Flood Resiliency Blueprint Update

September PAG Meeting

September 9, 2024

Agenda NC Flood Resiliency Blueprint

- Progress Update
- Blueprint Tool Update
- Action scoring criteria
- Implementation update
- Future of Blueprint program funding

What's Next

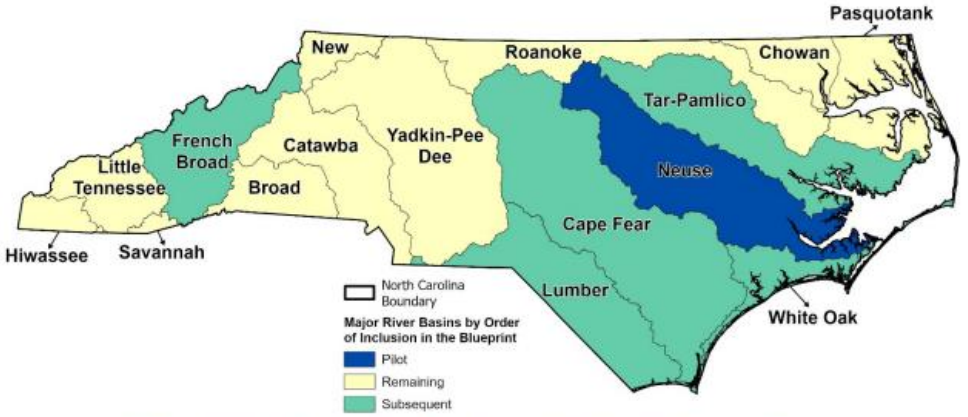
Flood Resiliency Blueprint Program Consultants

Jessica Gray *Cape Fear* 	Shana Shapiro *Lumber* 	Chris Dreps *Tar-Pamlico* 
Suna Morkoc *French Broad* 	Chris Dreps & Brad Connell *Neuse*	Brad Connell *White Oak*

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."**

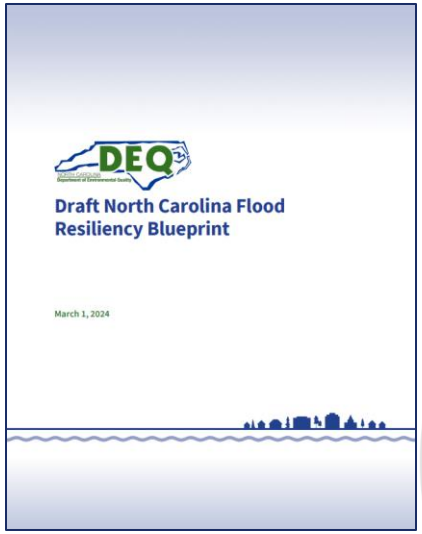
Basins: Neuse, Cape Fear, French Broad, Lumber, Tar-Pamlico, and White Oak



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

Blueprint Development - Multiphase Process

- **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

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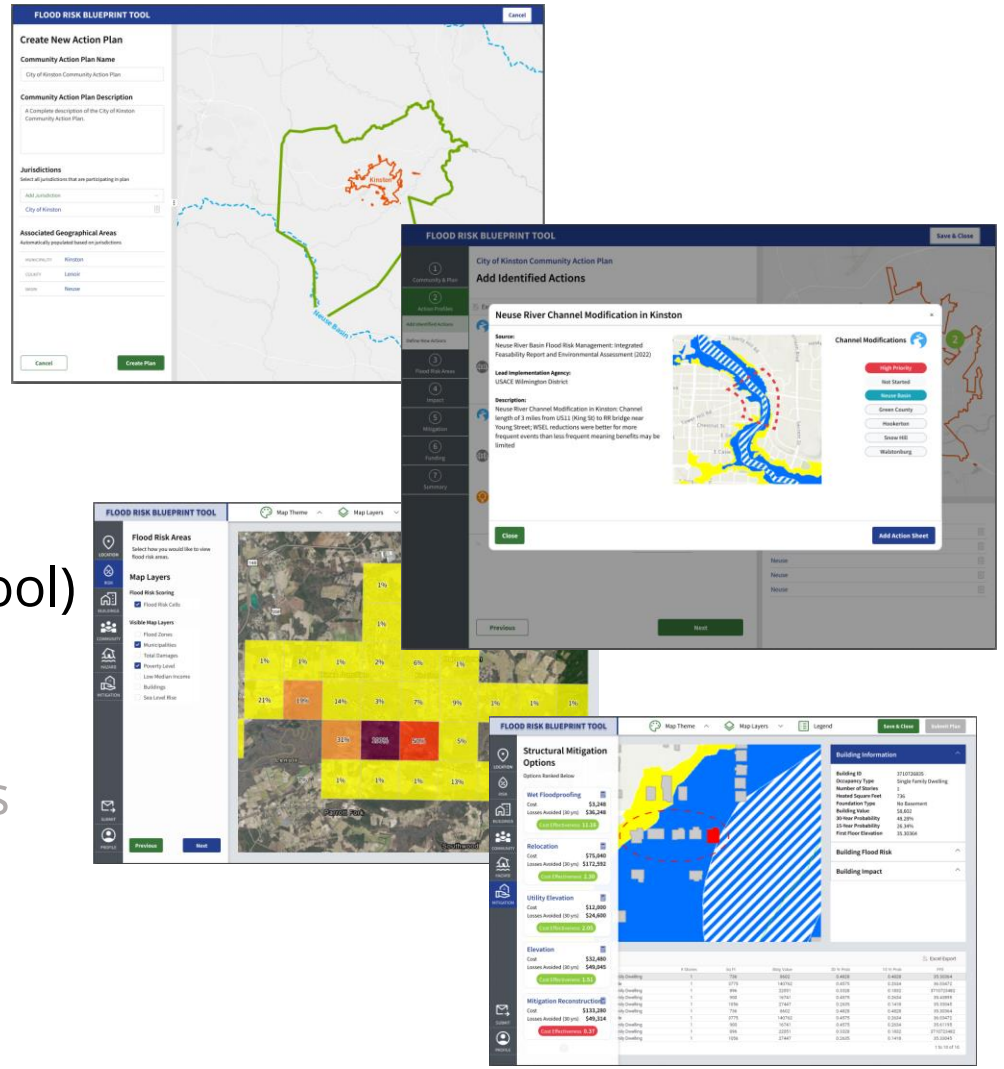

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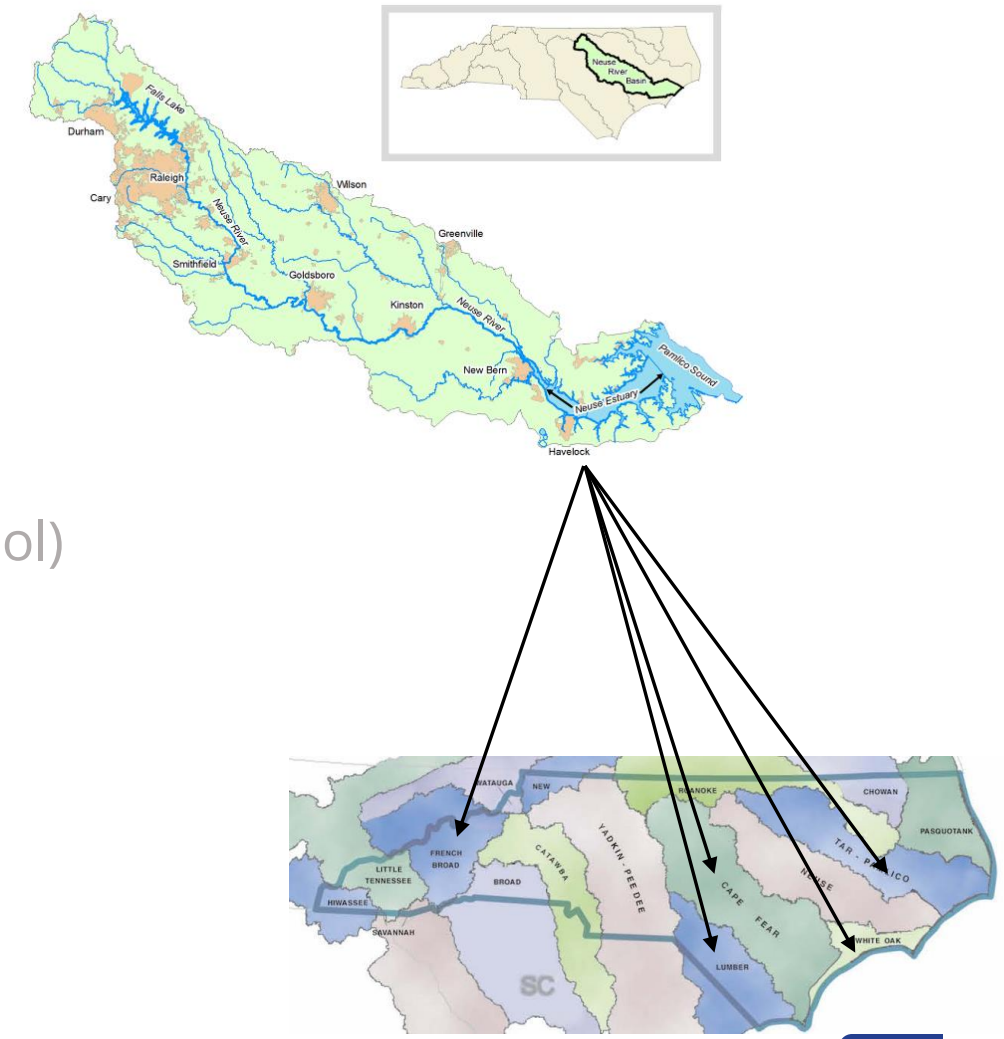


Flood Resiliency Blueprint Tool

NC Flood Resiliency Blueprint Tool

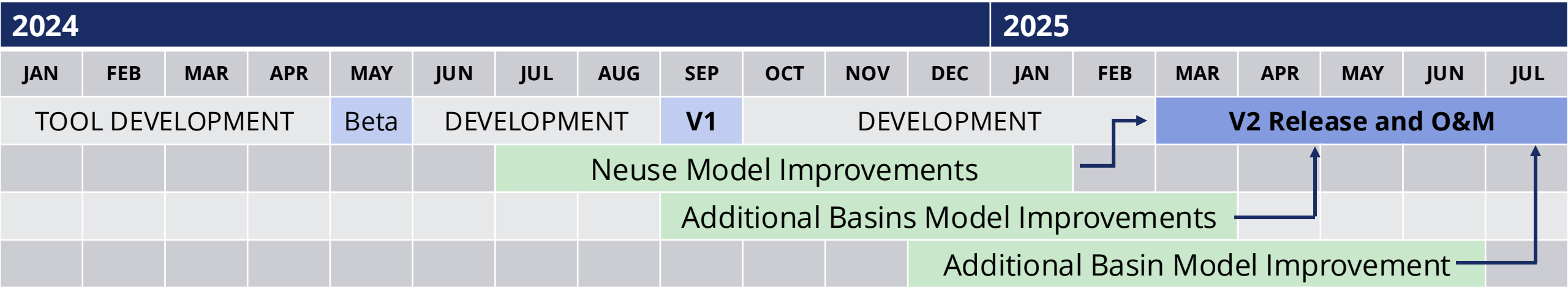
- Built on Hydrologic and Hydraulic (H&H) models
  - New methodologies allow users to:
    - Develop, Evaluate, Prioritize Resilience Actions
    - Plan and marshal funding to implement priority resilience measures

