

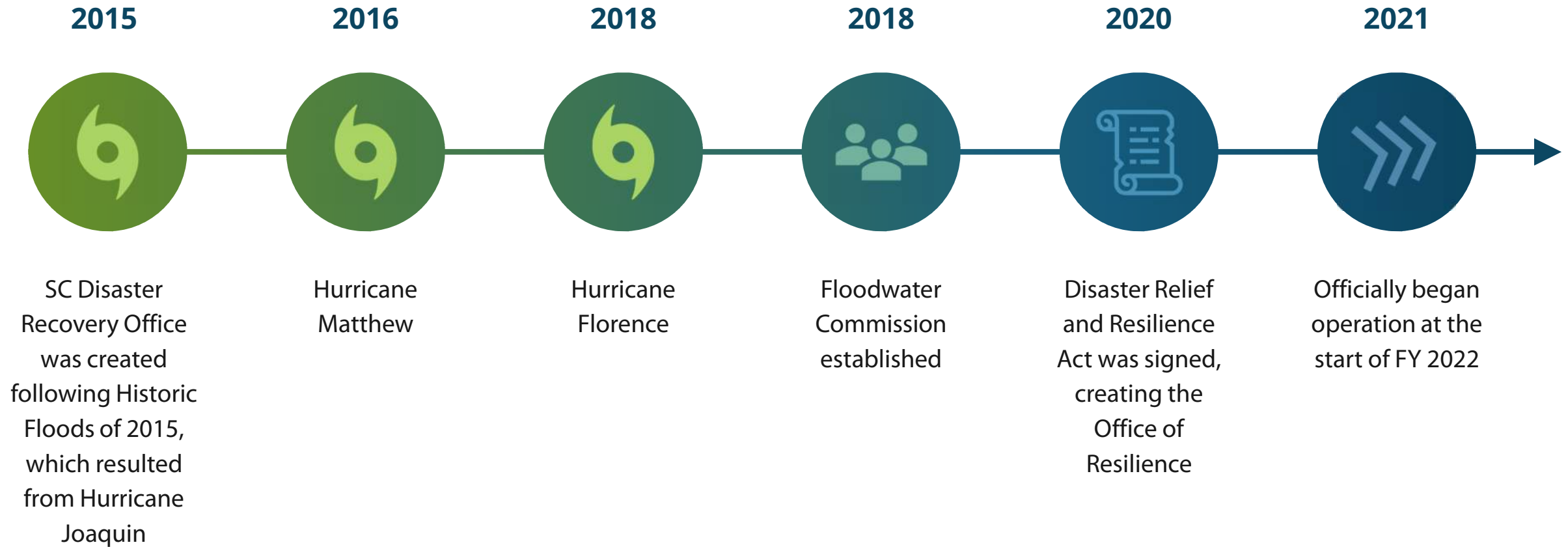
South Carolina Office of Resilience

Strategic Statewide Resilience & Risk Reduction Plan

January 2024



History



What is Resilience?

The ability of communities, economies, and ecosystems to anticipate, absorb, recover, and thrive when presented with environmental change and natural hazards.

What We Do

RESILIENCE

- Development and management of the Strategic Statewide Resilience & Risk Reduction Plan
- Management of the Disaster Relief and Resilience Reserve Fund and the SC Resilience Revolving Fund

MITIGATION

- **Buyouts:** Voluntary acquisitions of repetitively flooded land and property in order to return it to green space
- **Infrastructure:** Traditional “Gray” and Nature-based “Green” Infrastructure
- **Plans & Studies:** Funding for local governments and state agencies to develop and/or update hazard mitigation plans, stormwater plans, and more
- **Matching Grants:** Provide the local cost share for other federal flood mitigation programs

DISASTER RECOVERY

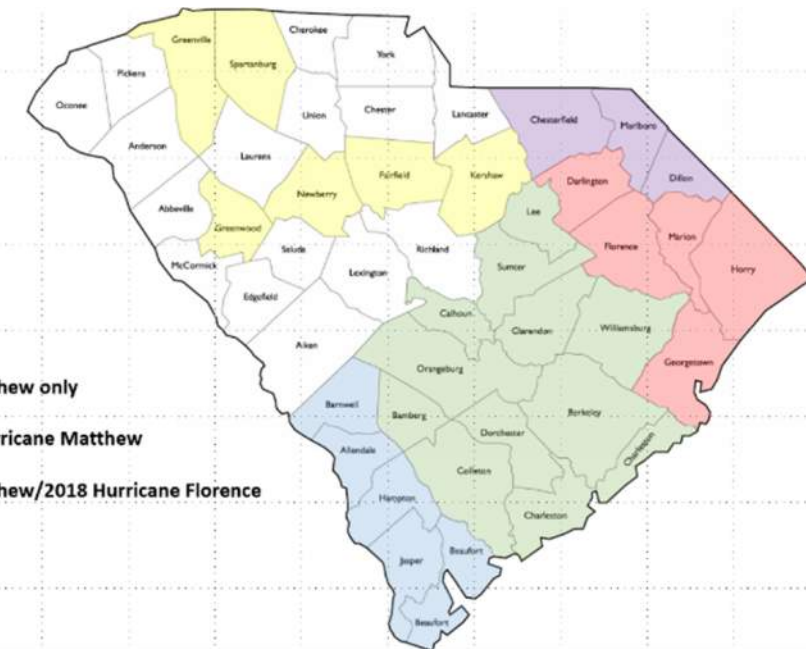
Long-term recovery: rebuild and replace homes damaged by hurricanes and flooding in FEMA-declared counties; funded by HUD CDBG-DR



Disaster Recovery

- Using HUD funds through a Community Development Block Grant-Disaster Recovery (CDBG-DR) grant, SCOR repairs, replaces or rebuilds homes impacted by hurricanes

- \$293M total federal HUD funding + \$10.5M from SC Housing Authority
- 3,400 homes total
- Grants are for 6 years
 - 2015 completed on time
 - 2016 scheduled to close on time
 - 2018 ahead of schedule to close

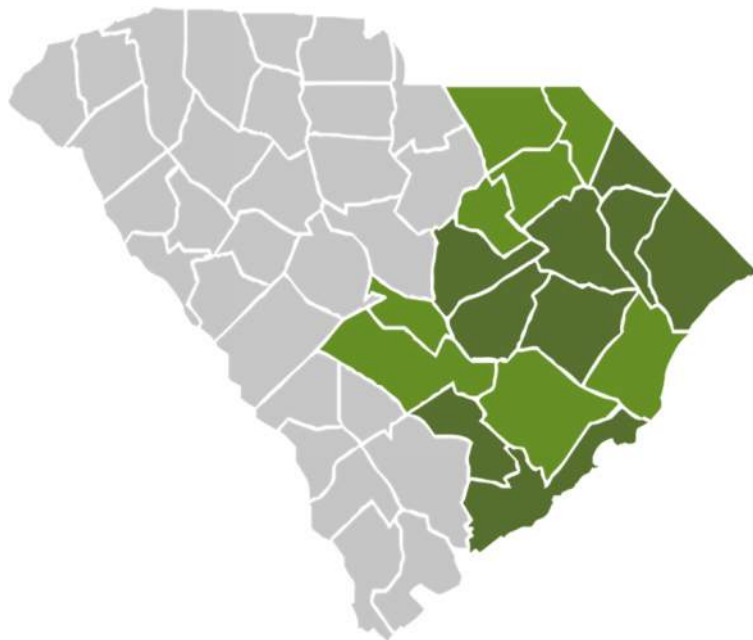


Mitigation: HUD CDBG-MIT

MITIGATION

\$162 million | 63% obligated

Expected completion NLT 2032



Available to 17 counties in SC:

Infrastructure

\$100 million allocated / \$62 million awarded
20 projects

Projects to reduce flooding – stormwater improvements, drainage tunnels, etc.

Phase I	Phase II
<ul style="list-style-type: none"> \$50M available Received \$113M in requests Awarded \$55M 	<ul style="list-style-type: none"> \$40M available Received \$91M in requests Award determination & notification: late 2023 or early 2024

55%

Plans & Studies

\$14 million allocated / \$6 million awarded
19 projects

Studies to assist communities in determining the cause of flooding in their area; assistance with or completion of various types of plans relating to flood mitigation. Plans and studies are meant to produce shovel-ready projects which can be submitted for funding under SCOR's Infrastructure program.

46%

Buyouts

\$37.5 million allocated / \$34 million awarded
6 projects

Acquisition of properties in the floodplain that have been repetitively flooded. The purpose of this program is to move citizens out of harm's way and return the land to green space so that the natural function of the floodplain is restored.

