Flood Resiliency Blueprint Update

SESWA Annual Conference

October, 2024





NC Flood Resiliency Blueprint

- Background
- Progress
- Blueprint Tool and Modeling



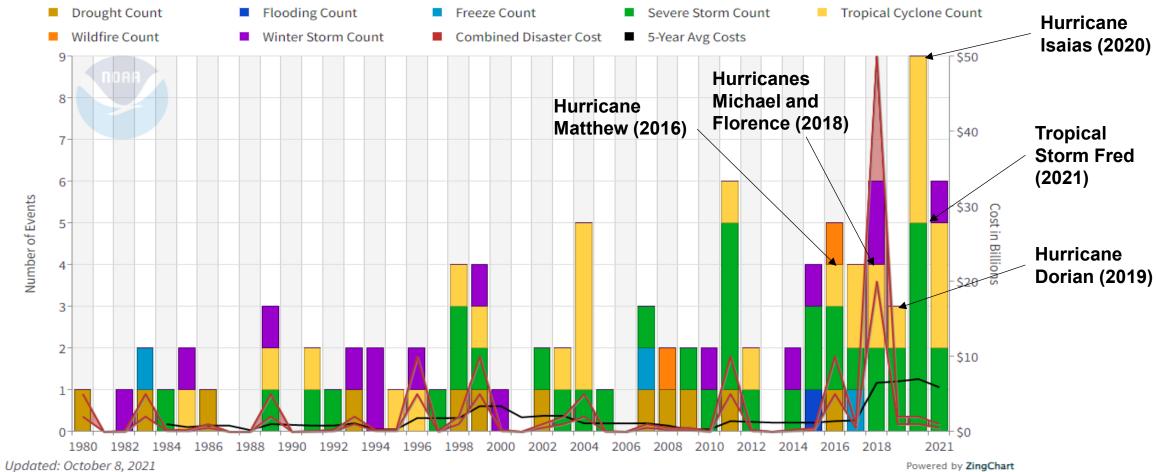


Background

Billion-Dollar Disaster Events



North Carolina Billion-Dollar Disaster Events 1980-2021 (CPI-Adjusted)





North Carolina population growth 1990-2035



Source: US Census Bureau, NCOSBM

EFFECTS OF IMPERVIOUSNESS ON RUNOFF AND INFILTRATION

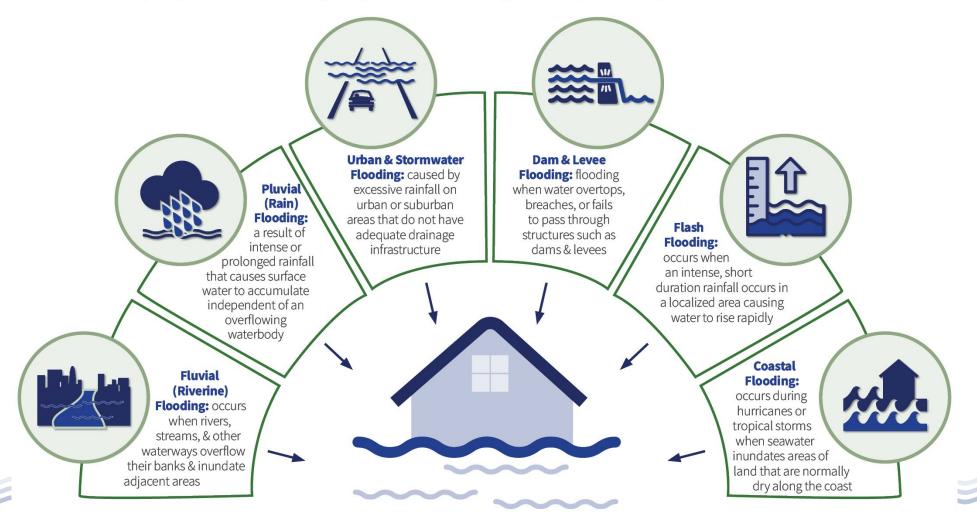


Source: The Watershed Institute

FLOOD HAZARD TYPES

NORTH CAROLINA
Department of Environmental Quality

There are many types and sources of flooding that create negative impacts to human safety, structures, infrastructure, and the environment. These sources of flooding may occur independently, but often occur concurrently with each other (compound flooding). Often, brick and mortar structures are a primary focus; however, impacts can include infrastructure, agricultural areas, natural resources, indirect economic impacts or anything else that could be negatively impacted by flooding. Different types of categorized flood hazards include:





NC Flood Resiliency Blueprint Goals

- Serve as the backbone of State flood planning
- Increase community resilience to flooding
- Reduce the cost and complexity for local government in the planning and implementation of flood risk reduction projects
- "...A successful blueprint should ultimately lead to a prioritized set of projects and funding strategies that the State can implement."