- 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

NC Flood Resiliency Blueprint Tool

Tool Development and Model Improvement

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

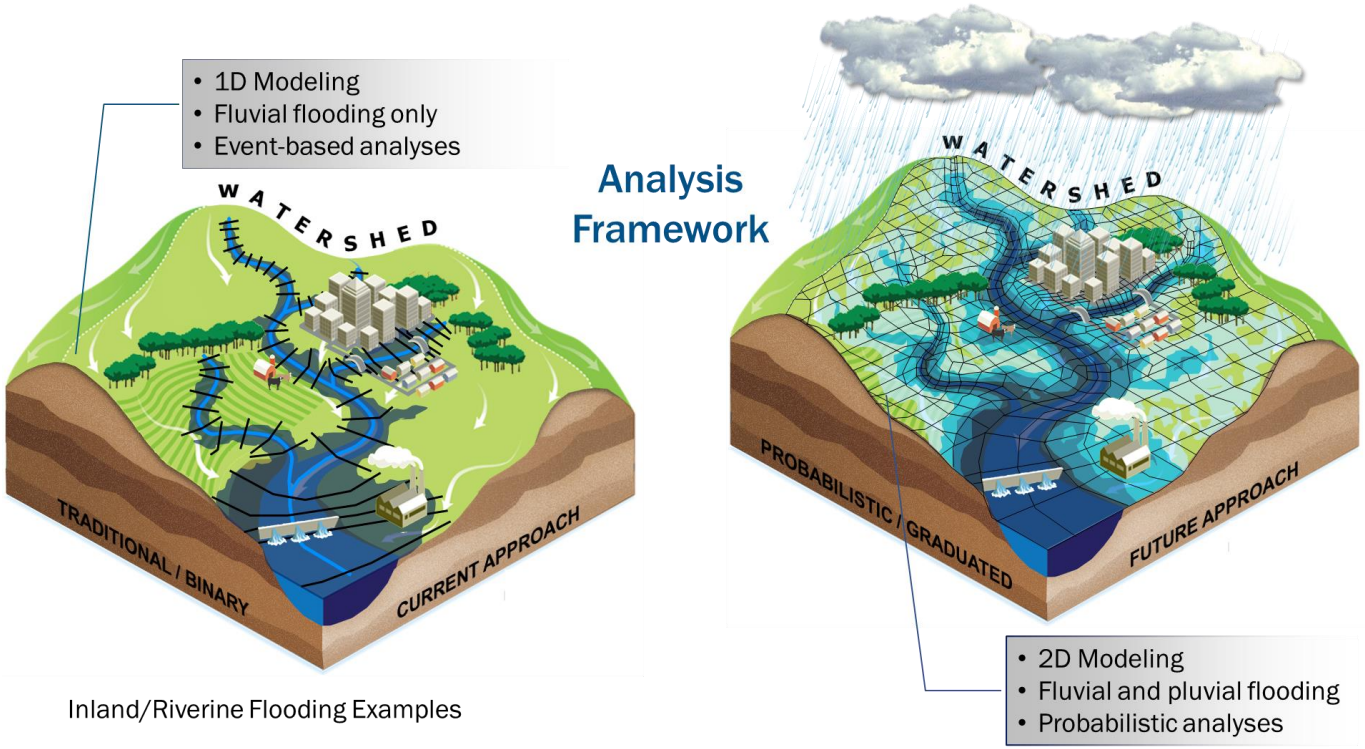


Flood Resiliency Blueprint Model Improvements

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



Inland/Riverine Flooding Examples

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

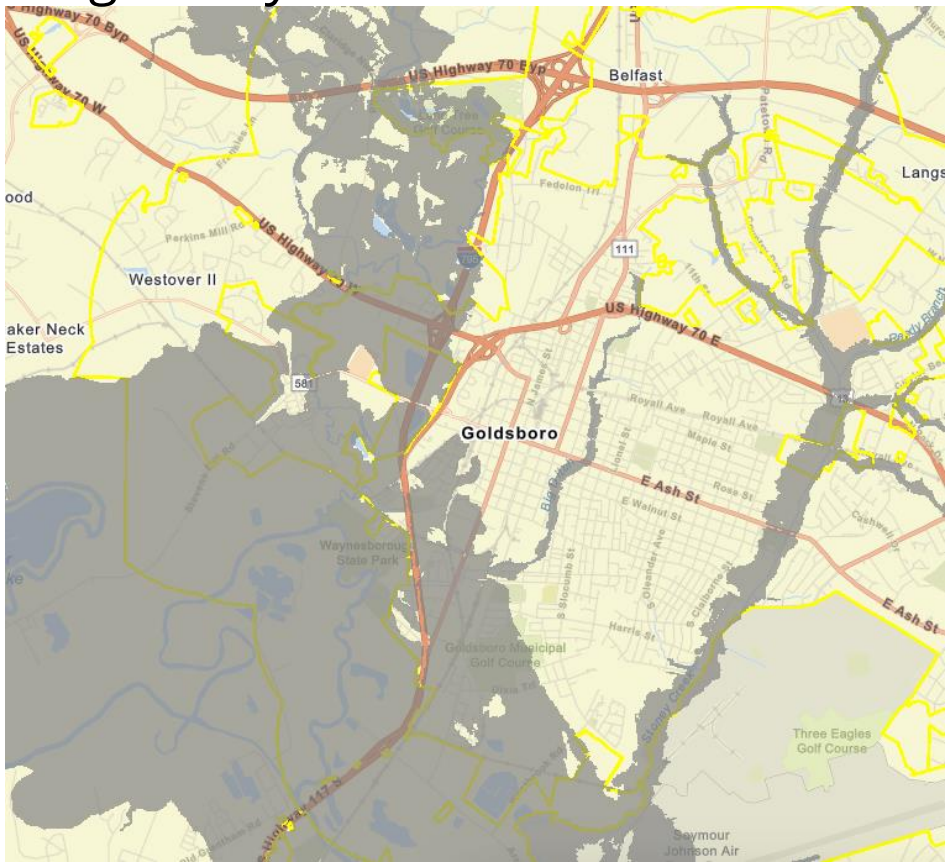
February 22, 2022 | Laura Oleniacz | 5-min. read

"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."

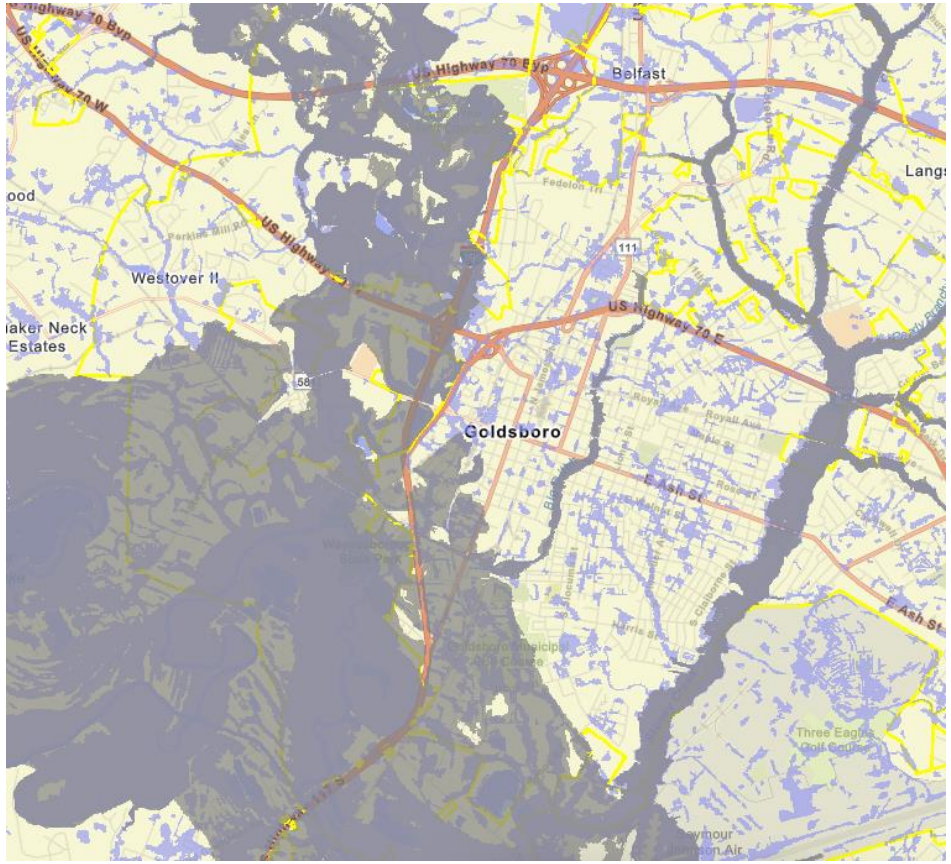
Flood Resiliency Blueprint Tool

1% Annual Chance

Regulatory Flood Plain



2D Rain on Grid



NCEM Advisory Flood Data

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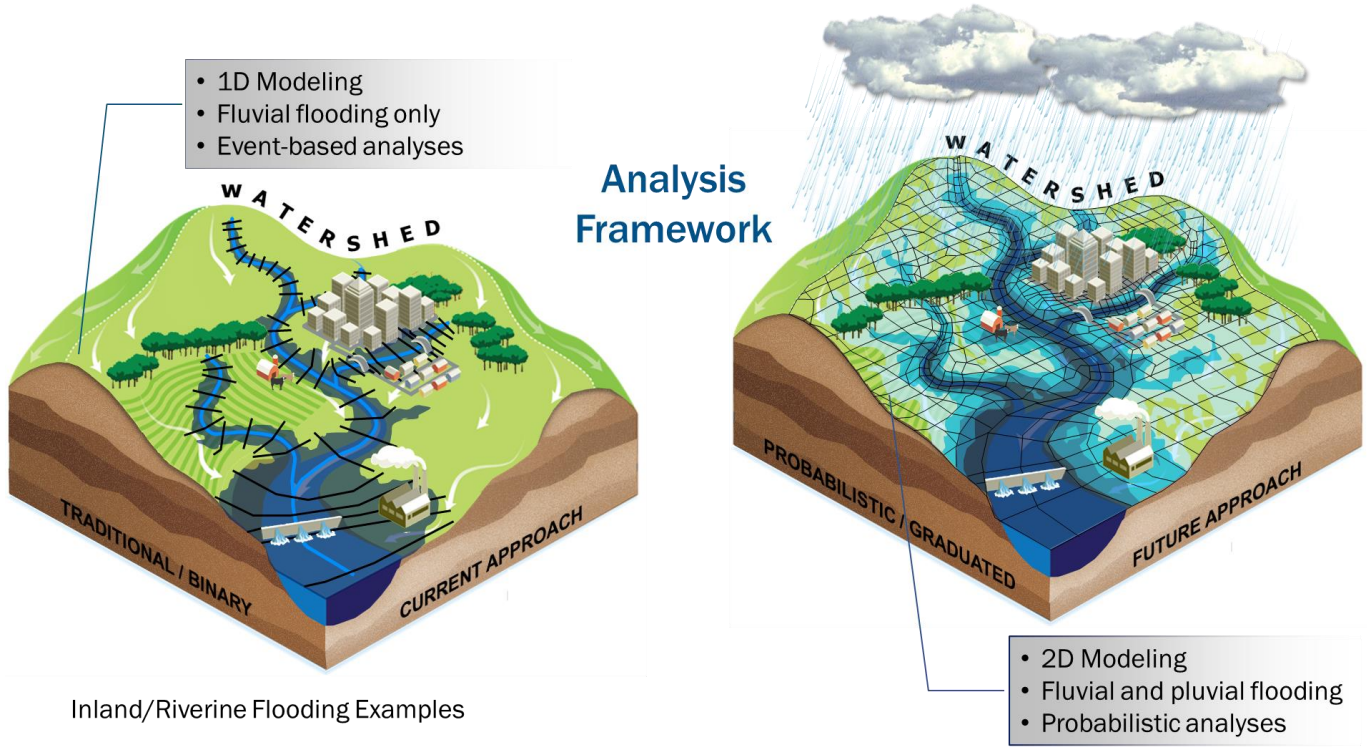