97%

Matching Grants

\$2.5 million allocated / \$2.5 million awarded
8 projects

Provides the local cost-share portion for various federal flood mitigation grants

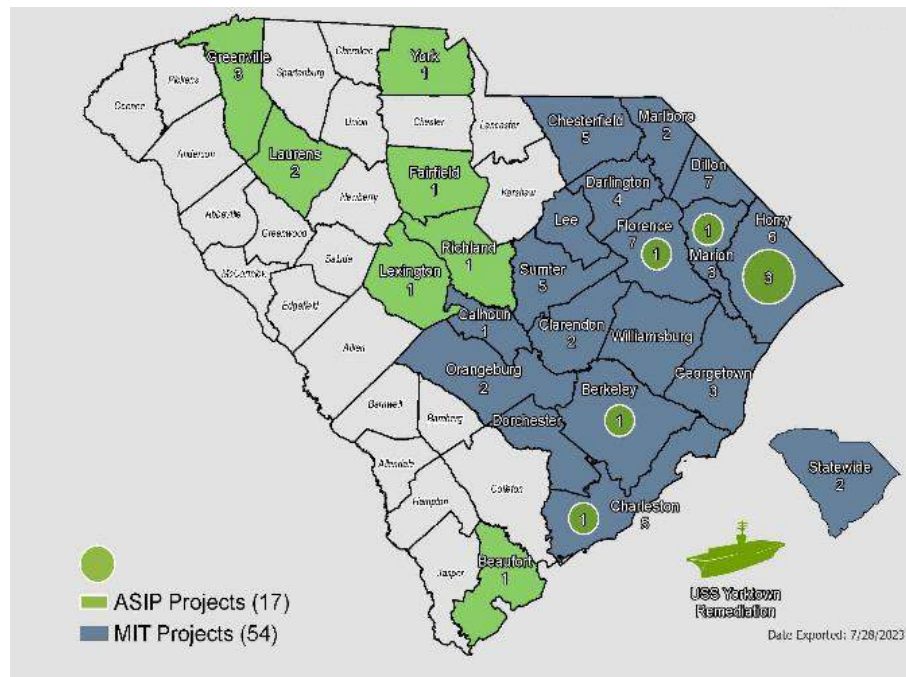
100%

Mitigation: American Rescue Plan Act Programs (ARPA)

\$100M Designated

ARPA Stormwater Infrastructure (ASIP)

- Available statewide – application period held Fall 2022
- \$55M Allocated
- 17 projects awarded for \$48.5M



USS Yorktown Remediation

- Pending JBRC approval
- \$40M available
- Estimated cost: \$26,710,016

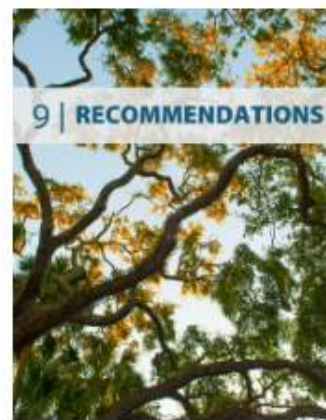
Phase I	Phase II
<ul style="list-style-type: none"> • Estimated \$10,710,016 • Environmental Study • Immediate hull repair and tank cleanup, necessary for environment remediation • Immediate repair contingency 	<ul style="list-style-type: none"> • Estimated \$16M • Cleanup of hazardous materials (fuel, PCBs, etc.) • Cleanup engineering oversight • Additional hull repair related to environmental remediation • Hull repair contingency



Strategic Statewide Resilience and Risk Reduction Plan

Resilience Planning

The South Carolina Office of Resilience is responsible for developing and implementing a **Strategic Statewide Resilience and Risk Reduction Plan** (Resilience Plan). The Plan identifies major flood risks around the state and potential losses that could occur as a result of extreme weather events. The Plan provides strategies for local governments to implement resilience into their communities in order to mitigate potential flood risks.



Legislative Guidance

- The Act stated that the plan should be developed with the principles recommended in the South Carolina Floodwater Commission Report.
- Intended to serve as a framework to guide state investment in flood mitigation projects. adopts programs and policies to protect the people and property of South Carolina from damage and destruction of extreme weather events.
- The Act directed that the initial version of the plan be completed by July 1, 2022. *
(Extended to July 1, 2023)

Floodwater Commission Principles

- Flood management plans and actions should be based on watershed boundaries, recognizing that water flows and floods do not follow jurisdictional or political lines.
- Decisions and actions should be based on high-quality, shared and integrated hydrologic and hydrographic models that are derived from increased data collection; the data and models should be transparent and freely accessible to all stakeholders.
- Building the capacity of local governments to develop science-based and actionable flood management plans and hazard mitigation plans should be a priority, especially for under-resourced communities. It does little good for one local jurisdiction to have high-quality plans if the upstream jurisdiction does not.
- Success will depend on collaboration. Collaboration must take place between state agencies to bridge boundaries, as well as between the state and local governments. Collaboration is essential to build trust among all stakeholders, which leads to partnerships, coordination and more effective programs. Collaboration should also be explicitly encouraged with key federal agencies (i.e. US Army Corps of Engineers, US Geological Survey, NOAA).

Floodwater Commission Principles

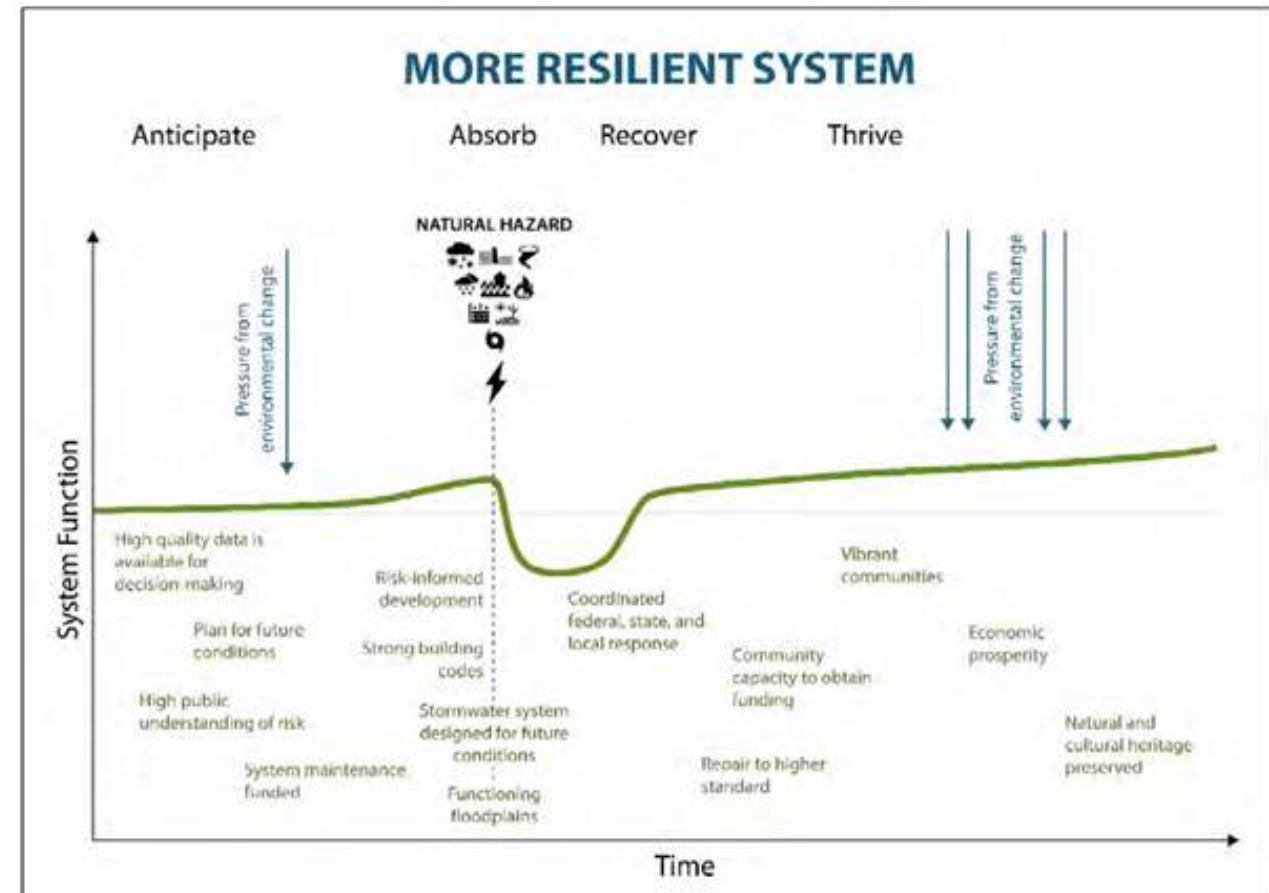
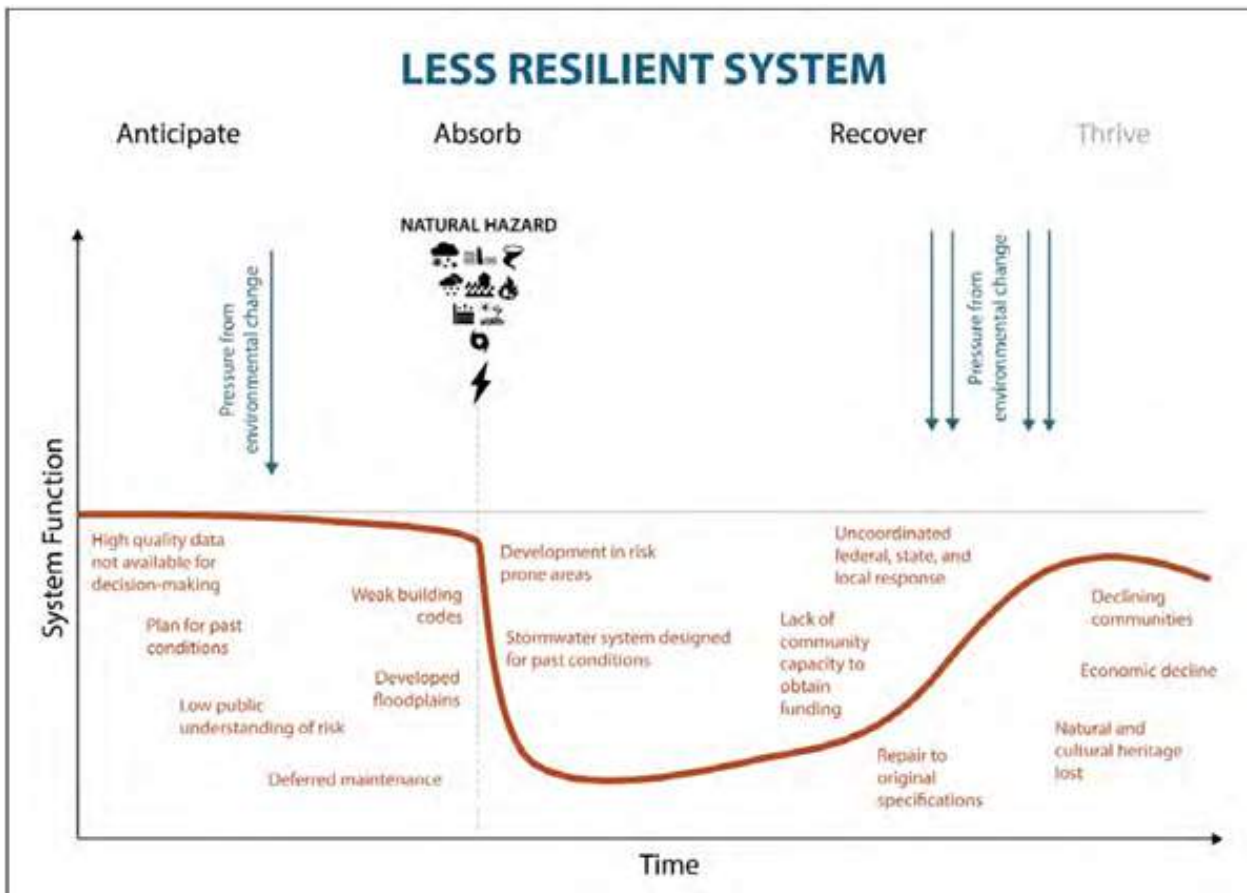
- Ongoing opportunities for public participation and education should be developed to encourage collaboration and build trust.
- Flood management programs should recognize the beneficial functions of natural floodplains, salt marshes, beach dunes, forests, living shorelines and other natural features to reduce flood risk, as well as the co-benefits they deliver for recreation, forestry, tourism, fisheries, and wildlife. “Nature-based solutions” should be considered included in the design of flood control projects whenever possible in order to increase resilience and be cost-effectiveness.
- Post-disaster funding coming to South Carolina from congressional appropriations should be managed in a unified state plan as much as federal rules and guidelines will permit, and coordinated across the multiple sources (i.e. FEMA, HUD).