Basins: Neuse, Cape Fear, French Broad, Lumber, Tar-Pamlico, and White Oak

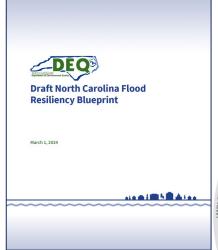


ES-Figure 3. North Carolina Major River Basins by Order of Inclusion in Blueprint

Blueprint Development - Multiphase Process

NORTH CAROLINA Department of Environmental Quality

- Phase I (2022 2024) Complete
 - Research and evaluation
 - Gap analysis
 - Recommendations and decisions (Programmatic, Policy, Tools, Approaches, Needs)
 - Neuse River Basin Action Strategy (Pilot)
 - Draft Blueprint
- Phase II (2023 2025) Ongoing
 - Develop online decision support tool (Blueprint Tool)
 - Begin implementation
- Phase III (2024 2025) Ongoing
 - Develop Action Strategies for five prioritized areas
 - Refine Decision Support Tool
 - Continue Blueprint implementation
 - Refine Blueprint and Neuse Action Strategy (including additional modeling)



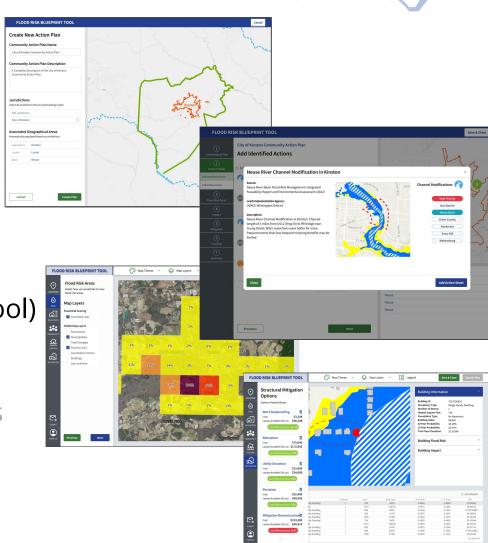


Community Engagement Q&A Meeting in Canton, 6/22/2023

Blueprint Development - Multiphase Process

NORTH CAROLINA
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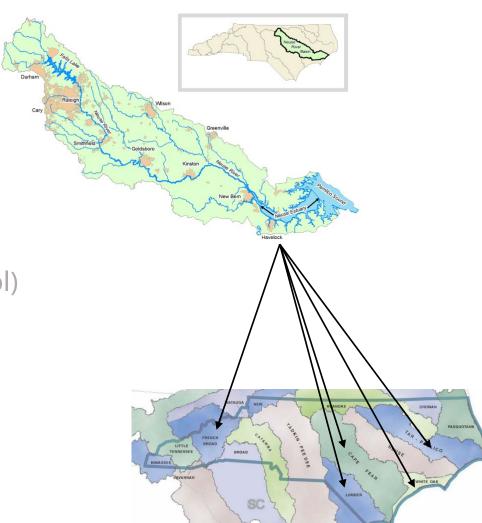
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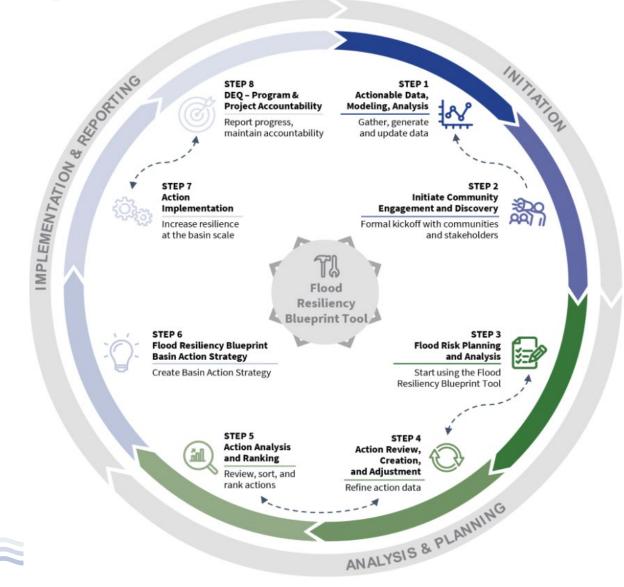