Inland/Riverine Flooding Examples

Flood Resiliency Blueprint Tool

- Expands on existing tools with new data and methodologies
- Integrates forecasted changes
- Is scalable (catchment to statewide)
- Allows for integration of future data and logic generated through multiple sources
- **Is dynamic** and improves as data and methodologies improve

NC FRIS

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

Blueprint Tool Functionality

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Flood Resiliency Blueprint Tool

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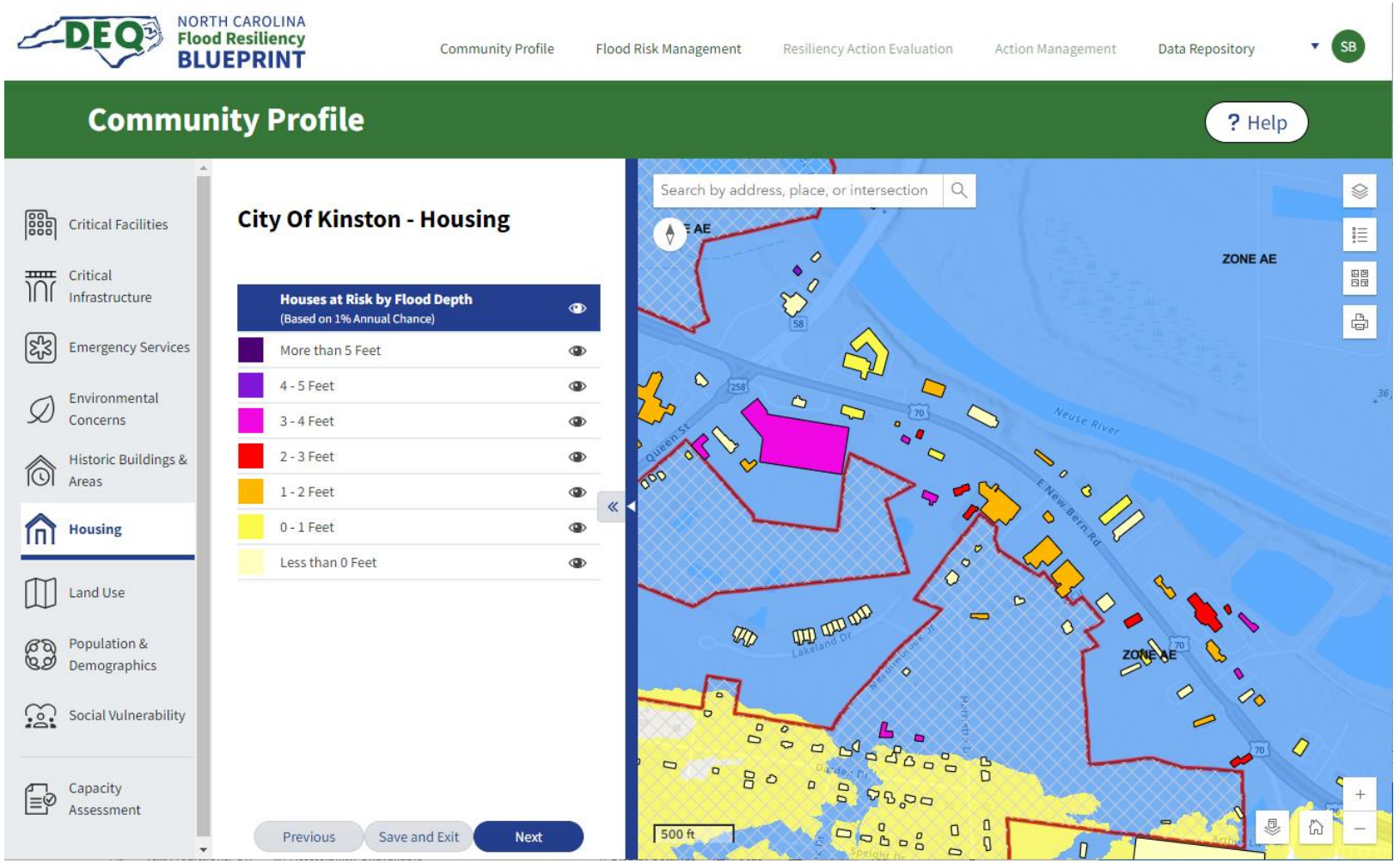
Build a Local Action Strategy

Develop New Resilience Actions



Flood Resiliency Blueprint Tool

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Build a Local Action Strategy

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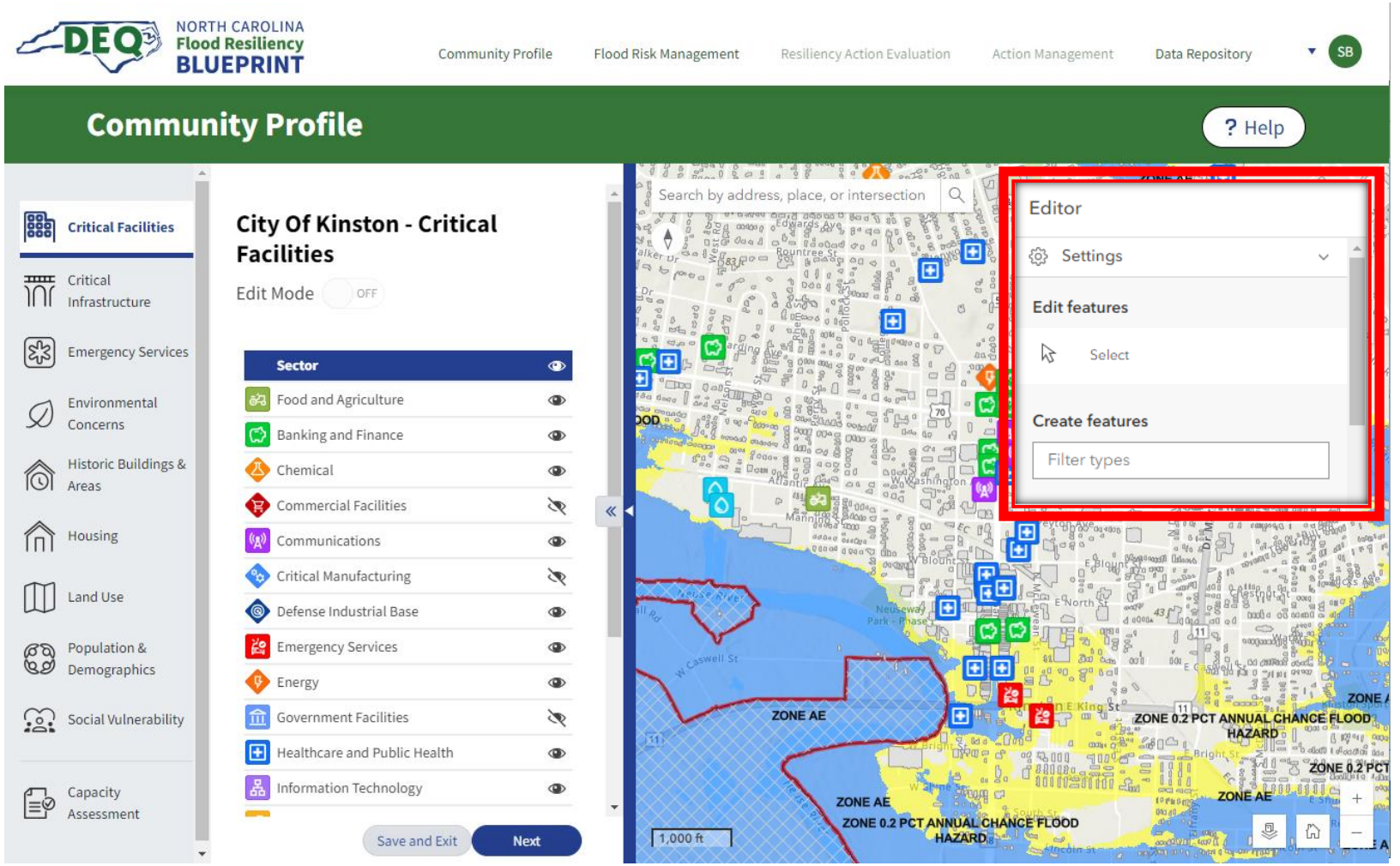

Flood Resiliency Blueprint Tool

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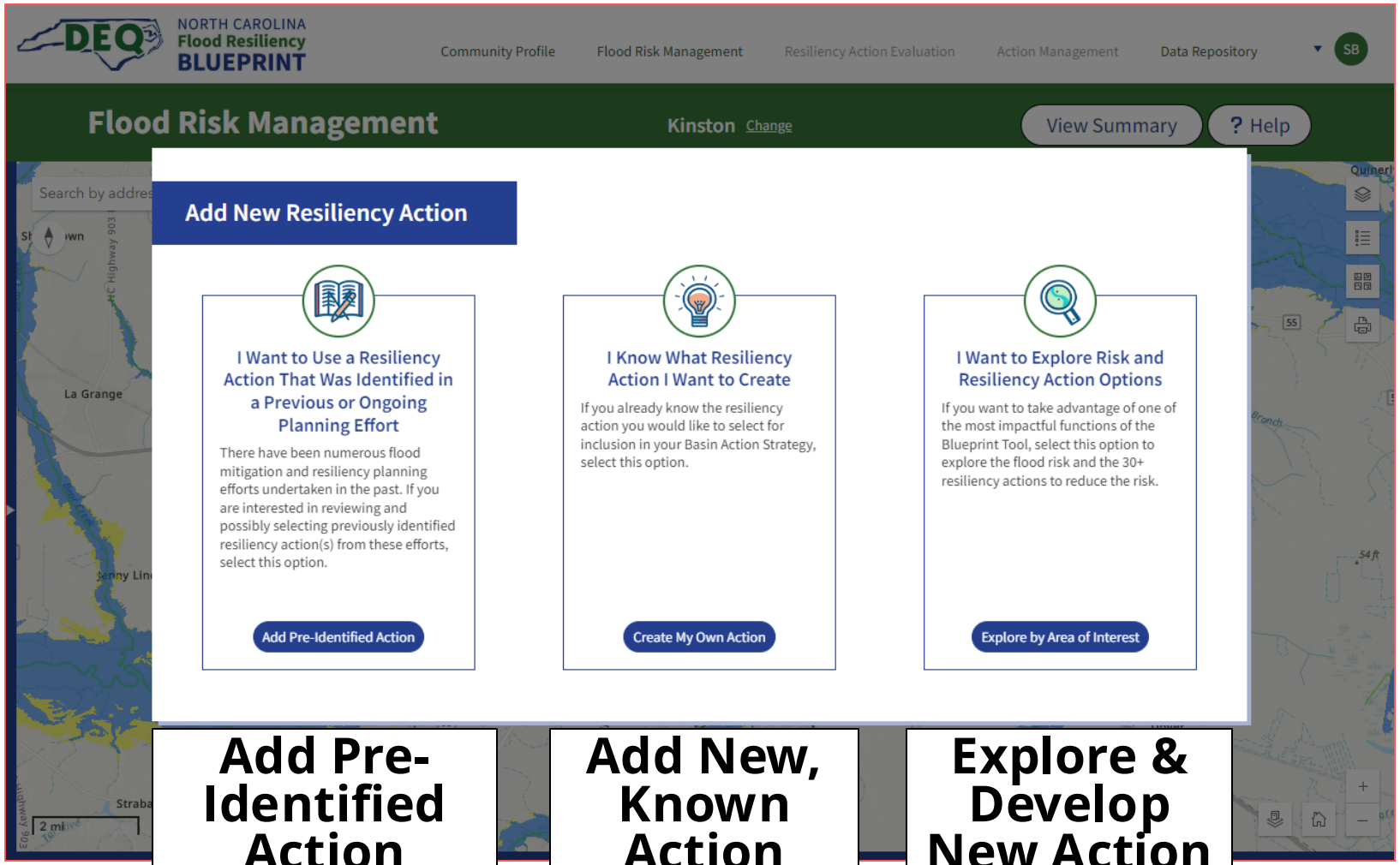


