Statewide Flood Resiliency Blueprint Implementation Report

Statutory Authority: Session Law 2021-180 Section 5.9(c)

Department of Environmental Quality

Division of Mitigation Services

July 1, 2024

Receiving Entities: Joint Legislative Commission on Governmental Operations and the Fiscal Research Division

In accordance with SL 2021-180 Section 5.9(c) and SL2022-75 Section 22.(b), the Department of Environmental Quality (DEQ) is submitting the following legislative report.

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 2022 in Section 22 of Session Law 2022-75 and directed the DMS to report a status update annually to the Joint Legislative Commission on Governmental Operations and the Fiscal Research Division.

The first status report was submitted by July 1, 2022, and is available online: https://www.deq.nc.gov/blueprint-implementation-report/open

The second status report was submitted by July 1, 2023, and is available online: https://www.deq.nc.gov/resiliency-blueprint/open

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. It includes 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

To ensure the Blueprint project development is successful, DEQ underwent an extensive Scope of Work (SOW) buildout process in 2022 for Phase I and again in 2023 for Phase II. DEQ conducted internal research and engaged experts and end users in Virginia, South Carolina, Louisiana, and Texas experiencing flood-related impacts similar to those in North Carolina. DEQ met with and held workshops with federal, state, regional, and local government flood and flood resiliency experts, non-governmental organizations, academia, and end users to develop and refine a draft SOW. After an extensive procurement process, AECOM was awarded a contract to serve as the vendor for the first stage of the Blueprint development effort on December 28, 2022. Subsequently, AECOM was awarded a contract to serve as the vendor for the second stage on November 1st, 2023.

The Blueprint will be executed in three phases, as described below. The phases will allow for nimble decision-making and constant evaluation of the process to incorporate lessons learned. After each phase, findings and recommendations will be reviewed, the project's direction evaluated, and the scope of work for subsequent phases refined accordingly.

Flood Resiliency Blueprint Phase I: The initial phase of the Blueprint included nine months of comprehensive research and analysis, community outreach, stakeholder engagement, and feedback provided by the Principal and Technical Advisory Groups. Extensive outreach and engagement activities during FY 2023-24 informed the development of the Blueprint. These activities included:

- The second, third, and fourth convening of the Principal Advisory Group
- The fourth and fifth convening of the Technical Advisory Groups
- A joint Principal, Technical, and Neuse Regional Advisory Group review of the Draft NC Flood Resiliency Blueprint.

The Blueprint team conducted additional Phase I outreach and engagement activities during FY 2023-24 to inform the development of the Neuse River Basin Flood Resiliency Action Strategy. These efforts included:

- The fourth, fifth, and sixth convening of the Neuse Regional Advisory Group
- Three Neuse River Basin Flood Resiliency Action Strategy Workshops in the upper (City of Durham), middle (Town of La Grange), and lower (City of New Bern) portions of the basin.
- A joint Principal, Technical, and Neuse Regional Advisory Group review of the draft Neuse River Basin Action Strategy

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 are 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 key deliverables includes four tasks, which build on each other toward the key deliverables. Each of the four tasks includes several publicly available subtask reports, of which 23 are accessible to view and download from the Blueprint Website. Four subtask reports are in the final stages of revision based on stakeholder feedback and will be made available soon. Individual subtask reports and accompanying descriptions can be reviewed in **Table 3**.

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). A preliminary draft of the Neuse River Basin Action Strategy was shared with the relevant stakeholders at the beginning of 2024 with the intent of further refining the document and incorporating findings from the workshops held in late April and early May 2024. As of July 2024, the Blueprint team is continuing to refine the Action Strategy by incorporating input from the workshops and addressing TAG/PAG comments from the preliminary draft.

Flood Resiliency Blueprint Phase II: Starting in late 2023, the second phase of the Blueprint focuses on developing a web-based decision support tool known as the NC Flood Resiliency Blueprint Tool (Blueprint Tool). This Tool will be a publicly accessible, data- and model-driven, GIS-enabled web application designed to aid flood planning and implementation statewide. The Blueprint Tool will be the 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
- Evaluate return on investment and added value provided by 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 to provide users with the functions needed to build flood resiliency in their communities. DEQ plans to partner with the North Carolina Division of Emergency Management (NCEM) to improve existing 2-dimensional Rain-on-Grid flood models, beginning with the Neuse River Basin. The improved models will exceed FEMA regulatory standards and allow DEQ to develop flood depth projections 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. To reflect this, the Blueprint team uses an agile development process to plan, build, and deploy the Blueprint Tool. Phase II's agile process includes iterative development, continuous integration, testing, and client collaboration to ensure the Blueprint Team has the flexibility needed to meet the Blueprint's user-centric approach. The development process also promotes risk management by

delivering the Tool in small increments and continuously testing it for stakeholder feedback. This helps identify and address potential issues early in development, reducing the risk of significant problems later.