- Built on Hydrologic and Hydraulic (H&H) models
 - New methodologies allow users to:
 - Develop, Evaluate, Prioritize Resilience Actions
 - Plan and marshal funding to implement priority resilience measures
- Who is the Tool for:
 - Local governments
 - planners, floodplain managers
 - Fellow state agencies
 - Policymakers
 - Soil and Water Conservation District Staff, NRCS staff, SeaGrant extension, COG members
 - Public





Tool Development and **Model Improvement**

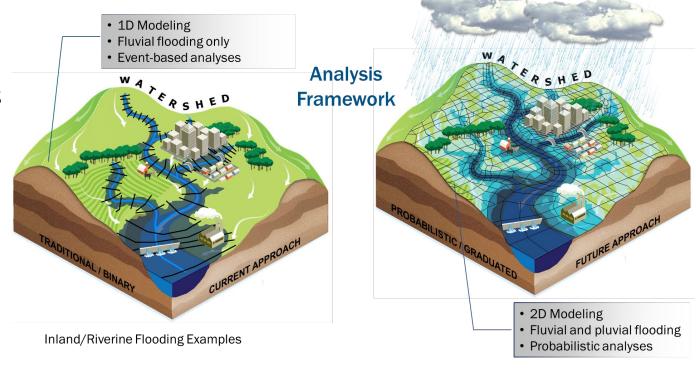
- April 2024 Beta Testing
- September 2024 Version 1 *Testing*
- Spring 2025 Version 2 Public

2024													2025						
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	
TOOL DEVELOPMENT				Beta	DEVELOPMENT			V1	DEVELOPMENT					V2 Release and O&M					
					Neuse Model Improvemen							nts	_		1			1	
					Additional Basins Mode							el Imp	rovem	ents					
								Additional Basin Model Improvement											

Flood Resiliency Blueprint Model Improvements

Better define flood extent and depths

- Current Conditions
- Capture future flooding
 - Changes in precipitation patterns
 - Sea level rise
 - Increased impervious surfaces
- Facilitate future improvements
 - Storm surge and compound flooding
 - Probabilistic framework



Support tool functionality

Flood Resiliency Blueprint Model Improvements



ENERGY & ENVIRONMENT

Nearly \$10B in Hurricane Debby damage occurred in areas without flood insurance requirements

BY SAUL ELBEIN - 08/13/24 12:36 PM ET

Study: U.S. Flood Damage Risk Is Underestimated

February 22, 2022 | Laura Oleniacz | 5-min. read

"According to a 2022 study from North Carolina State University, 68% of flood damage reports were outside of FEMA's high-risk flood zones in 2020 [and]... 16% of damage reports were in unmapped locations."