Add Pre-Identified Action

Add New, Known Action

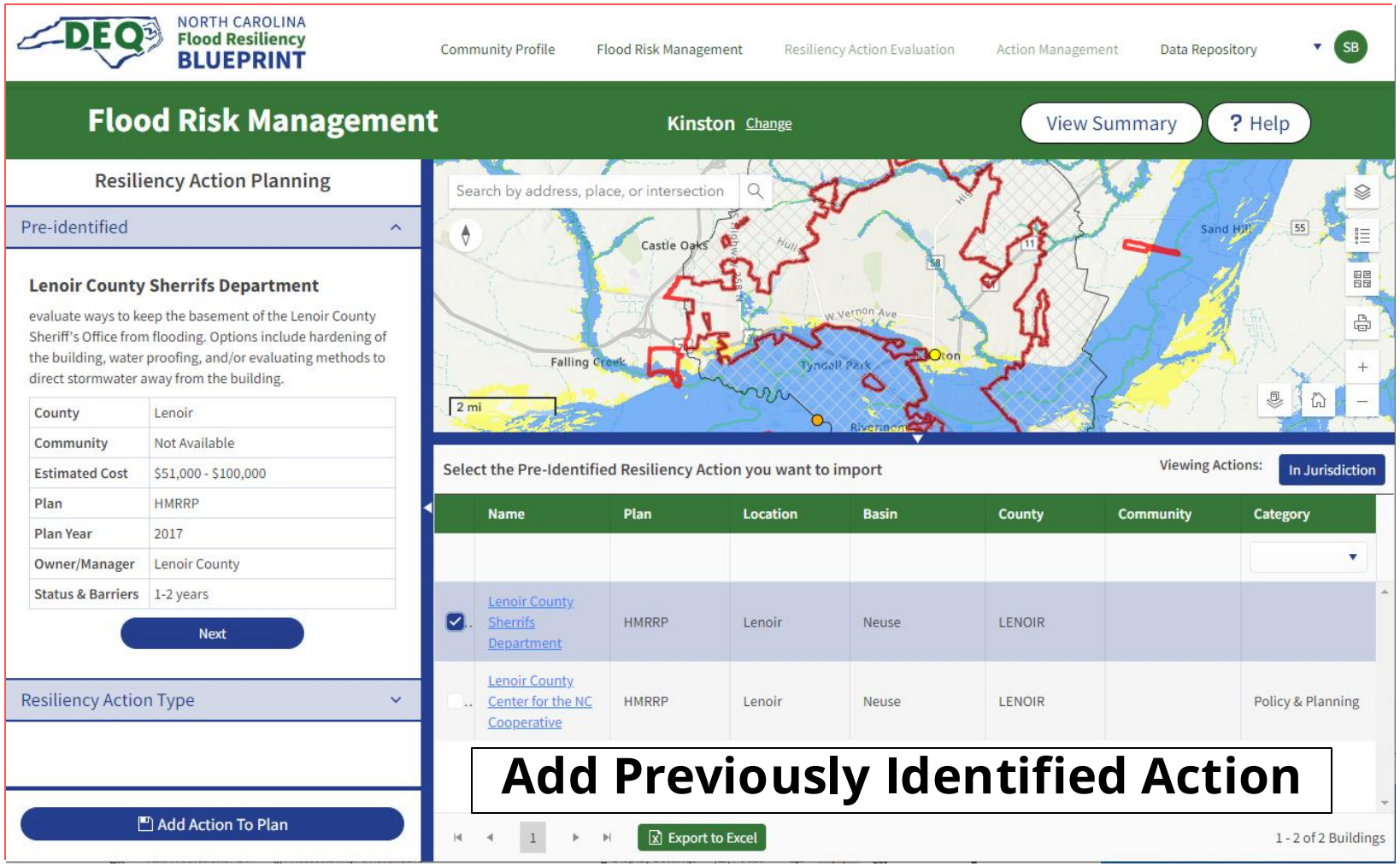
Explore & Develop New Action

Flood Resiliency Blueprint Tool

Develop a Detailed Community Profile

Build a Local Action Strategy

Develop New Resilience Actions



Flood Resiliency Blueprint Tool

Develop a Detailed Community Profile

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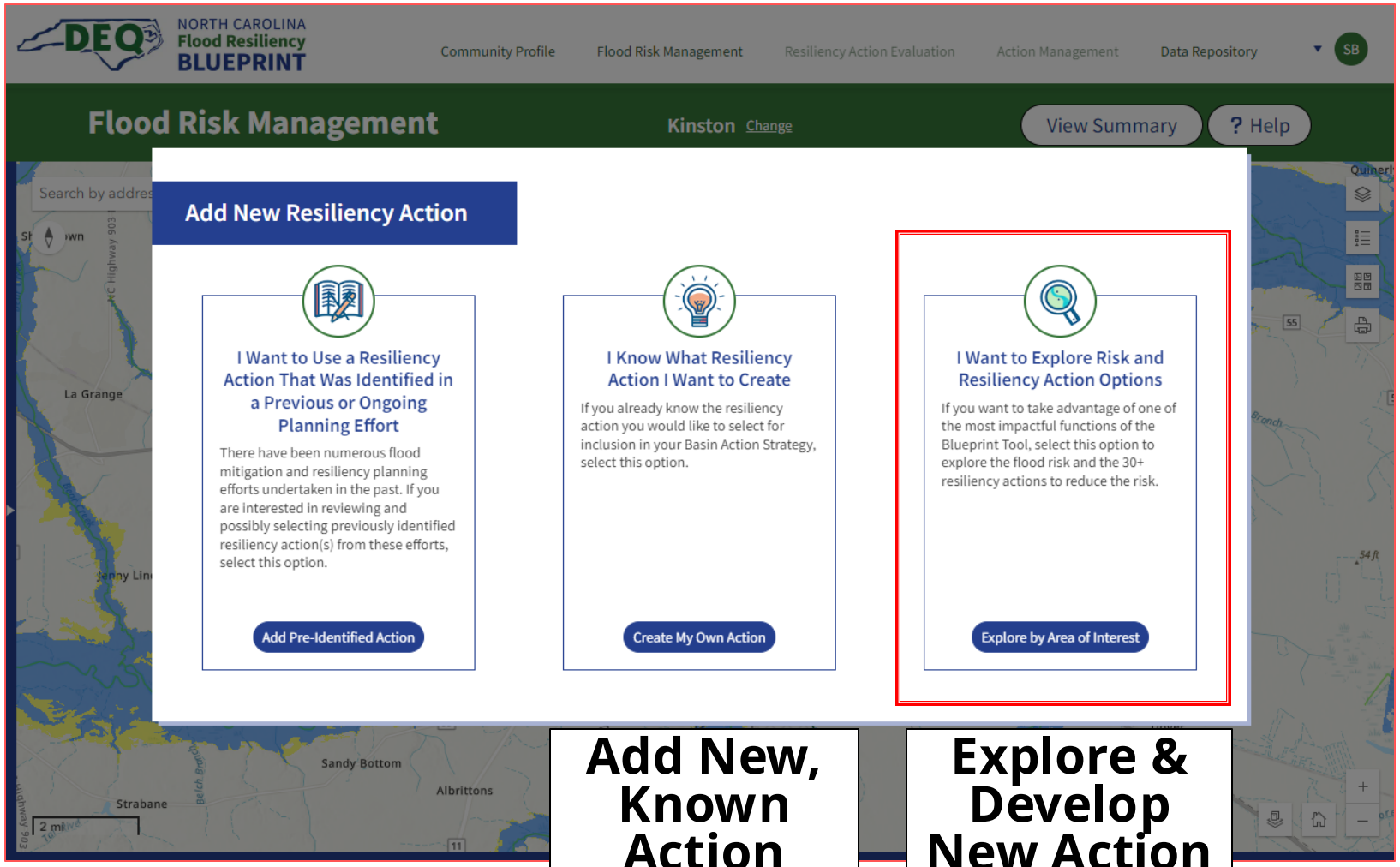


