment Program managed between the NC Office of Recovery & Resiliency and the NC Rural Center. Provides a formalized system for objective project selection across the Flood Resiliency Blueprint Action Strategies to be developed for individual river basins of North Carolina. The methodology will rank resiliency actions based on attribute categories, including, but not limited to, risks and regulations, funding opportunities, implementation, return on investment, and added value.
Estimating Impacts of Flooding on People, Environment, Infrastructure, and Economic Sustainability	Provides an assessment of the conditions of each Blueprint project location using a scoring system to facilitate the prioritization of various mitigation projects. The methodology evaluates the impacts of flooding on two scenarios: (1) Increase/decrease in the likelihood/extent of flooding, and (2) Increase/decrease in vulnerability/impact from flooding.