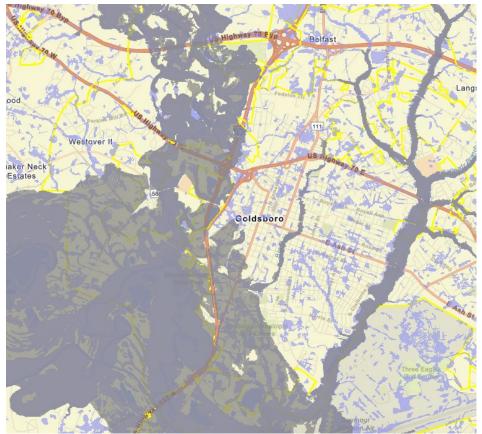


1% Annual Chance

Regulatory Flood Plain



2D Rain on Grid

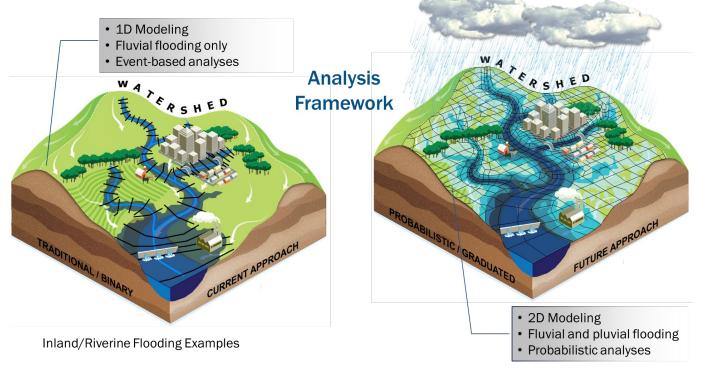


NCEM Advisory Flood Data

Flood Resiliency Blueprint Model Improvements

Better define flood extent and depths

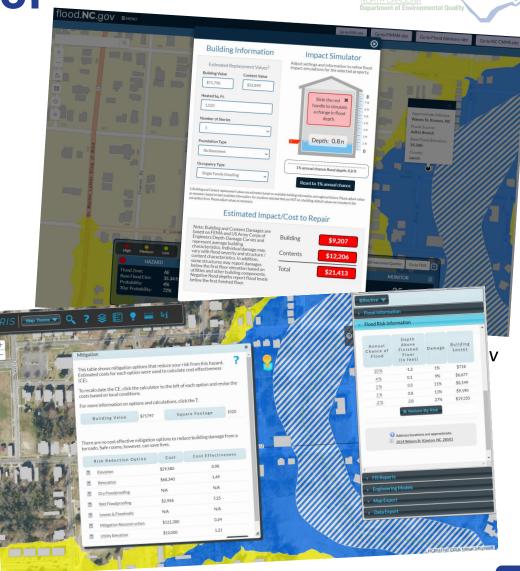
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Support tool functionality

DEO3

- Expands on existing tools with new data and methodologies
- Integrates forecasted changes
- Is dynamic and improves as data and methodologies improve



Blueprint Tool Functionality



Develop a
Detailed
Community
Profile

Develop New Resilience Actions

Build a local Action Plan

Explore Flood Risk Action Management (internal)

Fund Matching Tool

Project Complexity

Flood Risk Scores

Ranking Actions

Estimating Impacts of Flooding on People, Environment, Infrastructure, and Economic Sustainability +

Community Capacity

Data Repository

Goals:

- Be a resource for riverine and stream management to reduce flooding
- Reduce the cost and complexity for local government in the planning and implementation of flood risk reduction projects
- Lead to a prioritized set of projects

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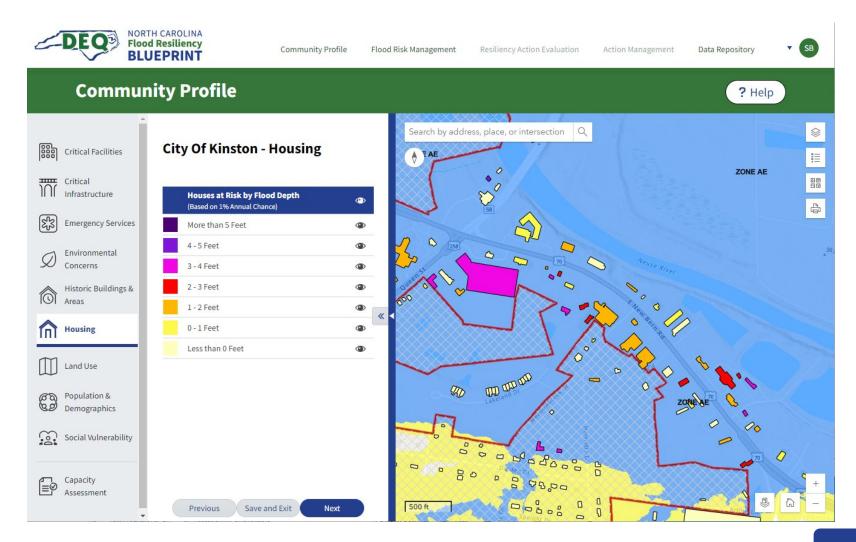
Community Capacity