The user-centric approach of Blueprint's Phase II is supported through "Sprint Review" meetings. The Blueprint team has held eleven Sprint Reviews in total as of June 20th, 2024, where a select group of stakeholders (see **Table 15** in Appendix B) who participated in Phase I activities were asked to review various facets of ongoing Blueprint Tool work and provide feedback. Additional engagement and outreach activities included a Blueprint 101 webinar prior to the start of Sprint Review meetings to ensure group members started with the same information. The Blueprint Team also performed a Beta Test over a two-week period in late April and early May 2024. Over 200 stakeholders and subject matter experts were invited to participate in the Beta Test, 56 of which provided feedback. The organizations that the Beta Testers represent can be reviewed in **Table 16** of Appendix B. The Blueprint Team continues to work with its advisory groups to prioritize and incorporate nearly 120 direct question responses and over 250 open comments provided by Beta Test participants for subsequent versions of the Blueprint Tool. Seeking out and addressing stakeholder feedback helps ensure the Tool is applicable to and meets the needs of the diverse array of flood resiliency stakeholders across the state.

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. As of June 20th, 2024, the Tool is designed to include six "functional" methodologies (**Table 2**) 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 1**.

Table 1. Flood Resiliency Action Categories and Number of Actions Included in the Blueprint Tool

Action Category	Number of Actions
Nature-Based Solutions	9
Building Level Mitigation	7
Infrastructure	4
Policy & Planning	4
Floodplain Restoration	3
Channel Improvement	3
Detention/Runoff	3
Other	2

Table 2. The Blueprint Tool's Functional Methodologies

Functional Methodology	Description
Funding Sources	Searches and matches funding data profiling federal, state, non-profit, philanthropic, and load 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.

Summary of Phase I Scope and Deliverables

Table 3 is an outline of progress made on Phase I in this reporting cycle (July 1, 2023 – July 1, 2024). Major deliverables during FY 2023-24 for Phase I included 27 Subtask reports, the Draft NC Flood Resiliency Blueprint process document, the Draft Neuse River Basin Action Strategy, and various stakeholder engagement and outreach activities.

Table 3. Blueprint Phase I Development Subtask Report Progress FY 2023-24

Category	Task	Status
Subtask Reports	Task 1: Data and Literature Reviews	Completed and Publicly Available • **Subtask 1.1** - Literature Review and Data Collection Inventory • **Subtask 1.3** - Outreach and Engagement Plan • **Subtask 1.4** - Catalogue of Government and Organization Watershed Planning Efforts in the Neuse River Basin • **Subtask 1.5** - Peer State Flood Resiliency Programs • **Subtask 1.7** - Review of Statewide Planning Efforts with Flood Resilience Recommendations • **Subtask 1.10** - Blueprint Recommendation Process
	Task 2: Gap Analysis	Completed and Publicly Available • **Subtask 2.1** - Flood Risk Resiliency Types and Sources of Flooding Inventory Gap Analysis • **Subtask 2.3** - Neuse River Basin Literature Review Expansion • **Subtask 2.4** - Hydrologic and Hydraulic Modeling Gap Analysis • **Subtask 2.5** - Future Flood Hazards Gap Analysis