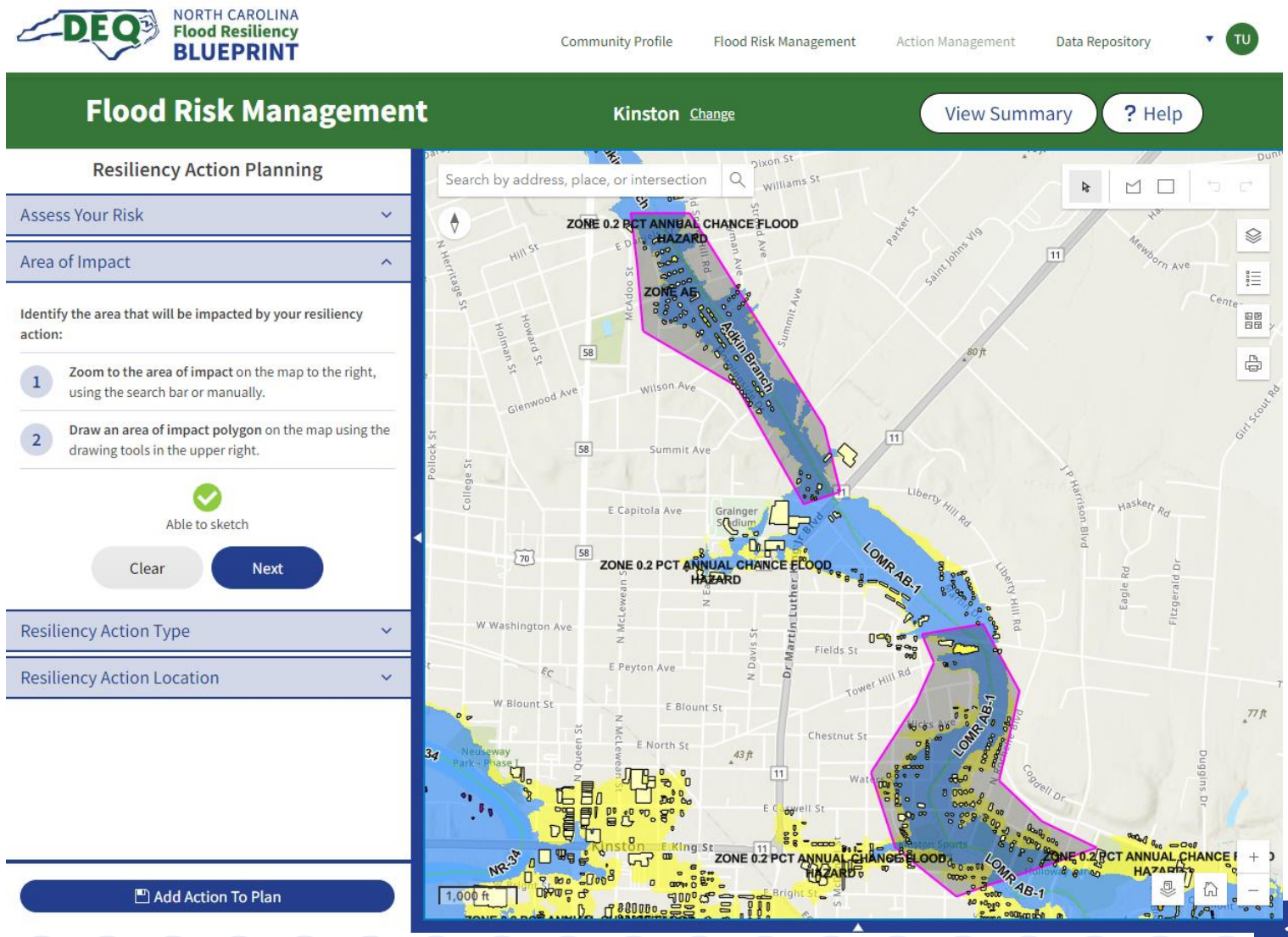
Add New, Known Action

Explore & Develop New Action

Flood Resiliency Blueprint Tool

Develop New Resilience Actions

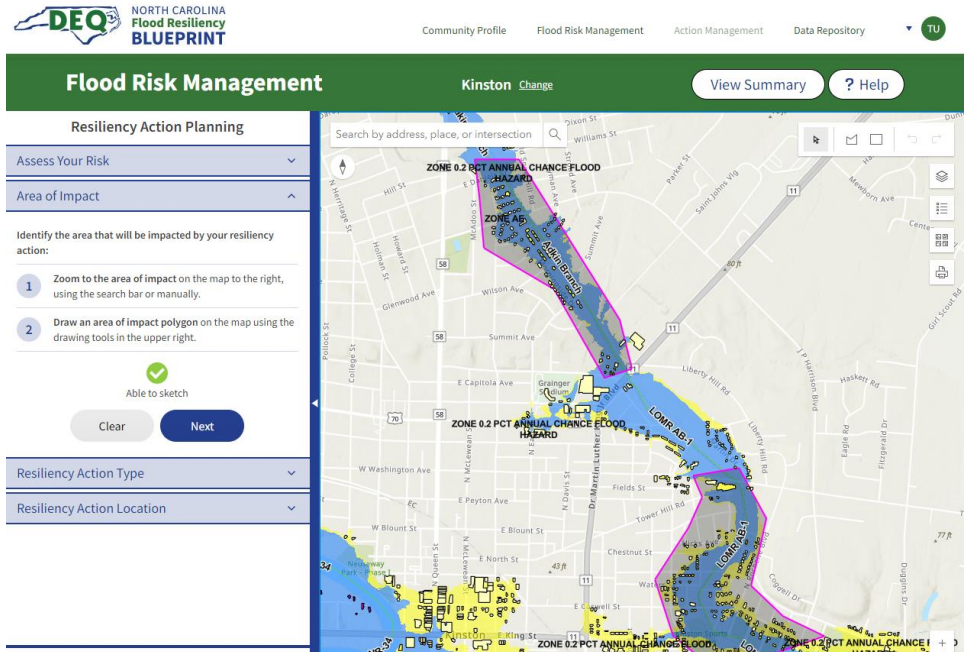
Identify an area of interest

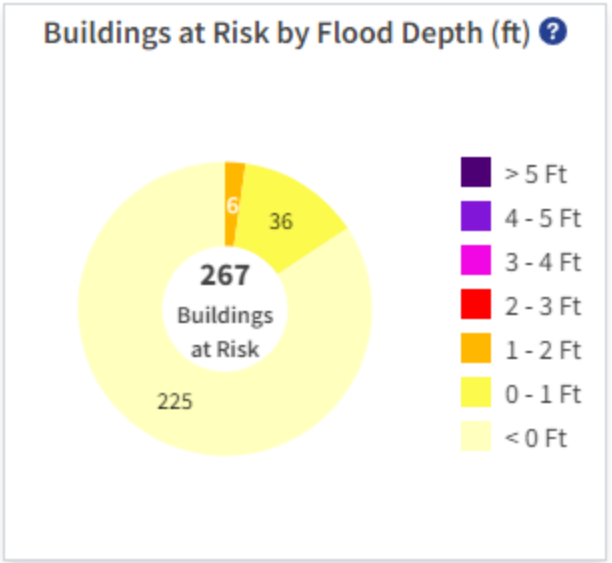


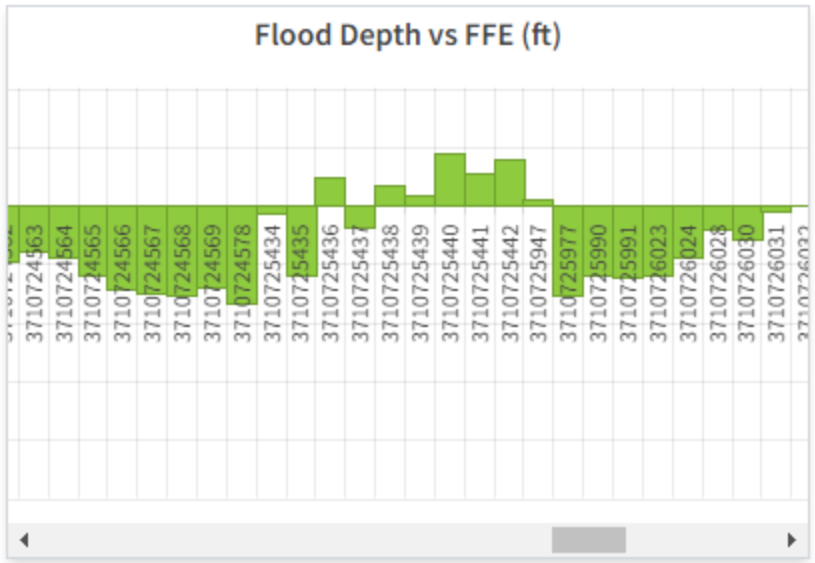
Flood Resiliency Blueprint Tool

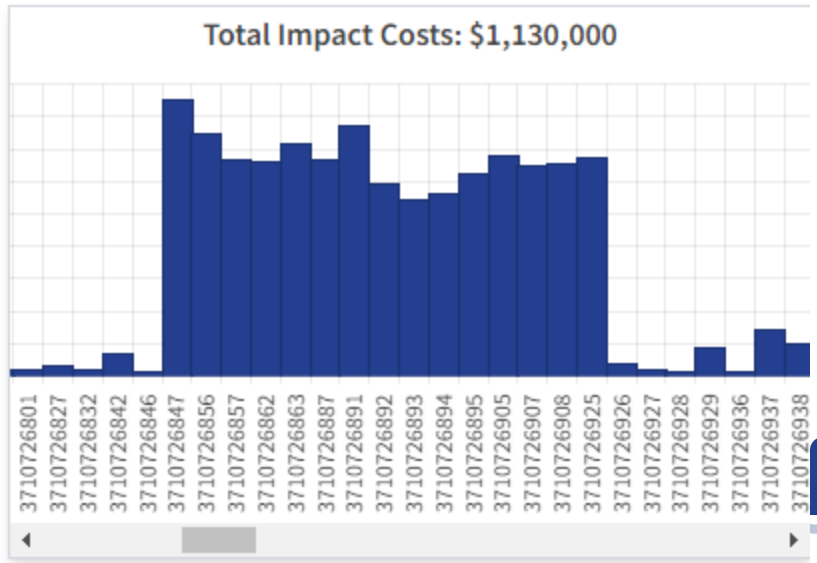
Develop New Resilience Actions

Assess flood Risk









Flood Resiliency Blueprint Tool

Develop New Resilience Actions

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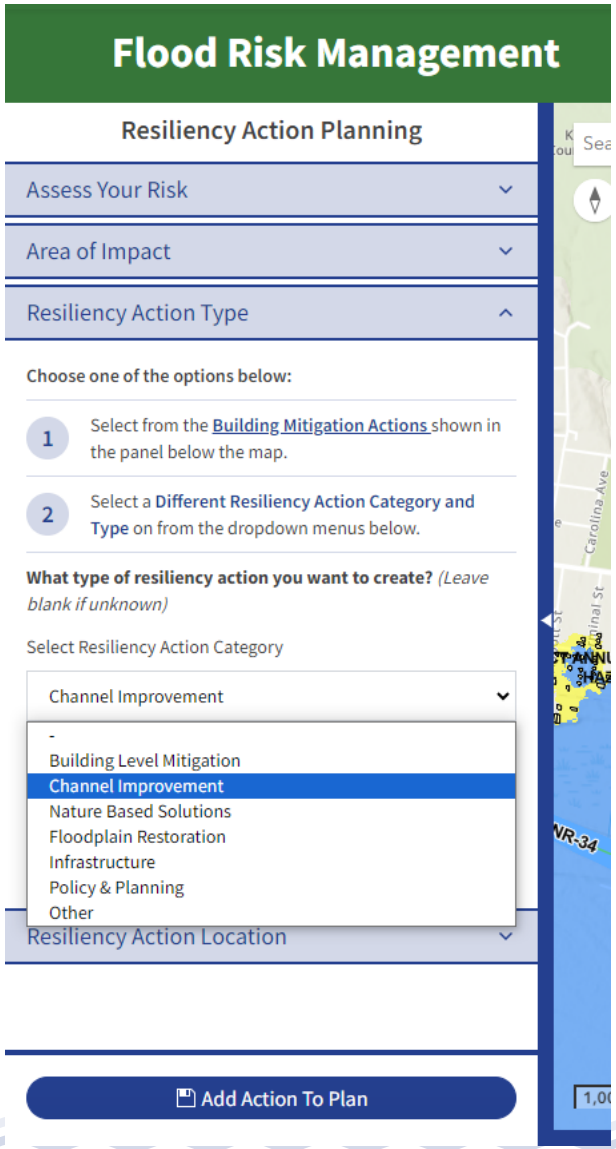


Resilience Action Categories

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

Flood Resiliency Blueprint Tool

* **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, bio-swales, 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

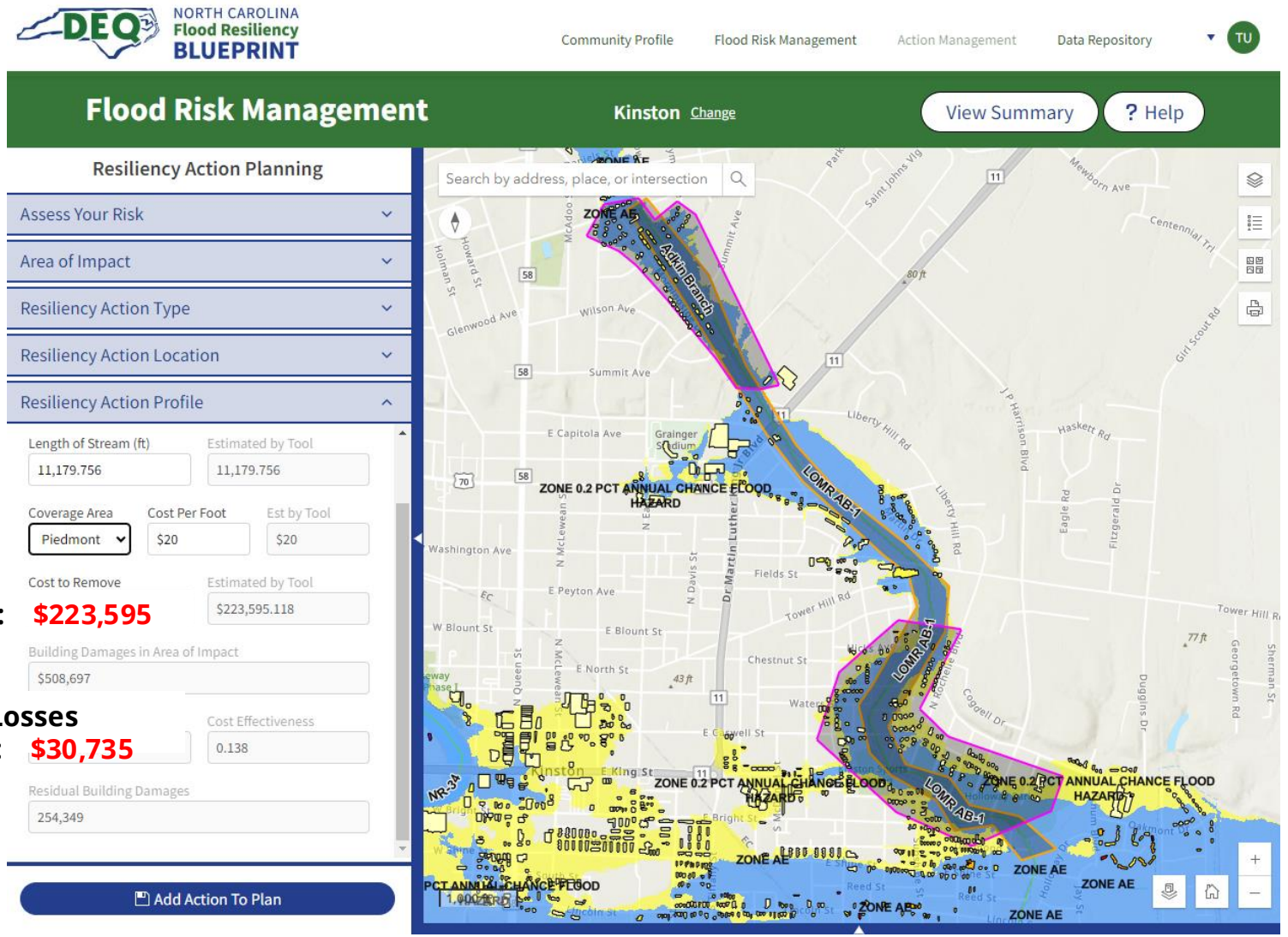
- Enhanced zoning *
- Land use/impervious area restrictions =
- River corridor/ Greenspace implementation *
- Stormwater, water quality, floodplain regulations =