Data Repository



Develop a Detailed Community Profile

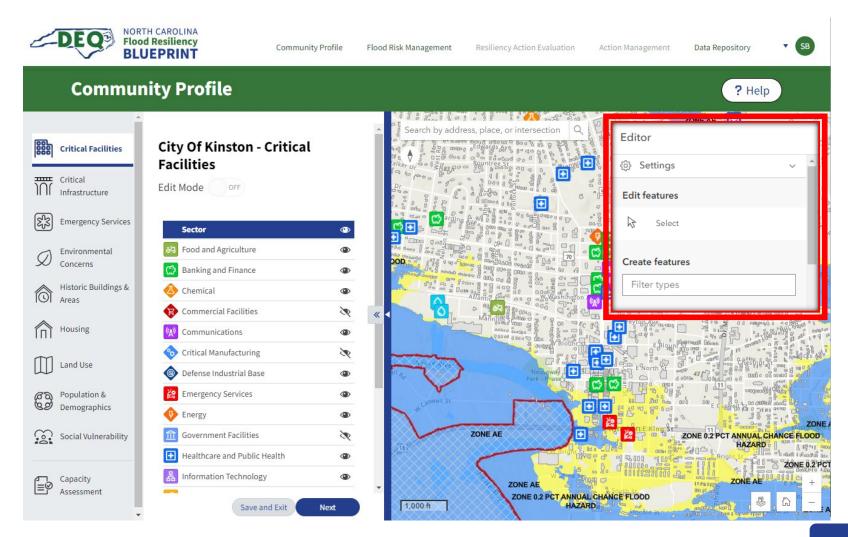
Build a Local Action Strategy





Develop a Detailed Community Profile

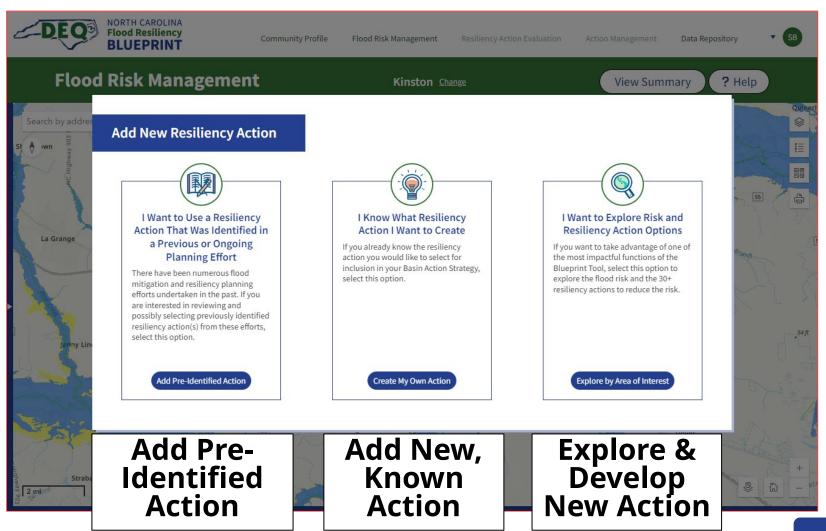
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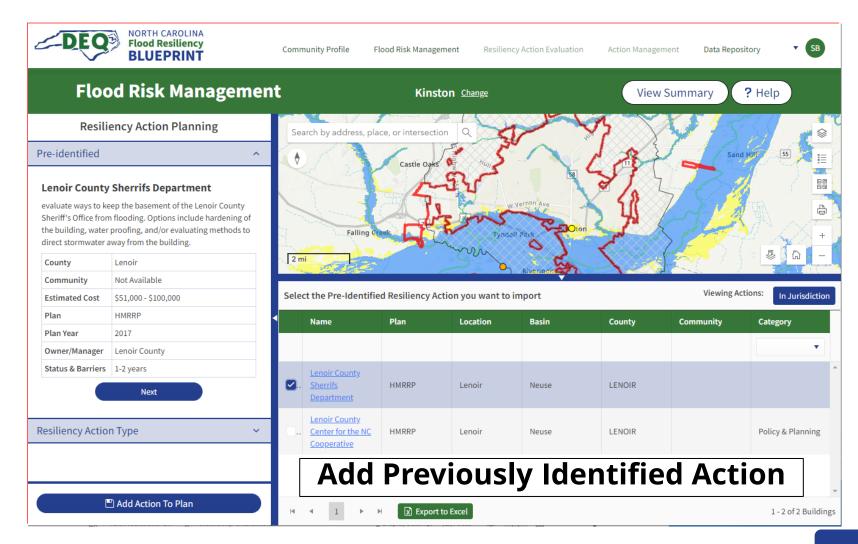
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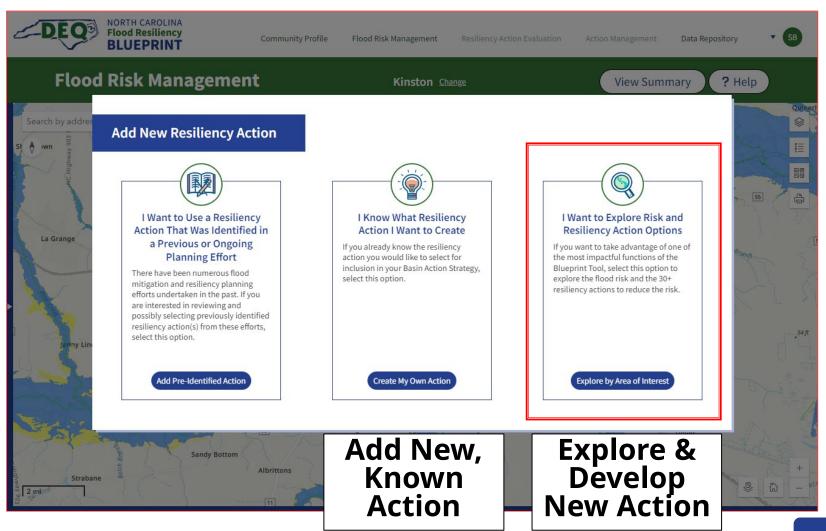
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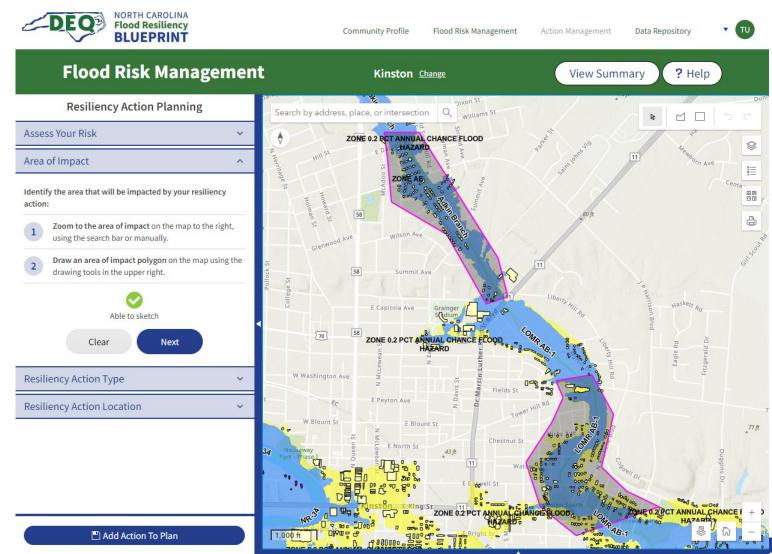
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Develop New Resilience Actions