Resilience Planning Assumptions

- The plan will not try to provide solutions to prevent changes to the climate but will offer recommendations for how the state may minimize the impacts that are expected to occur.
- Resilience Planning utilizes an adaptive management approach so that it can adjust to changing conditions and integrate new data sources as they become available.
- Initial Plan recommendations focuses flooding.
 - Other extreme weather events /disasters to be addressed in more detail in subsequent versions of the plan

Resilience Definition

The ability of communities, economies, and ecosystems within South Carolina to anticipate, absorb, recover, and thrive when presented with environmental change and natural hazards.

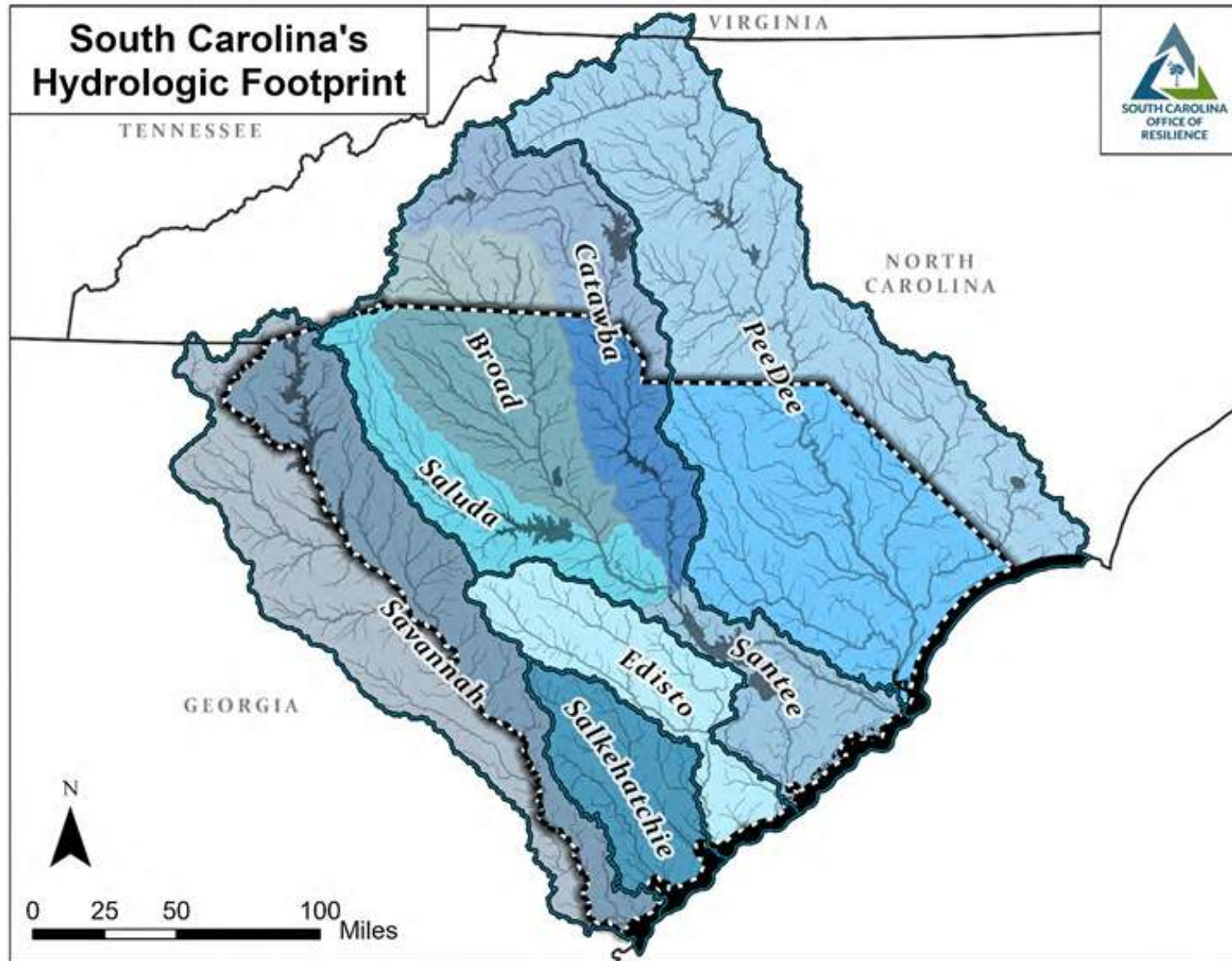




Strategic Statewide Resilience and Risk Reduction Plan

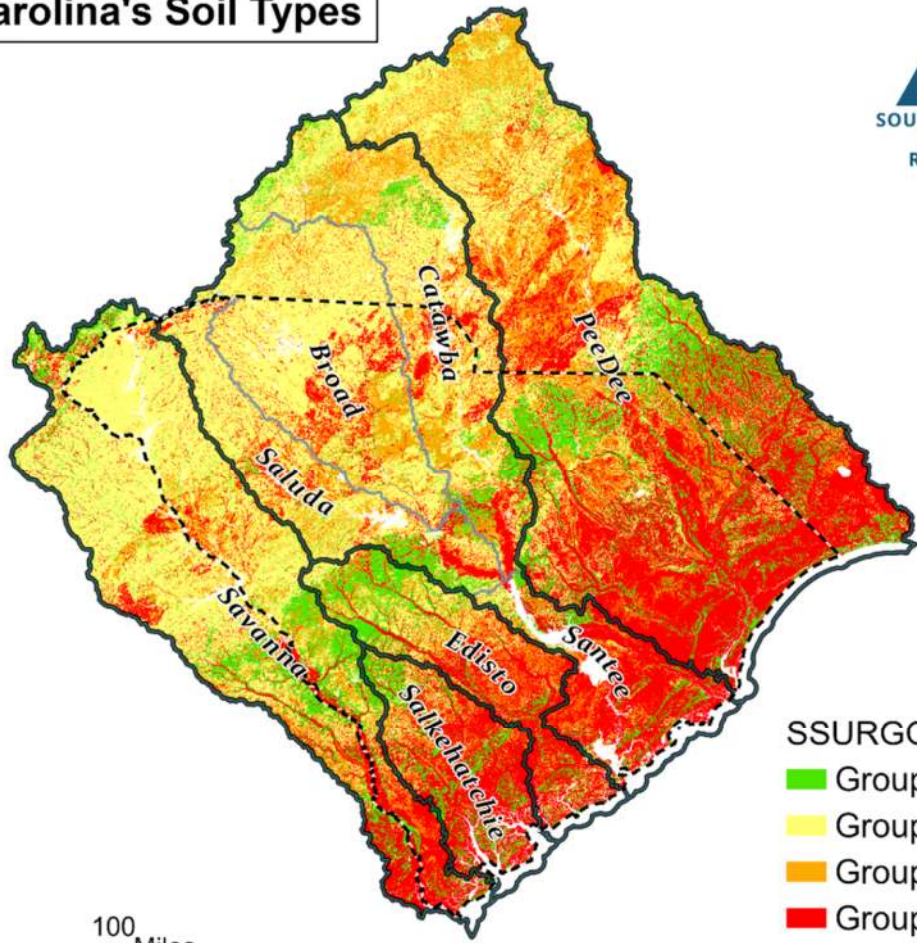
3 | PLANNING CONDITIONS

Planning Scale



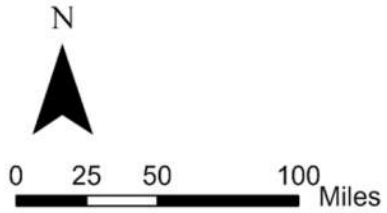
Water
doesn't
follow
political
boundaries.