Flood Resiliency Blueprint Tool

Develop New Resilience Actions

Stream Debris Removal

- Define Area of impact
- Define Action Location



Flood Resiliency Blueprint Tool September Version

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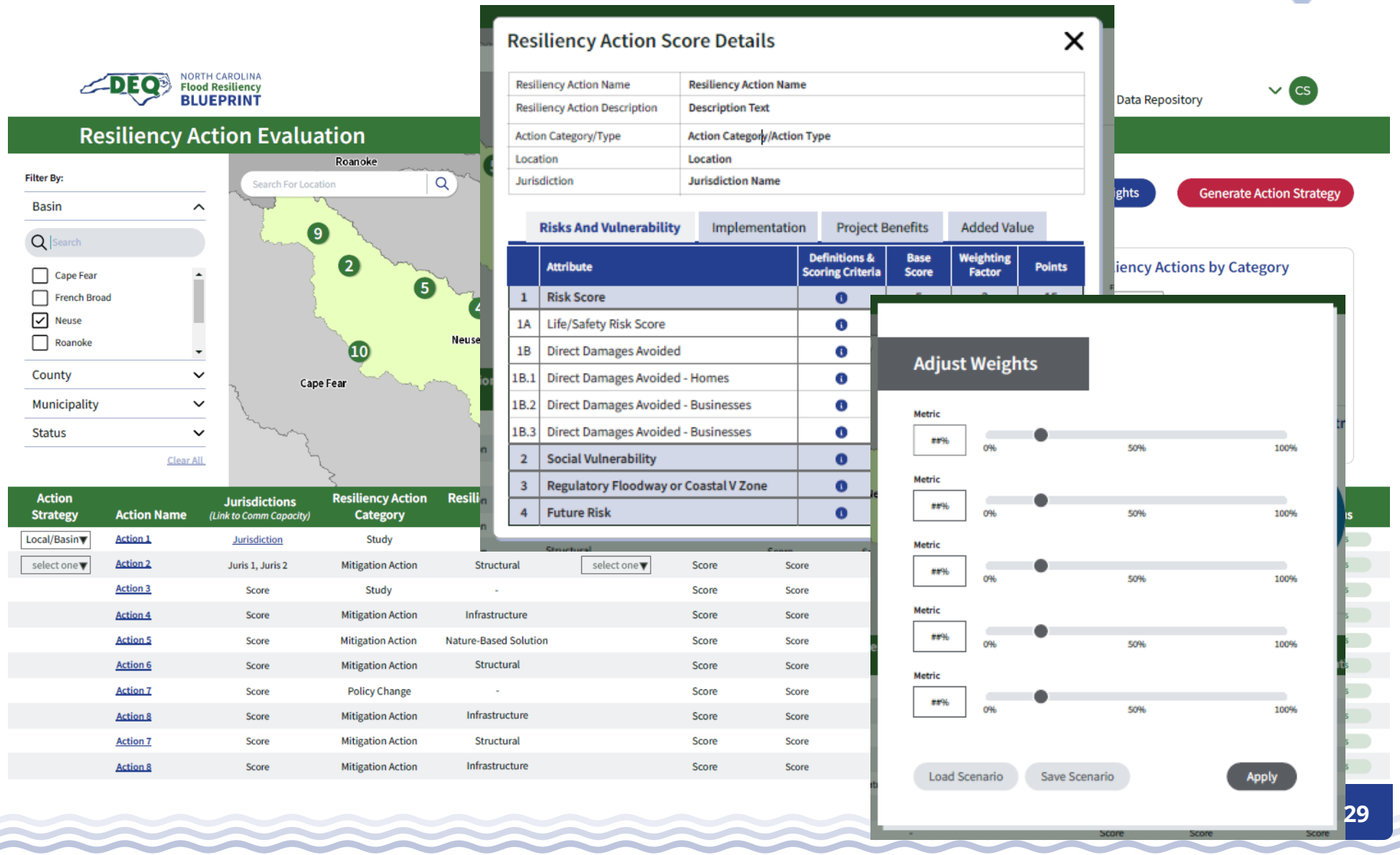

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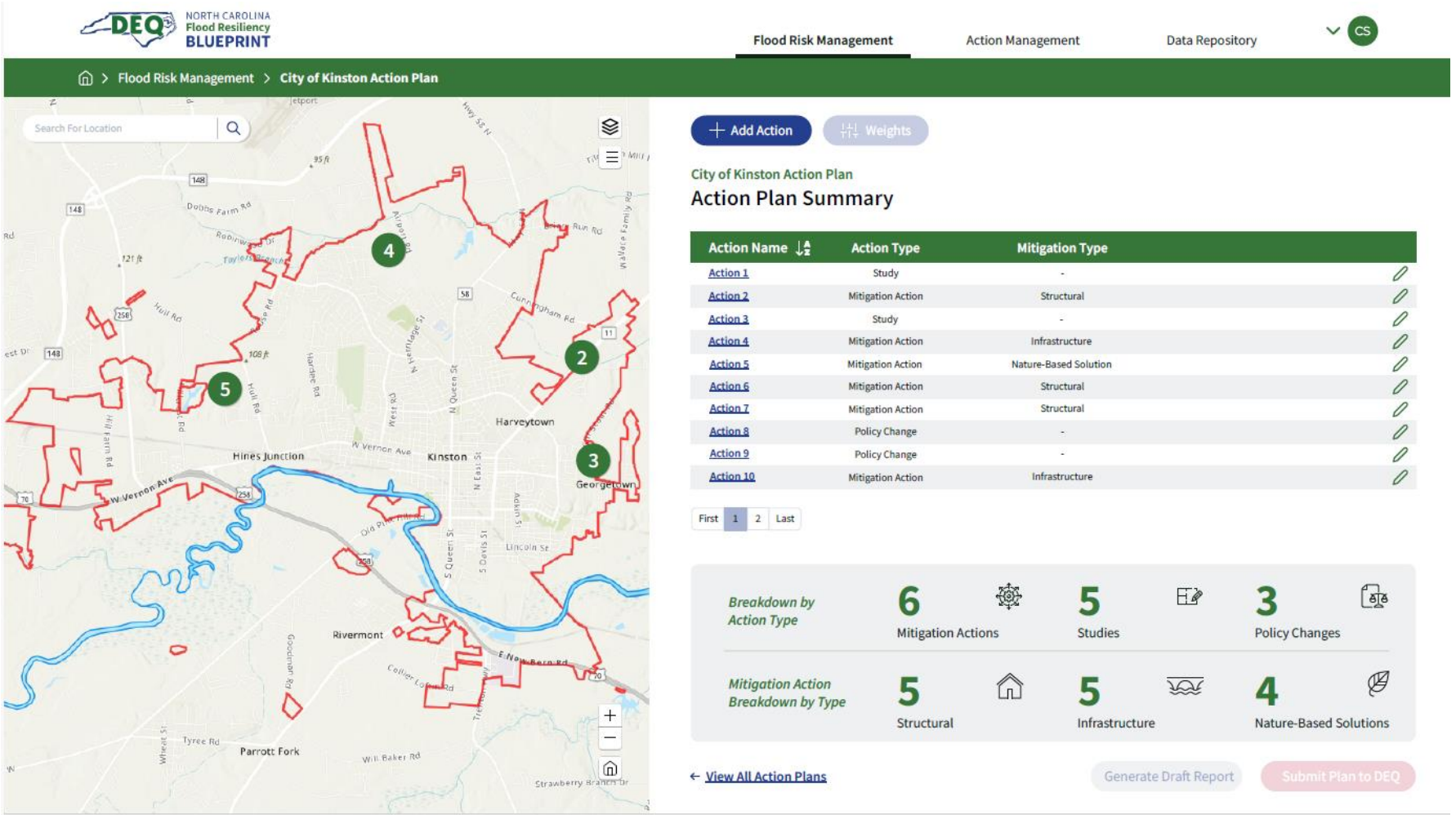

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Estimating Impacts of Flooding on People, Environment, Infrastructure, and Economic Sustainability +	Community Capacity	Data Repository

Fund Matching

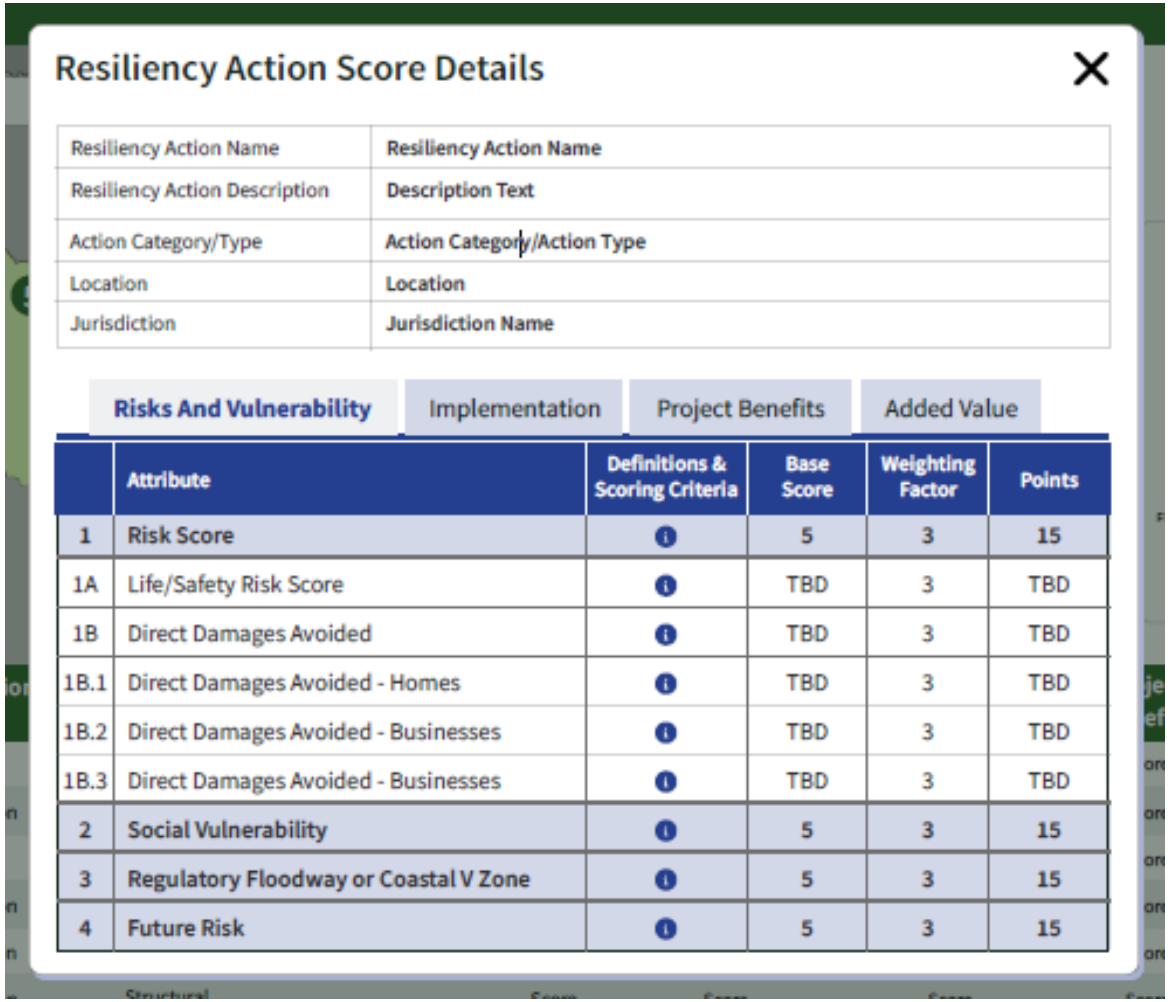
- Match proposed resilience actions with funding opportunities
  - Actively updated
  - Federal, state, philanthropic programs