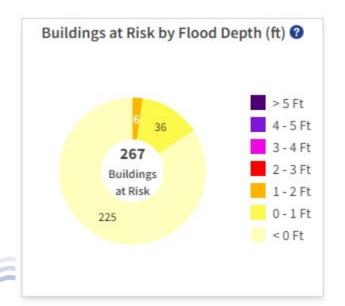
Identify an area of interest

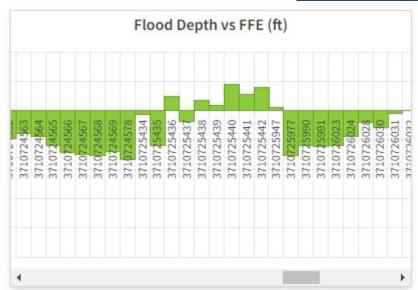


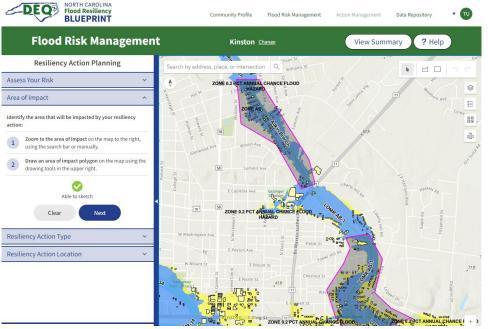




Assess flood Risk





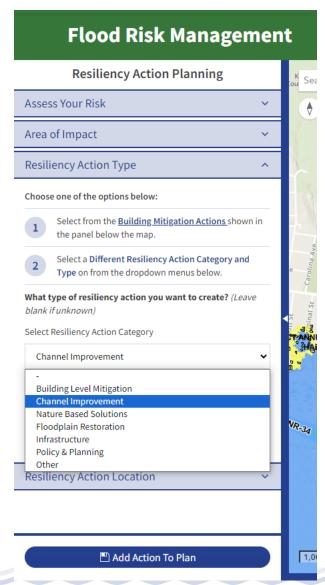






Develop New Resilience Actions

Explore Resilience Actions



Resilience Action Categories

- Building level mitigation
- Detention/Runoff reduction
- Channel Improvement
- Nature Based Solutions
- Floodplain Restoration
- Infrastructure
- Policy and Planning

- **Unique:** Distinctive, offering capabilities not available in any other tools
- **+ Enhanced:** Exists in other tools, but the Blueprint Tool extends these functionalities significantly, enhancing them to provide greater efficiency and effectiveness
- **Leverage/Coordinated:** Leverages the capabilities of similar tools, coordinating to provide cohesive advancements in data and function.