South Carolina's Soil Types



SSURGO Soil Class

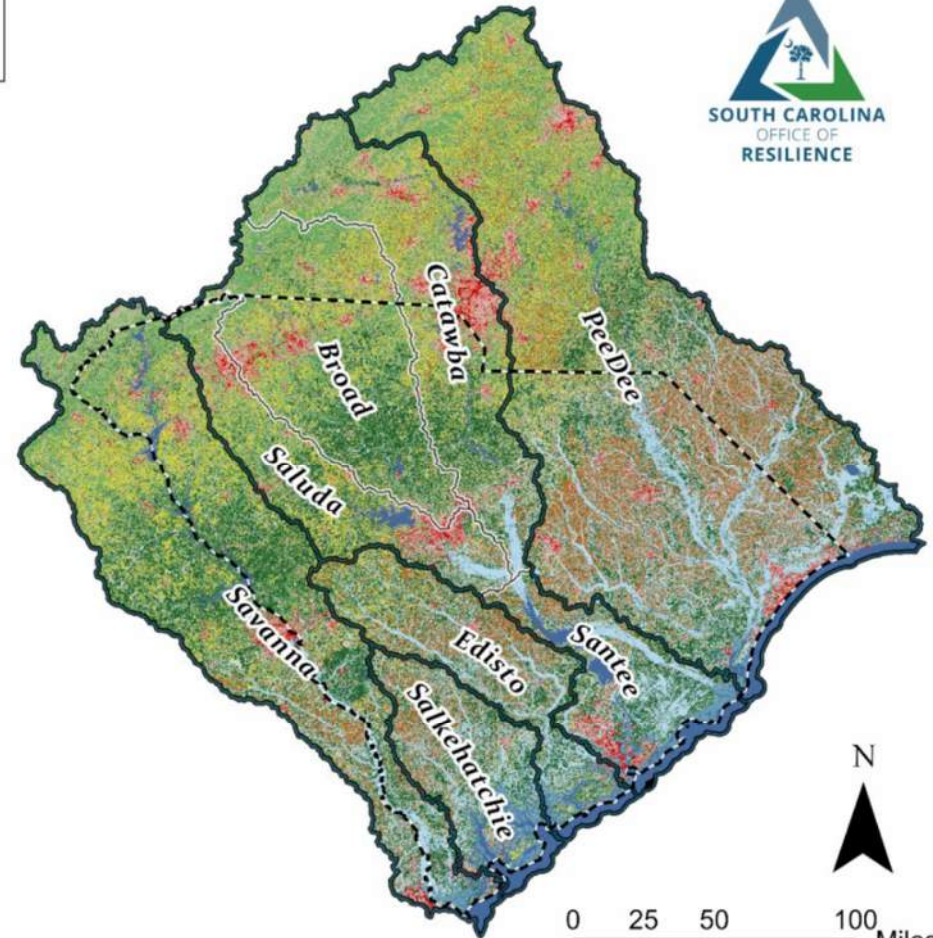
- Group A
- Group B
- Group C
- Group D



South Carolina's Land Cover

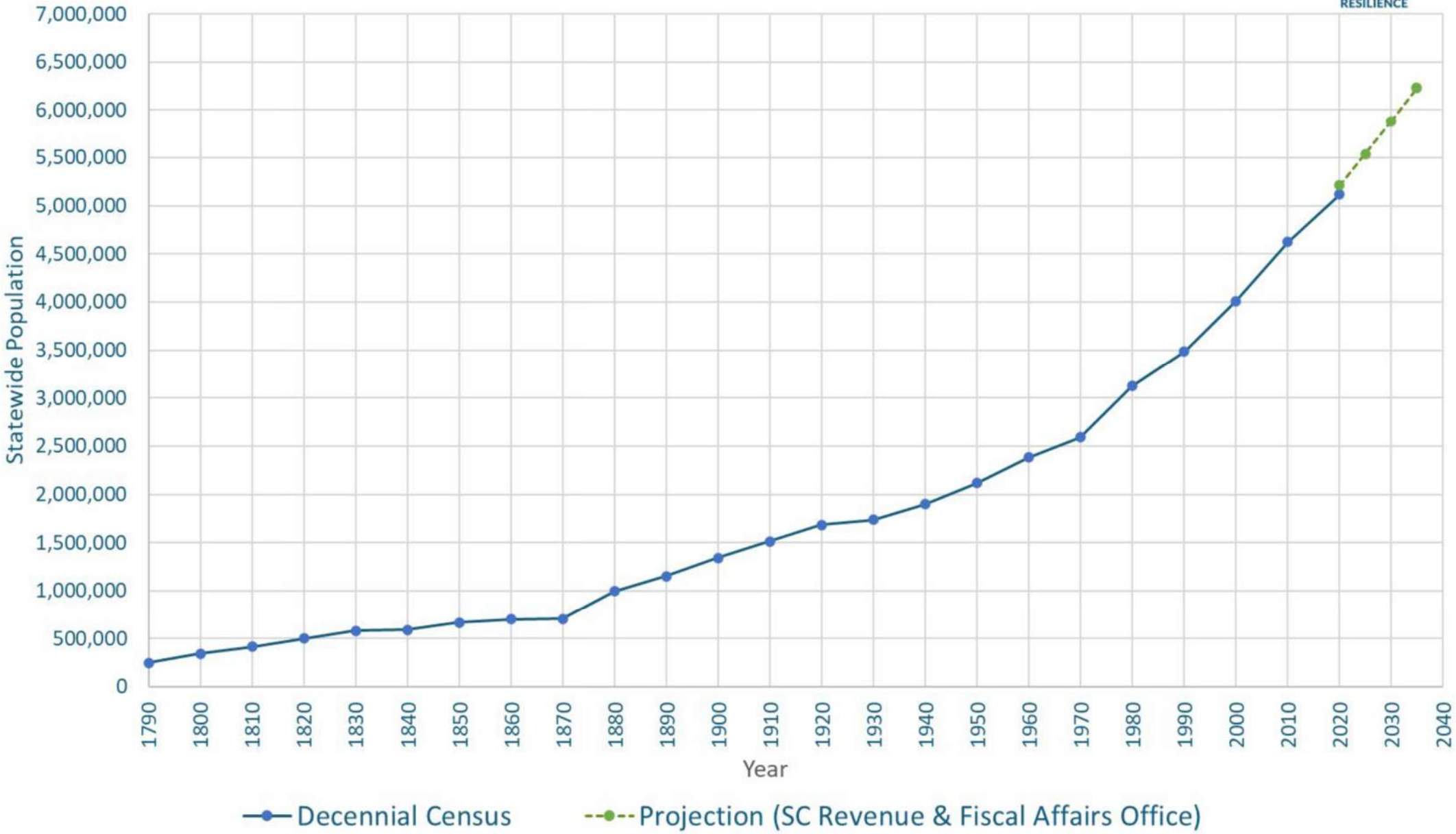


- Open Water
- Developed, Open
- Developed, Low
- Developed, Med
- Developed, High
- Barren
- Deciduous
- Evergreen
- Mixed Forest
- Shrub
- Grassland
- Hay
- Cultivated
- Woody Wetlands
- Herb. Wetlands