Scoring Criteria

Blueprint Tool Scoring Criteria

Ranking Criteria

- Risks and Vulnerability
- Implementation
- Project Benefits
- Added Value



Resiliency Action Score Details

Resiliency Action Name	Resiliency Action Name
Resiliency Action Description	Description Text
Action Category/Type	Action Category/Action Type
Location	Location
Jurisdiction	Jurisdiction Name

Risks And Vulnerability | Implementation | Project Benefits | Added Value

	Attribute	Definitions & Scoring Criteria	Base Score	Weighting Factor	Points
1	Risk Score		5	3	15
1A	Life/Safety Risk Score		TBD	3	TBD
1B	Direct Damages Avoided		TBD	3	TBD
1B.1	Direct Damages Avoided - Homes		TBD	3	TBD
1B.2	Direct Damages Avoided - Businesses		TBD	3	TBD
1B.3	Direct Damages Avoided - Businesses		TBD	3	TBD
2	Social Vulnerability		5	3	15
3	Regulatory Floodway or Coastal V Zone		5	3	15
4	Future Risk		5	3	15

Blueprint Tool Scoring Criteria

Risks and Vulnerability

	Attribute	Definition / Criteria	Score	How Generated
1	**Risk Score** = (flood hazard probability * impacts)	Measures the reduction in relative vulnerability and risk that results from a flood mitigation project (resiliency action).	5	Calculated in Tool
1A	**Life/Safety Risk Score** Source: TBD, possibly from 2-D modeling or NCDOT/NCEM metrics	Draft Example: 1) Is the project located in, or mitigate, an area with high velocity flood waters and with > than 6 inches of flood waters? (1 pt) 2) Does the project alleviate flooding on major roads (arterial routes)? (1 pt) 3) Does the project address access or connectivity issues caused by flooding (i.e. communities cut off or isolated by flooding)? (1 pt) "	5	Calculated in Tool and/or User input
1B	**Direct Damages Avoided** SOURCE: parcels/building losses	Determined by the relative extent of direct damages or losses ($) avoided for structures	4	Calculated in Tool
1B.1	Direct Damages Avoided - **Homes**		TBD	Calculated in Tool
1B.2	Direct Damages Avoided - **Businesses**		TBD	Calculated in Tool
1B.3	Direct Damages Avoided - **Industry**		TBD	Calculated in Tool

Blueprint Tool Scoring Criteria

Risks and Vulnerability

	Attribute	Definition / Criteria	Score	How Generated
2	**Social Vulnerability** Source: NCDEQ Underserved Data	The potential negative effects of floods on local communities of a flood resiliency action based on NCDEQ Potentially Underserved data. Submitters are encouraged to ensure equity concerns are addressed throughout project implementation/administration and can change or annotate score as needed.	5	Calculated in Tool, ability for user input
3	**Regulatory Floodway or Coastal V Zone** Source: FEMA data	Additional risk as determined by the proximity of the property of a flood resiliency action to the regulatory floodway or coastal V zone intersecting its boundaries.	2	Calculated in Tool
4	**Future Risk**	Same a risk score methodology just uses future conditions modeling.	TBD	Calculated in Tool

Blueprint Tool Scoring Criteria

- Implementation

	Attribute	Definition / Criteria	Score	How Generated
1	**Regional Benefits**	The extent to which the proposed flood resiliency action supports regional productivity and resilience, such as (but not limited to) the ability of the region to maintain local industries, grow tourism, as well as anticipate and adapt to threats as a result of climate change (e.g. flooding). Note: for the purposes of this matrix, a region is defined to be the multi-county region, or at least greater than a one-county area.	4	User input
2	**Potential Barriers**	Potential barriers such as inadequate financial/infrastructure resources or local land use regulations. The potential of a barrier to limit opportunities for implementing the proposed flood resiliency action.	3	User input

Blueprint Tool Scoring Criteria

Implementation

	Attribute	Definition / Criteria	Score	How Generated
3	**Opportunity to Fulfill Strategies in Existing Plans, Programs, and Policies**	The extent to which the proposed flood resiliency action aligns with existing plans, programs, and policies, and/or the opportunity to integrate the proposed flood resiliency action within existing plans, programs, and policies across government agencies.	3	User input
4	**Local Workforce Development**	The extent to which the flood resiliency action encourages equitable economic growth and opportunity for the local community/region. • 4 – Project supports and encourages local workforce development and growth among historically underserved communities and vulnerable populations • 3 – Project supports the development and growth of local small and minority-owned businesses • 2 – Project supports the development of strong regional and local public-private partnerships with business leaders, financial and educational institutions and non-profits to empower knowledge sharing and organizational capacity • 1 – Project supports standard workforce development in communities/region	4	User input

Blueprint Tool Scoring Criteria

Project Benefits

	Attribute	Definition / Criteria	Score	How Generated
1	**Risk Avoidance/Critical Infrastructure**	The extent to which the flood resiliency action will protect critical facilities, infrastructure, and other key assets and minimize the disruption of essential services including emergency response, utilities, transportation, public health, and other social/lifeline services. The overall degree to which the project increases community resilience during a flood event.	3	Calculated in Tool, ability for user input
2	**Equitable Benefits**	The extent to which the flood resiliency action encourages or benefits equitable outcomes for the local community/region.	3	User input
3	**Environmental Benefits**	The extent to which the proposed flood resiliency action is a nature-based solution, and limits unwanted impacts on natural systems (habitats, species, resources).	4	User Input/Calculated in Tool

Blueprint Tool Scoring Criteria

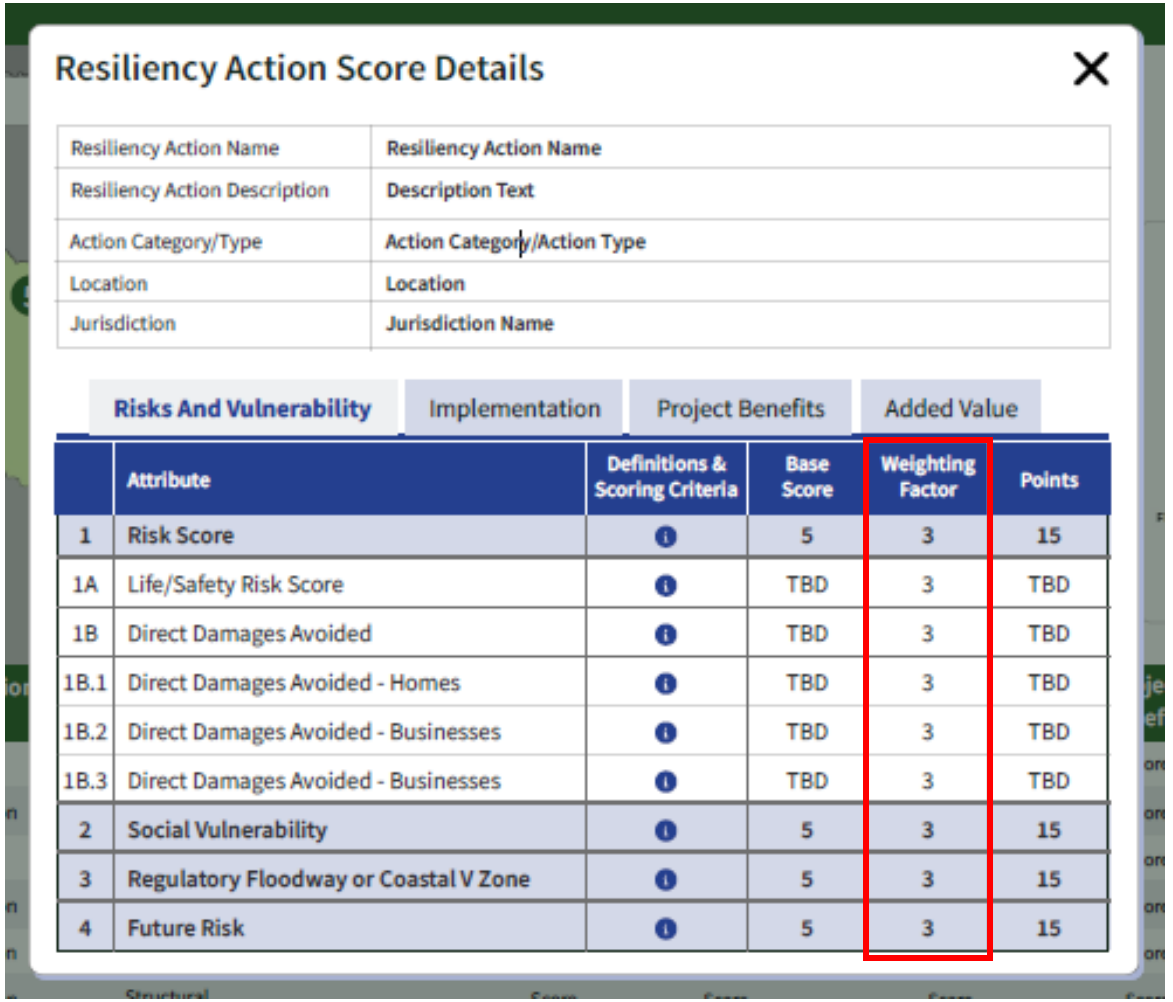
Added Value

	Attribute	Definition / Criteria	Score	How Generated
1	**Greenways/Parks/Trails**	The extent to which the proposed flood resiliency action enhance, expands, or integrates with an existing or planned greenway, park, or trail.	2	User input
2	**Road Network Exposure/Flooding**	The extent to which the proposed flood resiliency action reduces road network exposure/flooding.	2	User Input/Calculated in Tool
3	**Historic/Cultural Assets**	The extent to which the proposed flood resiliency action reduces damage to historic or cultural assets.	2	User Input/Calculated in Tool
4	**Water Quality Buffer**	The extent to which the proposed flood resiliency action enhances, expands, or integrates with a water quality buffer.	2	User input

Flood Resiliency Blueprint Tool

Community Weighting

- Economic Sustainability and Development
- Environmental Benefits
- Equity and Social Vulnerability
- Flood Impacts to Business and Industry
- Flood Impacts to Homes
- Ease of implementation
- Life/Safety During Flood Events



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Risks And Vulnerability | Implementation | Project Benefits | Added Value

	Attribute	Definitions & Scoring Criteria	Base Score	Weighting Factor	Points
1	Risk Score		5	3	15
1A	Life/Safety Risk Score		TBD	3	TBD
1B	Direct Damages Avoided		TBD	3	TBD
1B.1	Direct Damages Avoided - Homes		TBD	3	TBD
1B.2	Direct Damages Avoided - Businesses		TBD	3	TBD
1B.3	Direct Damages Avoided - Businesses		TBD	3	TBD
2	Social Vulnerability		5	3	15
3	Regulatory Floodway or Coastal V Zone		5	3	15
4	Future Risk		5	3	15