Detention/Runoff Reduction

Reduction New structures +

Retrofit Existing structures +

Quarries *

Dry dams +

Floodplain Restoration

Riparian buffers +

Floodplain mitigation preservation *

Floodplain restoration/Multi-use floodplains *

Nature-Based Solutions

Water farming *

Afforestation +

Bioretention +

Raingardens, bioswales, etc. +

Permeable pavement +

Flood storage wetlands *

Stream restoration = Channel Improvement

Debris removal =

Channel dredging =

Channel widening =

Building Level Mitigation

Relocation =

Utility elevation =

Structural elevation =

Reconstruction =

Wet floodproofing =

Dry floodproofing

Acquisition/
Demolition =

Infrastructure

Levee =

Dike/ Berm =

Roadway elevation/ Road crossing modification =

Stormwater management activities +

Policy & Planning

Enhanced zoning

Land use/impervious area restrictions

River corridor/ Greenspace implementation *

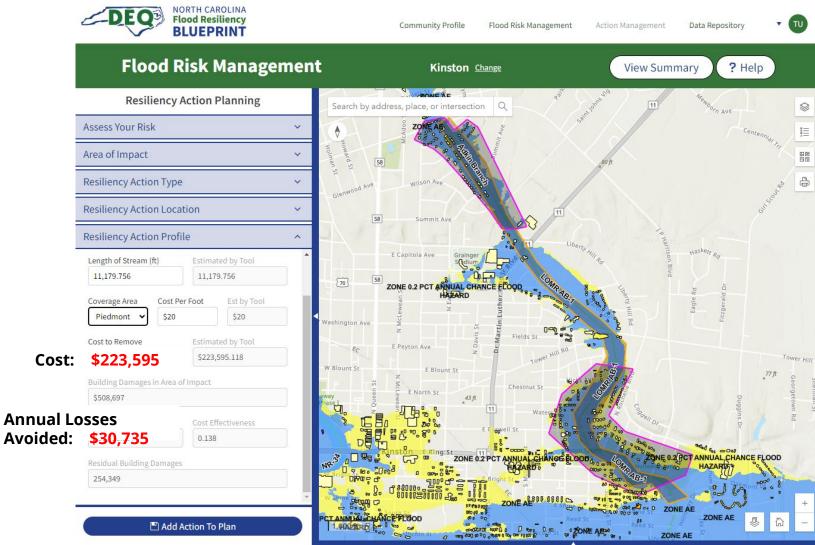
> Stormwater, water quality, floodplain regulations =



Develop New Resilience Actions

Stream Debris Removal

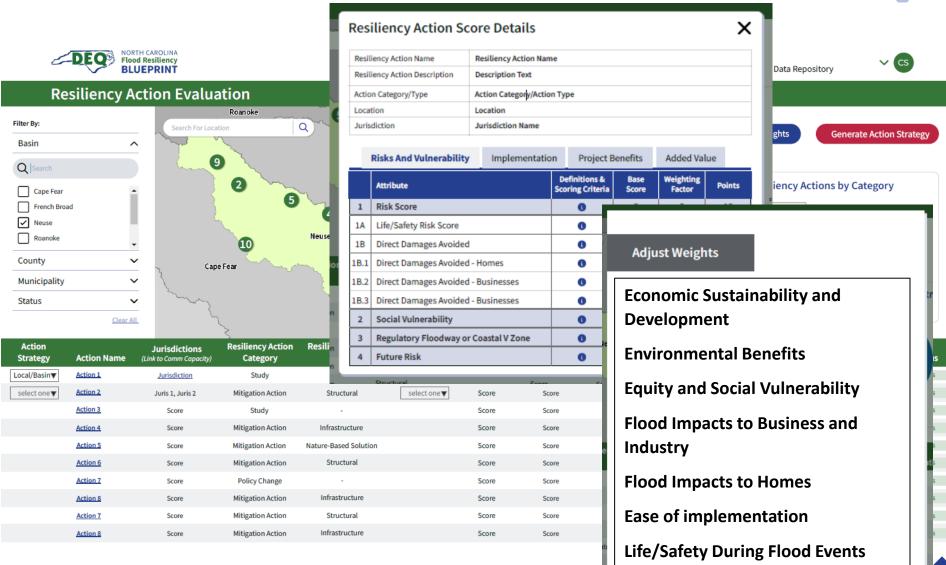
- Define Area of impact
- Define Action Location