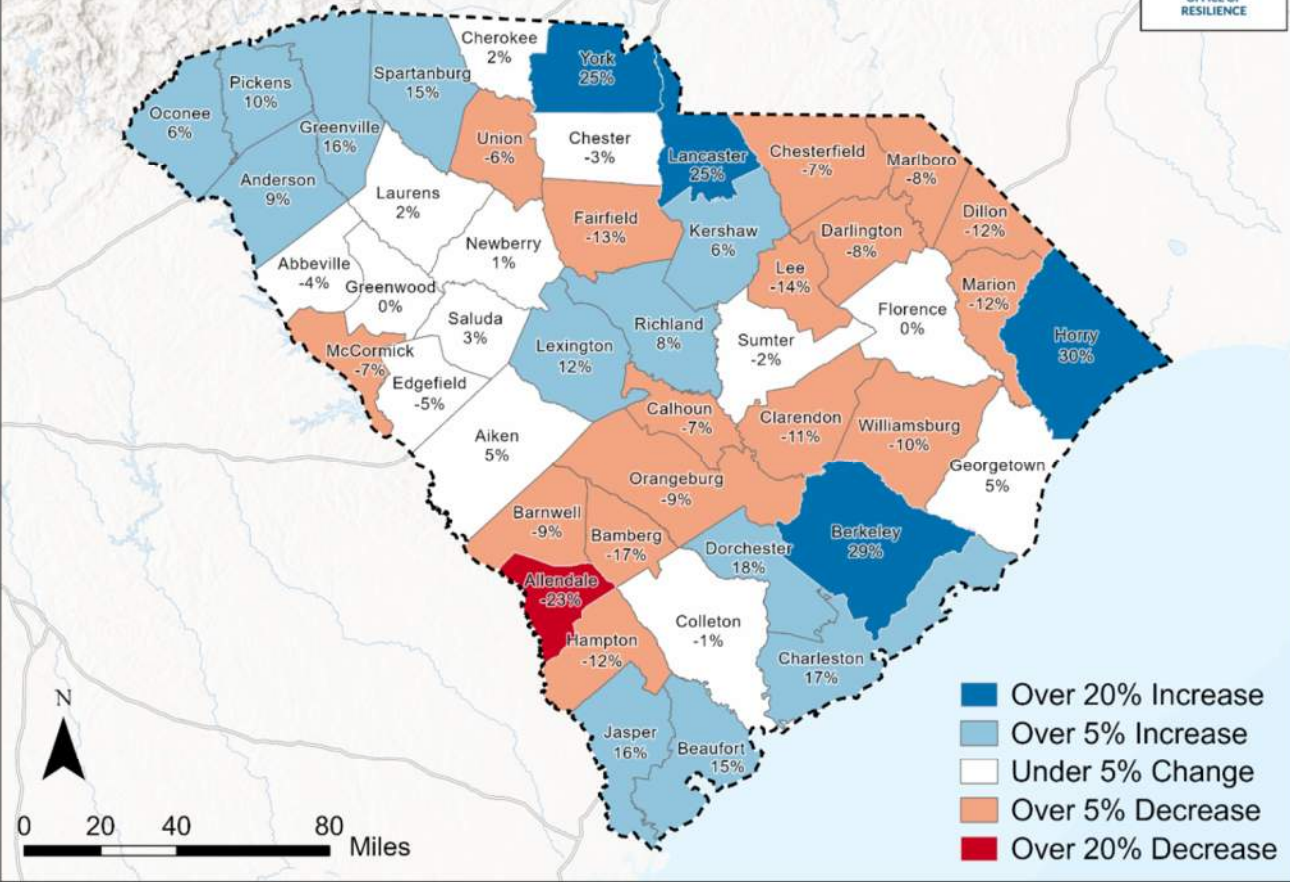


South Carolina Population

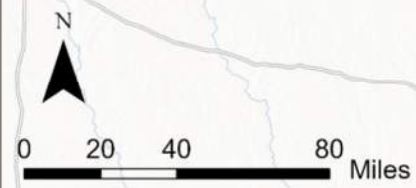
1790-2035



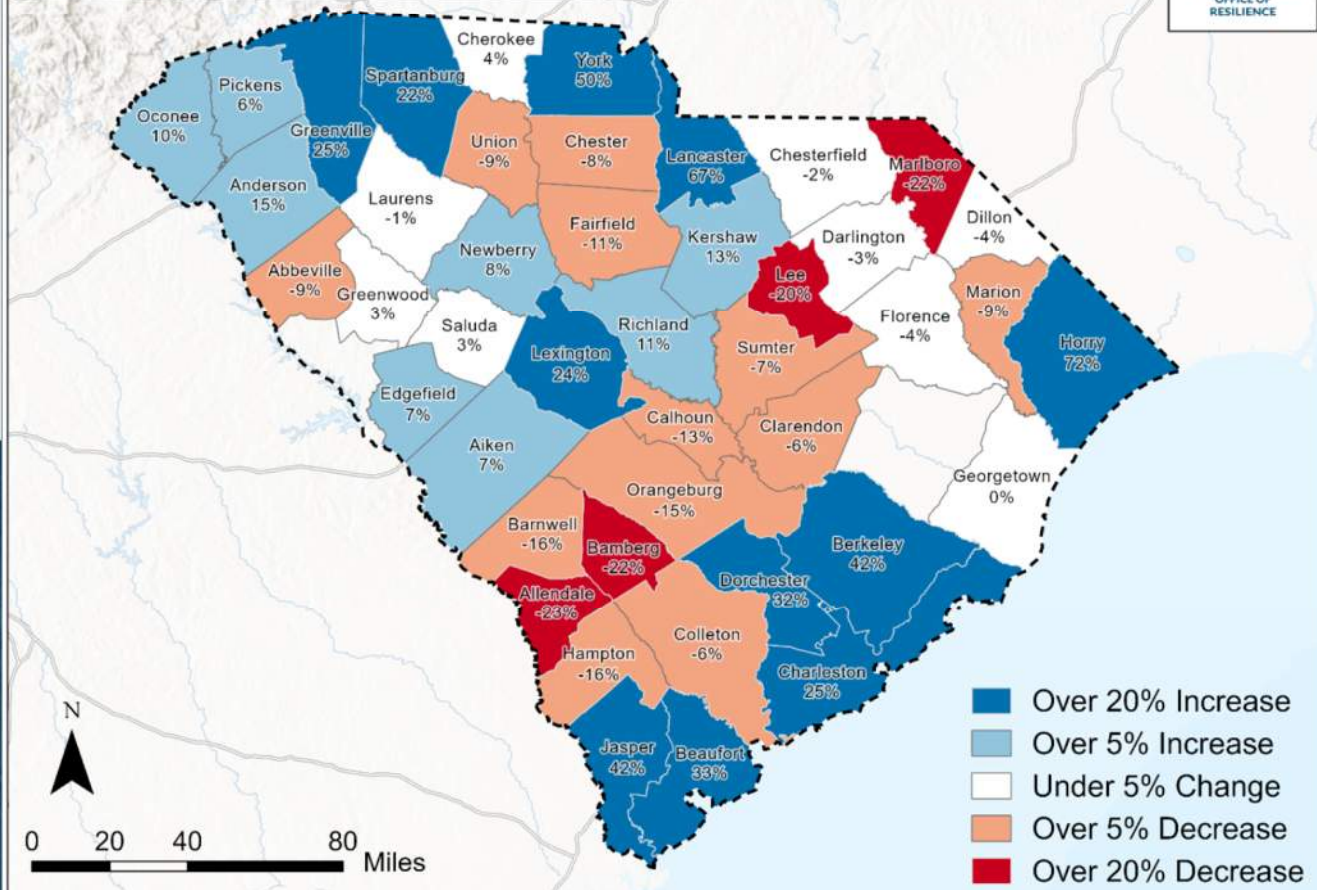
County Population Trends 2010 - 2020



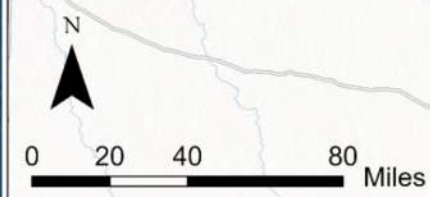
- Over 20% Increase
- Over 5% Increase
- Under 5% Change
- Over 5% Decrease
- Over 20% Decrease



County Population Projections 2020 - 2035



- Over 20% Increase
- Over 5% Increase
- Under 5% Change
- Over 5% Decrease
- Over 20% Decrease



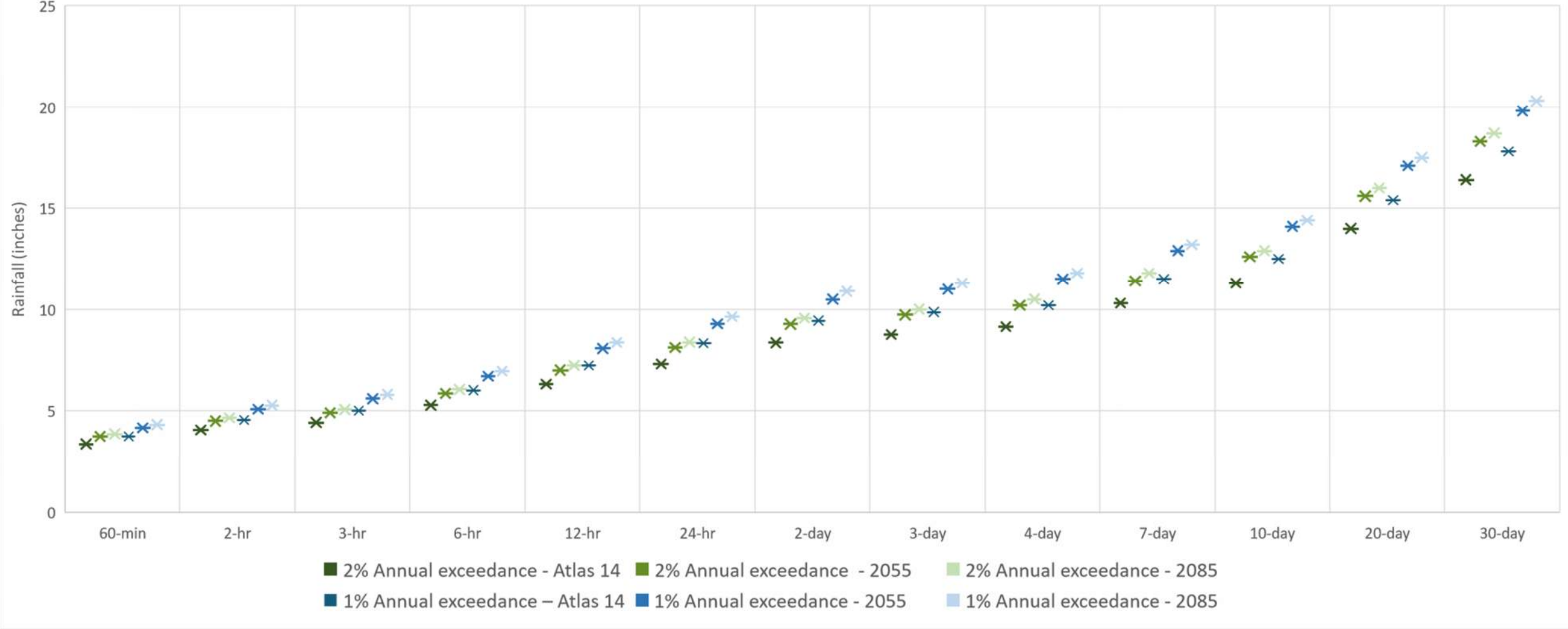
Strategic Statewide Resilience and Risk Reduction Plan