Flood Resiliency Blueprint Implementation

Project Implementation

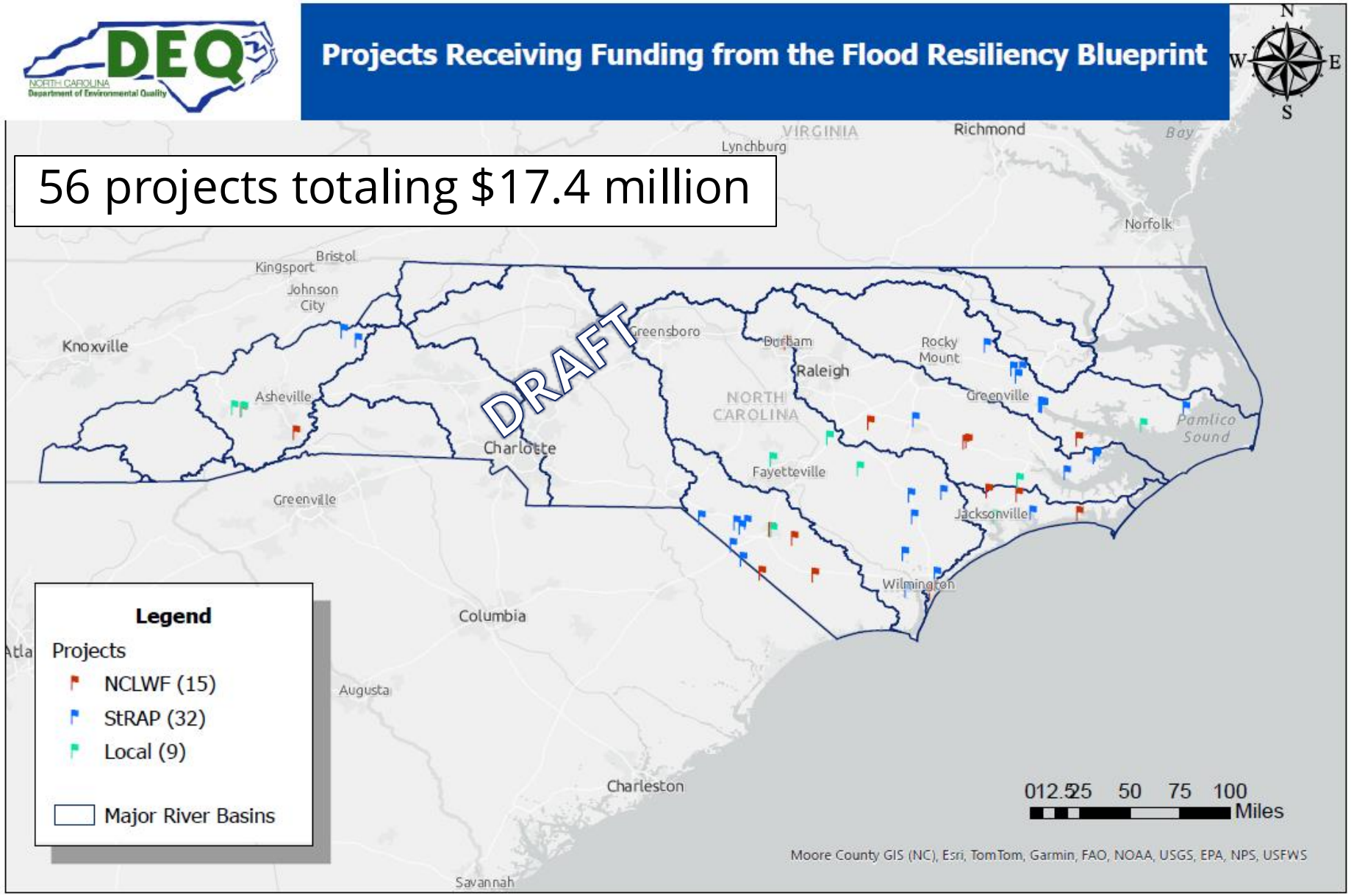
- 2021 N.C.G.A allocation of $96M became available Spring 2024, to implement priority flood resilience projects.
- Step 1: Blueprint coordinates with state agencies and programs
  - NCDACS Streamflow Rehabilitation Assistance Program (StRAP)
  - N.C. Land and Water Fund
  - N.C. Emergency Management

Project Implementation

Prioritizing projects based on:

- ability to reduce flood damage to infrastructure, homes, businesses,
- identification in Hazard Mitigation or Resilience Planning efforts,
- location in a high-risk area,
- likelihood of reducing flood risk to underserved communities,
- additional public benefits (e.g. parks, trails, etc.).

Project Implementation



Project Implementation

Planned Awards to date

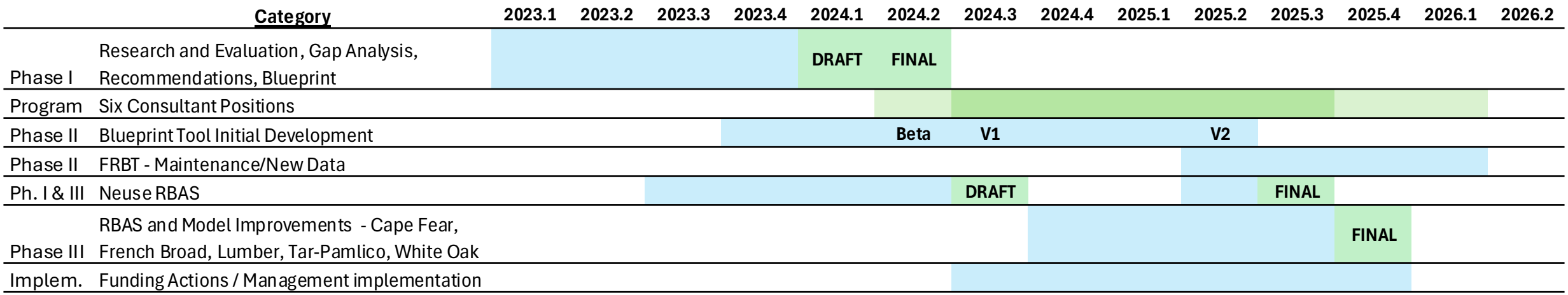
- (Work with NCEM not captured)

Partner	River Basin	Sum of Proposed DEQ Award
NCLWF	Cape Fear	$800,000
NCLWF	French Broad	$1,404,625
NCLWF	Lumber	$2,400,000
NCLWF	Neuse	$2,077,956
NCLWF	Tar-Pamlico	$704,809
NCLWF	White Oak	$1,660,014
NCLWF Total		**$9,047,404**
Other	Cape Fear	$1,500,000
Other	Lumber	$569,476
Other	Neuse	$110,000
Other	White Oak	$1,500,000
Other Total		**$3,679,476**
StRAP	Cape Fear	$921,775
StRAP	French Broad	$495,200
StRAP	Lumber	$975,500
StRAP	Neuse	$686,536
StRAP	Tar-Pamlico	$1,642,980
StRAP Total		**$4,721,991**
Grand Total		**$17,448,871**

Future of Blueprint Program and Funding

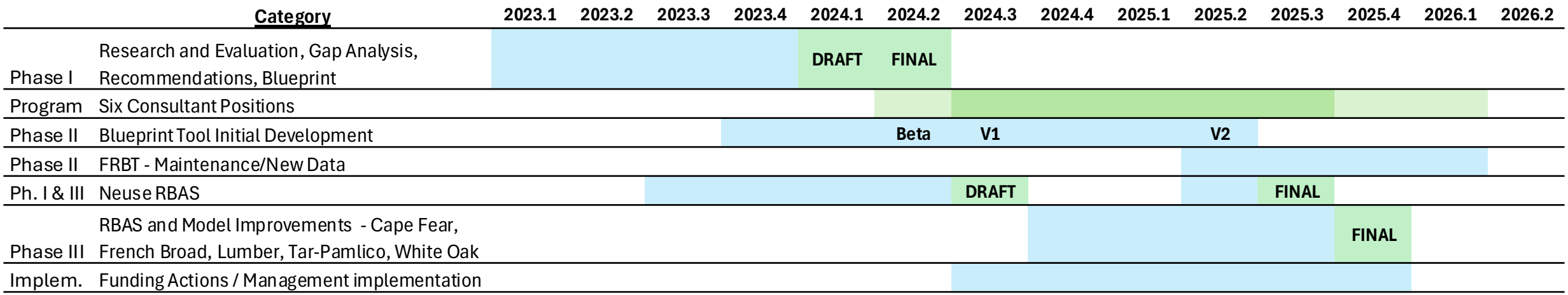
Fall 2025 Outlook

- Completed and functional Blueprint Tool.
- Completed modeling & RBAS for 6 basins.
- $96M implementation funding under contract.



Fall 2025 Outlook

- Time-limited staff terms end at critical time.
- No mechanisms for continued maintenance of Tool or models.
- Statewide Blueprint stops at 6 of 17 river basins.



Future of Blueprint Discussion

- Funding
  - Staff
  - Blueprint Tool
  - Implementation

- Structure & Oversight

Closing

What's Next

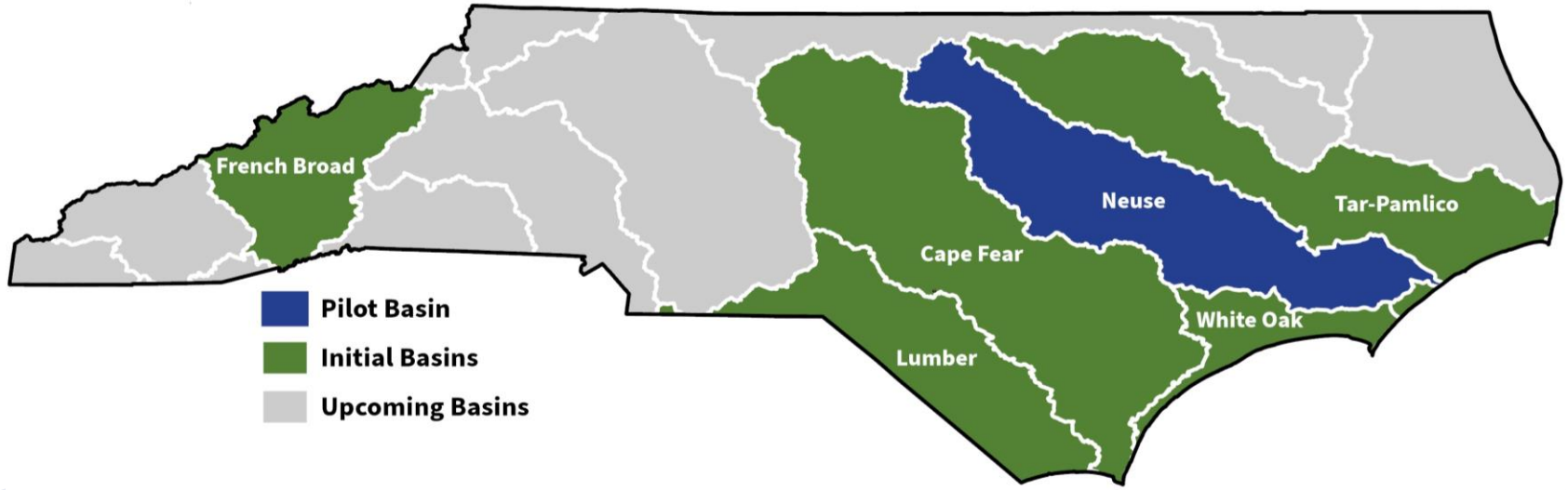
PHASE II - Tool Development and Model Improvement

- 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
- Mining Hazard Mitigation plans and other planning efforts
- Agricultural Pond Flood Storage pilot project with Dept. of Agriculture

Thank You! | Questions?