		• **Subtask 2.6** - Flood Risk Reduction Project Funding Analysis • **Subtask 2.7** - Existing Inventory of Toolkit Flood Resilience Strategies • **Subtask 2.8** - Nature-Based Solutions Gap Analysis • **Subtask 2.11** - Identification and Evaluation of Online Flood Mitigation Decision-Making Support Tools • **Subtask 2.12** - Artificial Intelligence and Machine Learning Tools to Support the Development of the Blueprint • **Subtask 2.13** - Nature-Basin Solutions Existing Opportunities Gap Analysis • **Subtask 2.14** - Identification of Vulnerable and Under-resources Communities in the Neuse Basin <u>Final Revision in Progress</u> • **Subtask 2.9** – Progress Restrictions Analysis • **Subtask 2.10** – Identification of Existing Recommendations
	Task 3: Recommendations/ Decision Framework	<u>Complete and Publicly Available Reports</u> • **Subtask 3.1, 3.2, & 3.13** - Flood Resiliency Blueprint Tool Recommendations • **Subtask 3.5, 3.6, & 3.7** - Recommendations: Open Access H&H Modeling, Storm Frequencies, and Climate Forecast Models Support Tools • **Subtask 3.9, 3.10, & 3.14 -** Recommendations: Standardized Statewide Datasets • **Subtask 3.11** - Recommendations for the Utilization of Artificial Intelligence in Machine Learning to Inform Blueprint <u>Final Revision in Progress</u> • **Subtask 3.3** - Recommendations for Integrating Federal, State, and Regional Flood Resiliency Efforts • **Subtask 3.15** - Recommendations for Developing and Maintaining Local Stormwater Management Programs
	Task 4: Online Decision Support Tool Requirements Analysis	<u>Completed and Publicly Available</u> • **Subtask 4.1** - Flood Resiliency Blueprint Tool Requirements

		• **Subtask 4.2, 4.2, & 4.3** - Flood Resiliency Blueprint Tool Storyboards, Wireframes, and Mockups

Draft Neuse River Basin Flood Resiliency Action Strategy	Ongoing: 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 2024 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.
	• Released a Preliminary Draft to advisory groups for feedback in December 2023
	• Reviewed the Preliminary Draft during a joint PAG and TAG engagement meeting
	• Held three Neuse River Basin Flood Resiliency Action Strategy Workshops in the basin's upper, middle, and lower portions.
	• Completed the vetting of preidentified actions:
	  o Policy, Plans, & Program
	  o Projects
	• 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	

Draft North Carolina Flood Resiliency Blueprint process document	Ongoing: 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… • Incorporated applicable findings from subtask reports to the information and recommendations provided in the draft Blueprint process document • Shared a draft of the Blueprint document with advisory groups in December 2024 • Reviewed the document during a joint PAG and TAG engagement meeting • Incorporated stakeholder feedback into the draft Blueprint • Published the Draft North Carolina Flood Resiliency Blueprint process document in March 2024 • Made the Draft publicly available to view or download (PDF) on the Blueprint Website	

Summary of Phase II Scope and Deliverables

Table 4 outlines the progress of the Blueprint's Phase II for this reporting cycle (July 1, 2023 – July 1, 2024). The scope and deliverables for Phase II can be summarized by the Blueprint's Phase II Request for Proposals, which states, "In Phase II, the vendor shall design and build the NC Flood Resiliency Blueprint Tool IT platform that will support all basins statewide. The 'Tool' shall serve as the official online decision support tool utilized to support and enable the development and management of the Flood

Resiliency Blueprint. The following scope of work outlined in this document fulfills key components of N.C. Session Law 2021-180, Sections 5.9.(c) (Senate Bill 105) and N.C. Session Law 2022-75, Section 22.a.(3) (HB 911)."

Table 4. Blueprint Phase II Development Progress FY 2023-24

Category	**Task**	**Status**
Application Modules	Develop the following modules: • Landing Page/Login • Flood Risk Management • Resiliency Action Evaluation • Action Management Module • Community Profile • Funding	Included in Beta Version: • Landing Page/Login • Flood Risk Management (limited to Risk Assessment, Existing Resiliency Actions, and Custom/New Resiliency Actions) • Community Profile In Progress: • Flood Risk Management • Resiliency Action Evaluation • Funding
Database	Use the recommendations generated in Blueprint's Phase I to architecturally design and construct a database structure to support the Tool's functionality, as specified in the general statute.	In Progress: the database will continue to be built out as methodologies are finalized and refined.
Retrieval of data from different systems via Application Programming Interface (API)	Create the API needed to connect to several external systems based on different user needs for the decision-making process and document the API. In addition, the ability to change, add, and update easily will be included.	In Progress: continuing to build out the API as methodologies are finalized and application modules developed.
Reports	Work with DEQ to determine the best NCDIT support data analytics software to generate reports. Create templates for consistency across different report types. Generate digital and printable reports based on geographic area, selected projects, or selection criteria.	In Progress: conversations have been held on the tool's desired reporting products. The Blueprint will continue these discussions and develop reports in later phases of work once the application is closer to completion.
Data Queries	Develop the queries/search capabilities necessary to provide the desired Tool functionality to various Tool users.	In Progress: queries/search capabilities will continue to be built out as methodologies are finalized and application modules are developed and refined.