4 | CLIMATE TRENDS



SC Precipitation Projections

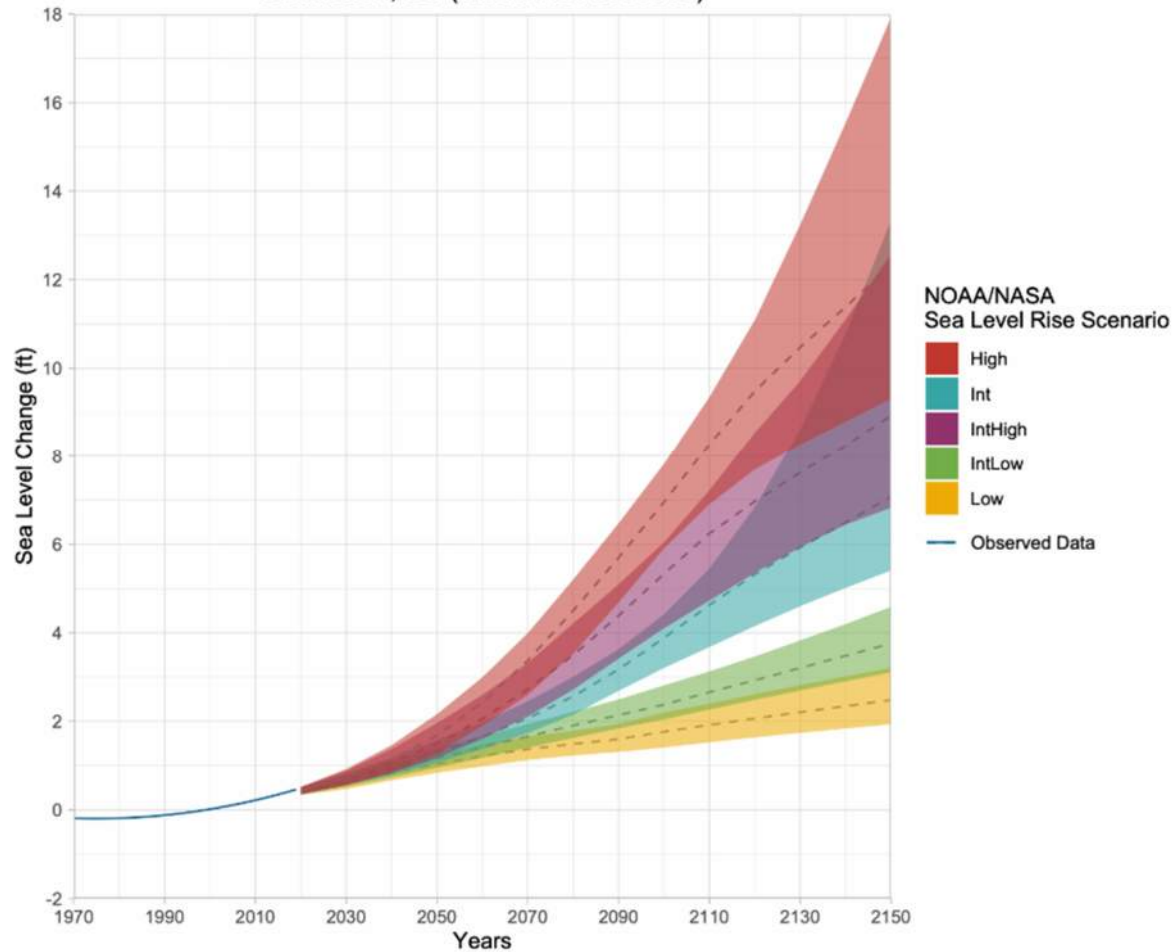
Rainfall Runoff Curve, Columbia, SC - RPC 4.5



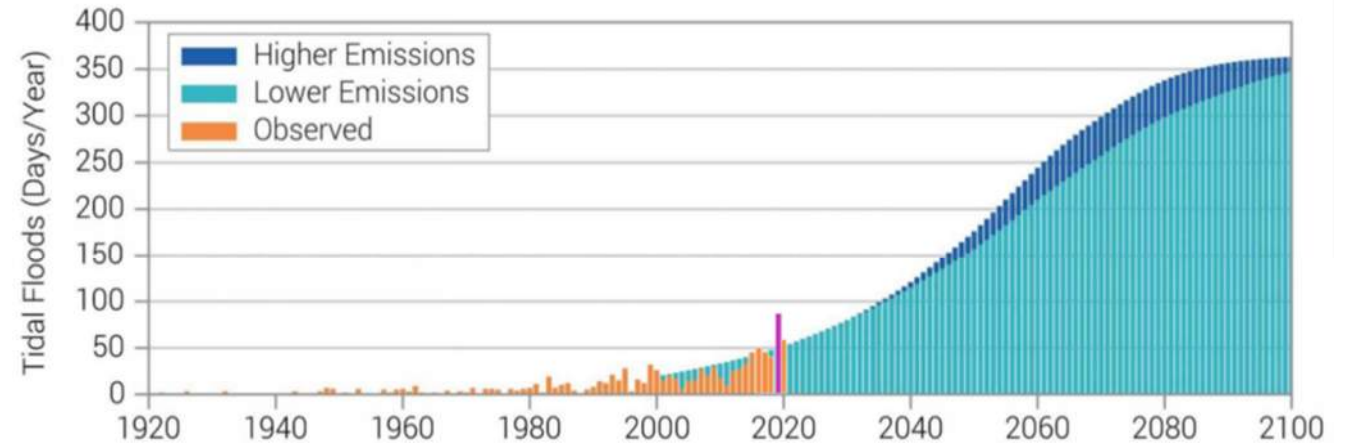
Source: Strategic Environmental Research and Development Program (SERDP/Department of Defense)

Sea Level Rise Projections

Interagency Sea Level Rise Projections
Charleston, SC (Station ID: 8665530)

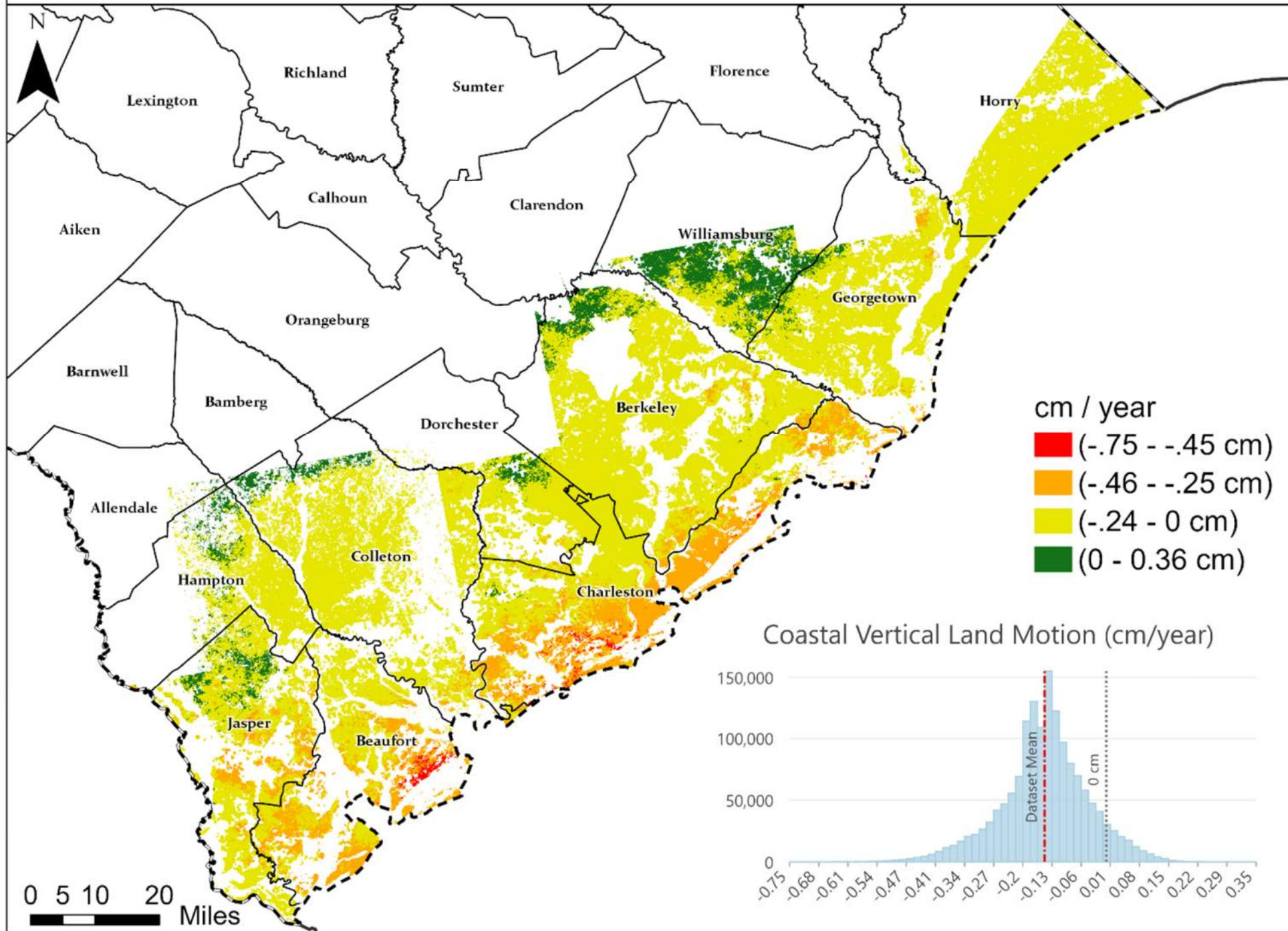


Observed and Projected Annual Number of Tidal Floods for Charleston, SC



Source: [NCA State Summaries](#), [NOS/ NOAA](#)

Coastal Vertical Land Motion Rate- USGS 2007-2021



Strategic Statewide Resilience and Risk Reduction Plan

5 | FLOOD RISK AND VULNERABILITY ASSESSMENT



Flood Frequency

House 1 is in the
500-year floodplain

0.2% chance of flooding
in a single year

6% chance of flooding
over a 30-year mortgage



House 2 is in the
100-year floodplain

1% chance of flooding
in a single year

26% chance of flooding
over a 30-year mortgage



House 3 is in the
10-year floodplain

10% chance of flooding
in a single year

95% chance of flooding
over a 30-year mortgage



0.2% annual chance (500-year flood)

1% annual chance (100-year flood)

10% annual chance (10-year flood)



Surface Water & Flash Flooding

(PLUVIAL)

Pluvial flooding occurs when an extreme rainfall event takes place in an area where there is inadequate drainage for that particular amount of rainfall. This type of flooding is not associated with a body of water. Flash flooding occurs due to intense, high velocity rain events and is worsened by inadequate drainage.