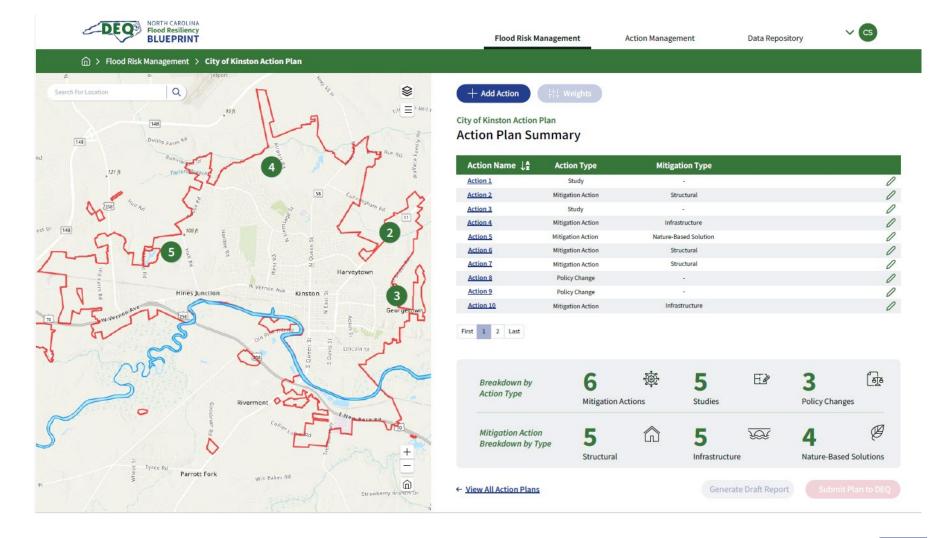


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Infrastructure, and
Economic Sustainability +

Community Capacity

Data Repository

Fund Matching

- Match proposed resilience actions with funding opportunities
 - Actively updated
 - Federal, state, philanthropic programs





Closing



What's Next

PHASE II - Tool Development and Model Improvement

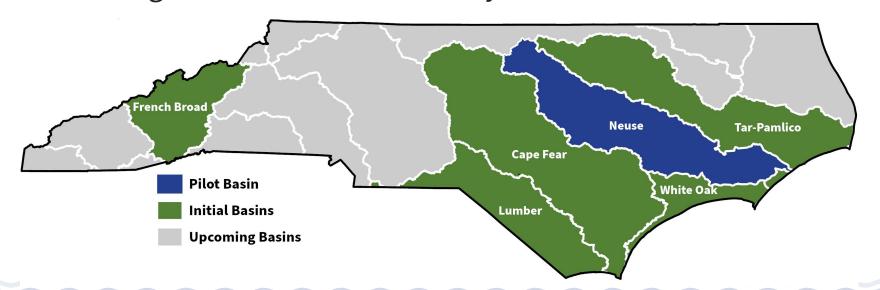
- September 2024 Version 1 Testing
- Spring 2025 Version 2



What's Next

Phase III

- Blueprint contracting with vendors In Process
- Supporting the development of Basin Action Strategies
 - Cape Fear, French Broad, Lumber, Tar-Pamlico, and White Oak
 - Establishing Basin Technical Advisory Committees

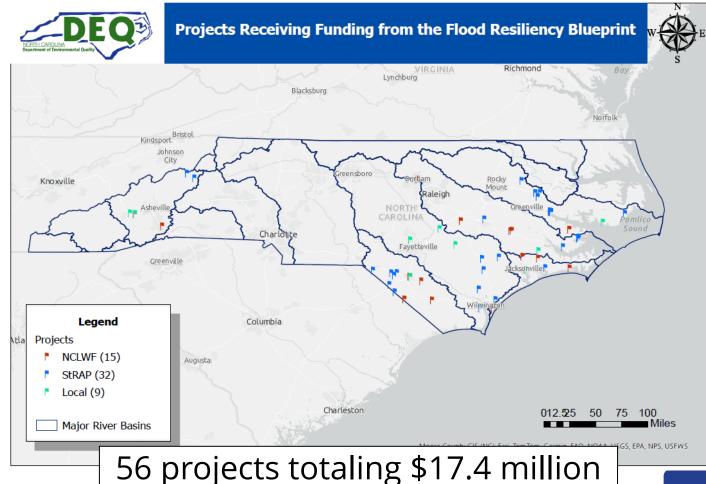




What's Next

Continued Implementation

- Working with NCEM and other State programs to identify funding opportunities
- Mining Hazard Mitigation plans and other planning efforts
- Agricultural Pond Flood Storage pilot project with Dept. of Agriculture







Thank You! | Questions?