Training and Transition	Provide comprehensive technical documentation related to the maintenance and operation of Tool to enable DEQ and NCDIT employees to maintain long-term functionality.	Ongoing: the Blueprint has held several training workshops related to the tool over FY 2023-24, including a Blueprint 101 Workshop for the Sprint Review User Group and a Beta Test Walkthrough Workshop with accompanying guide document and presentation. Technical documentation is also being developed to provide DEQ and NCDIT employees with details on specific methodologies and resiliency actions included in the Tool. These technical documents also serve as the development team's foundation to integrate the proposed approaches into the online decision support tool format. Upon completion of the Blueprint Tool, DEQ staff and communities will be offered training through several workshops, recorded webinars, documents, etc.
Prototype Version	Release a clickable visual representation of the tool's basic functionality. Provide an example of each part of the process with limited customization options.	Completed January 20th, 2024
Beta Version and Test	Release a refined Beta version based on prototype feedback and ongoing work that serves as proof of concept. Conduct a Beta Test with select stakeholders. Hold at least one workshop to brief DEQ and stakeholders on the testing procedures. Document and incorporate stakeholder feedback into subsequent Tool versions.	Beta Version & Beta Testing: Completed May 10th, 2024 Beta Test documentation: Completed May 23rd, 2024 In Progress: continuing to work through and incorporate stakeholder feedback into the Blueprint Tool for future version releases

Flood Resiliency Blueprint Phase III: Phase III applies the online support tool, developed in Phase II, and the Draft Flood Resiliency Blueprint, developed in Phase I, to river basins statewide. Phase III will develop river-basin-specific action strategies, similar to the Draft Neuse Basin Action Strategy developed in Phase I, for five additional targeted river basins in North Carolina, with additional basins to be added as funds allow. The five additional targeted river basins in the state currently planned for Phase III are the Cape Fear, Lumber, Tar-Pamlico, White Oak, and French Broad basins.

Summary of Future Phases and Tasks

Table 5. Blueprint Development Future Phases and Tasks Associate with Phases II & III over FY 2024-25

Category	Status
Phase II	Ongoing: completion of contracted Phase II requirements is anticipated towards the end of 2024. The Blueprint will continue to seek and incorporate stakeholder feedback, maintain the Tool development workflow, and continue building functionality for subsequent version releases and related testing of the NC Flood Resiliency Blueprint Tool.

Phase III	Ongoing: while the Blueprint Tool continues to be developed, planning is underway for how the Tool and recommendations from the Draft NC Flood Resiliency Blueprint process document can be effectively applied to targeted basins. Additional River Basin Action Strategies will be developed soon as the Tool moves into more refined versions.

Due to State contracting rules that ensure fair competition, more specific details on the Scope of Work for Phase III cannot be shared until the contract selection process has been completed.

Budget

Administrative expenses - totaling $153,593.41 were paid in FY23-24. Programmatic expenses totaling $3,158,419.80 were paid in FY23-24 for activities supporting Phase I and Phase II. **Table 6** identifies expenditures for the Blueprint to date. The remaining funds are anticipated to be encumbered by the end of calendar year 2024 primarily to support the Phase III activities.

Table 6. Current expenditures for Flood Resiliency Blueprint

	Programmatic	**Administrative**	**Total**
Initial Budget			
Initial Funding	$ 19,400,000.00	$ 600,000.00	$ **20,000,000.00**
Expenditures			
	Phase I & II	Administrative	
21-22 Expenditures		$ 38,847.86	$ 38,847.86
22-23 Expenditures		$ 121,662.39	$ 121,662.39
23-24 Expenditures (through 6/25/2024)	$ 3,158,419.80	$ 153,593.41	$ 3,312,013.21
Total Expenditures	$ 3,158,419.80	$ $314,103.66	**$ 3,472,523.46**
Summary			
Total Expenditures			**$ 3,472,523.46**
Encumbrance			**$ 4,345,513.60**
Unobligated			**$ 12,181,962.94**

Appendix A – Blueprint Phase I Advisory Group Members

As of 6/20/2024

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 7. 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 8. 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 9. 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 10. **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 11. **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 12. **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.

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

Table 13. The **Tool Development/Acceptance** TAG provides input and feedback to DEQ on the business case and functional requirements of Blueprint tools, websites, and applications.

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

Table 14. 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.

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

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
- 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 2**) 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 15**) 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 15. Sprint Review User Group Member Organizations

Organization Type	Organization
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 Beta Test

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. 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 Beta Test. 56 individuals participated in the Beta Test, representing over 30 unique organizations listed in the table below.

Table 16. 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