River Flooding

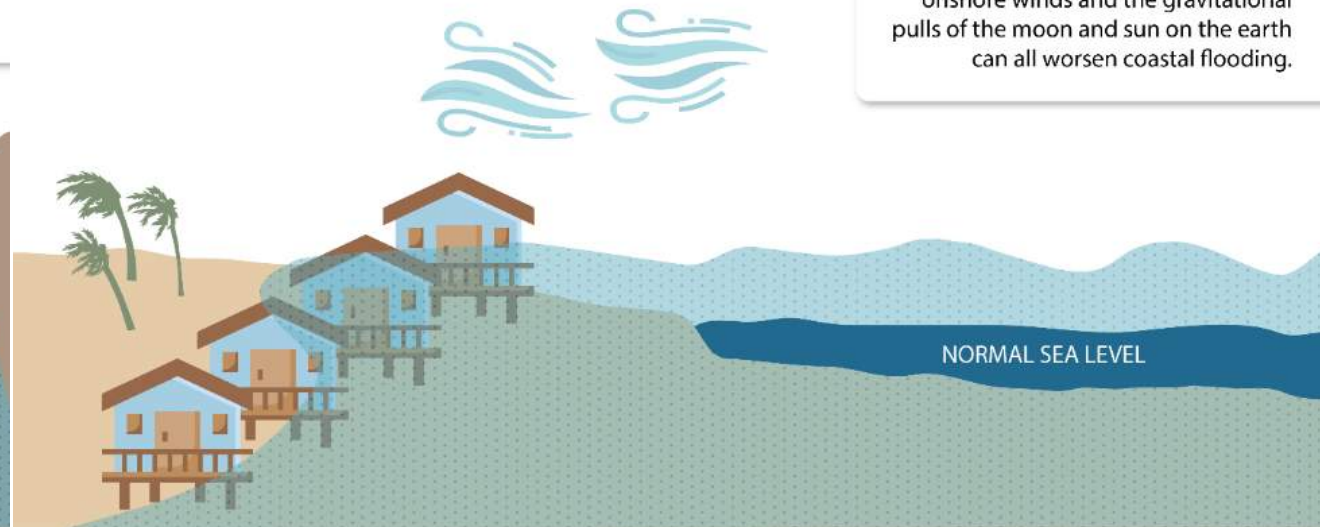
(FLUVIAL)

Fluvial flooding, or river flooding, occurs when the water level of the river overtops its banks or natural levees due to excess precipitation. This type of flooding can be devastating because it can occur in a different location than where the precipitation occurred.

Coastal Flooding

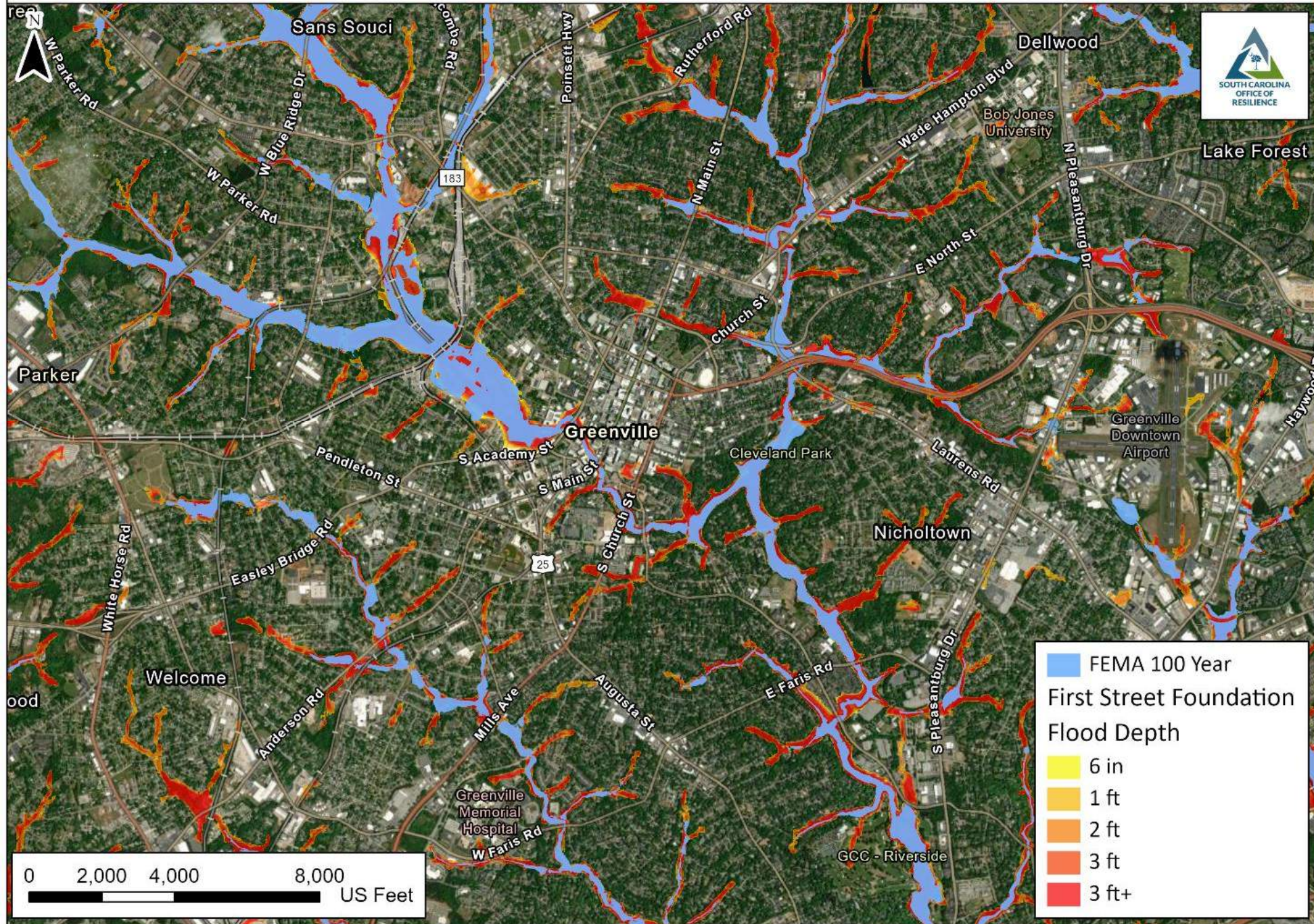
DUE TO STORM SURGE OR TIDES

Coastal flooding can be caused by storm surge, high tides, and sea level rise. Compound riverine flooding, onshore winds and the gravitational pulls of the moon and sun on the earth can all worsen coastal flooding.



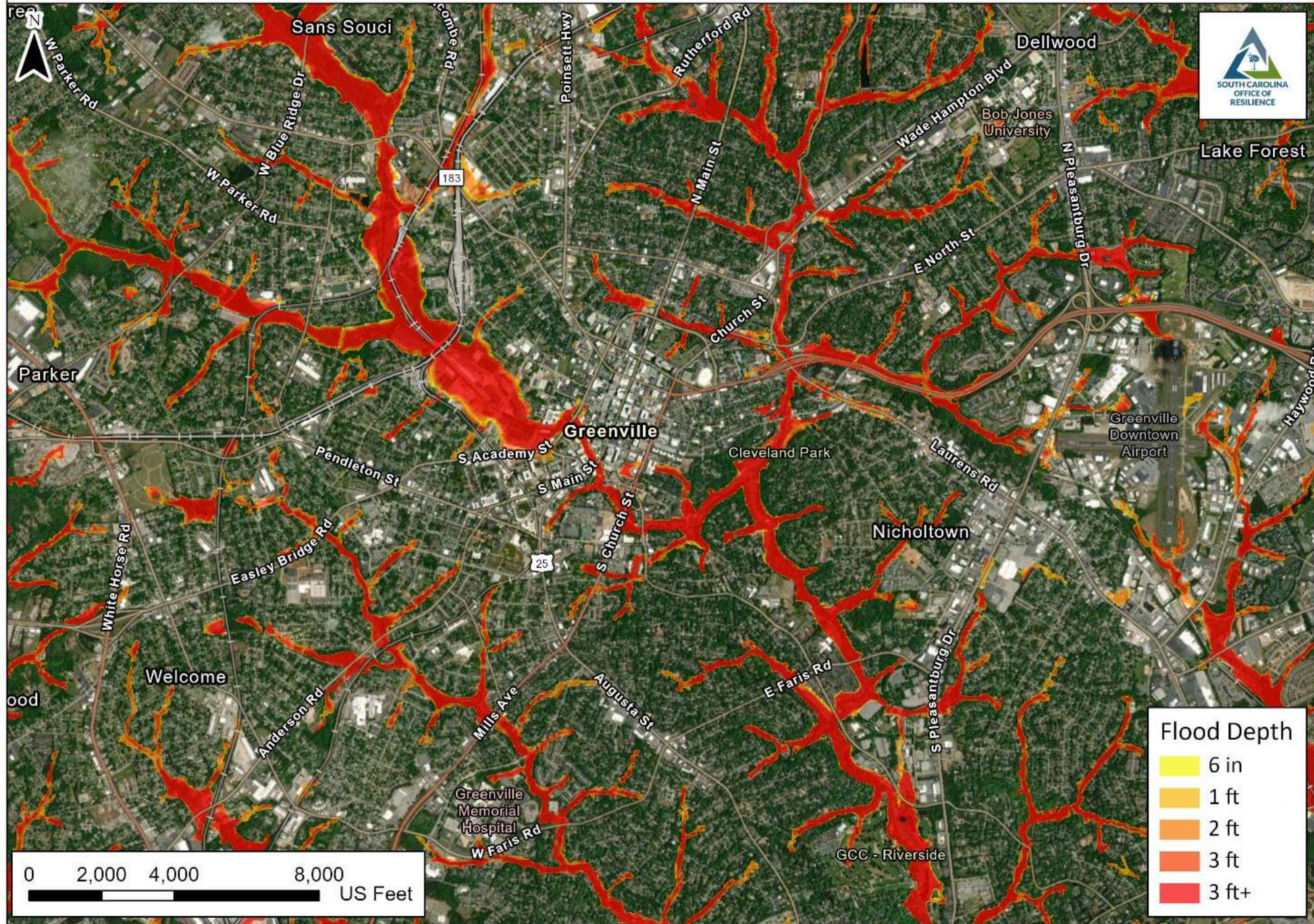
First Street Foundation Flood Model

2022 - 1% Annual Chance Flood Event (100 Year)



First Street Foundation Flood Model

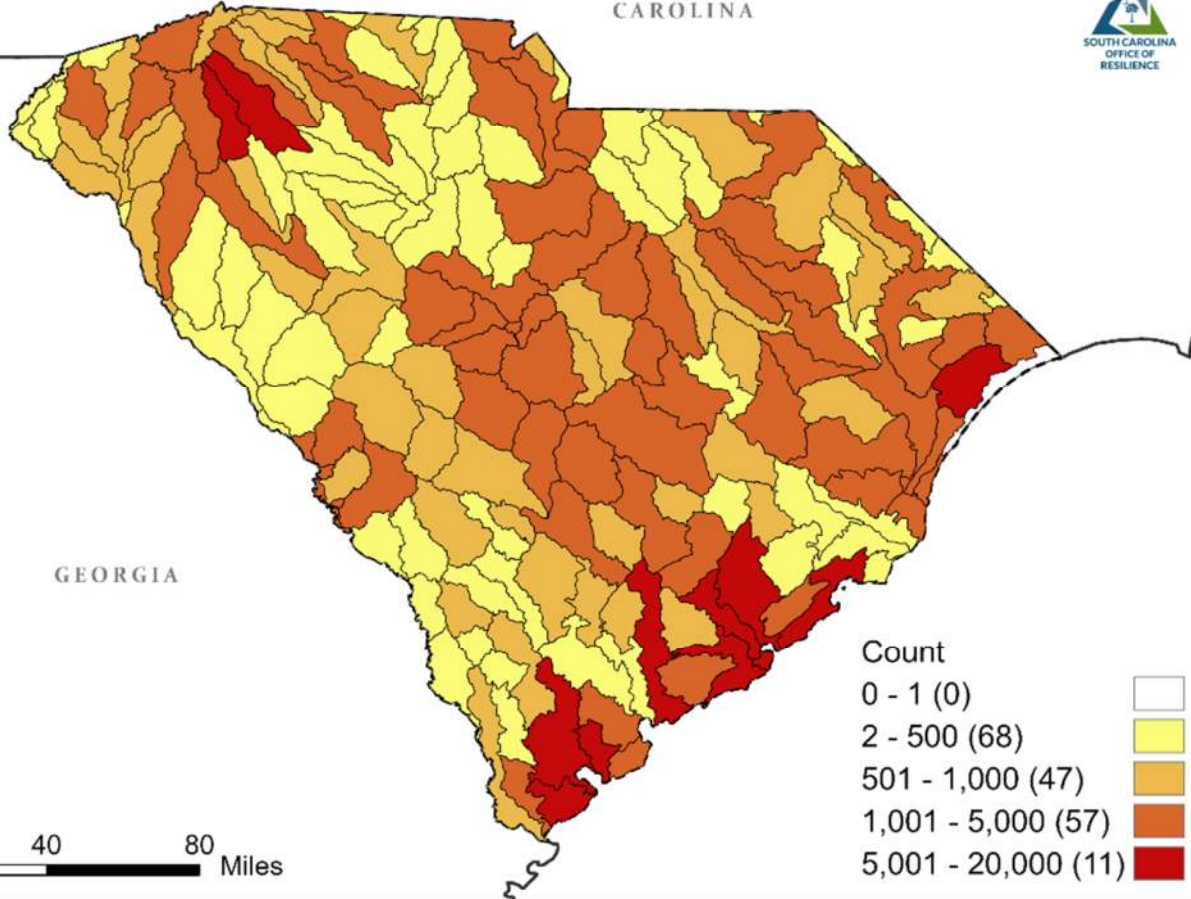
2022 - 0.2% Annual Chance Flood Event (500 Year)



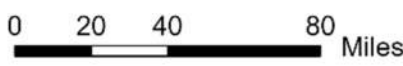
Parcel Count by HUC10 - Inundation Greater than 6 inches

2022 - 1% Annual Chance Flooding Event

NORTH CAROLINA



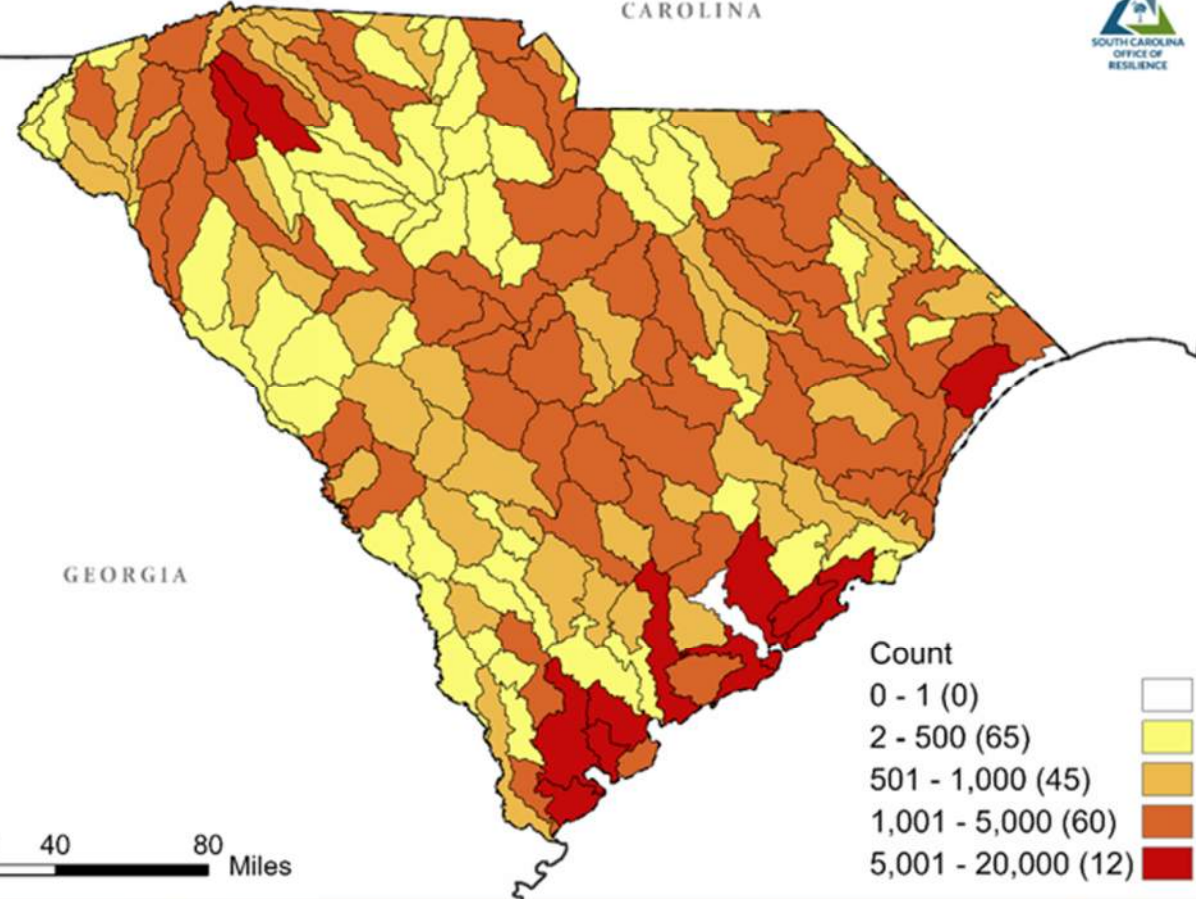
GEORGIA



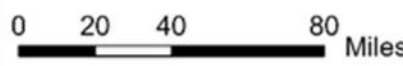
Parcel Count by HUC10 - Inundation Greater than 6 inches

2052 - 1% Annual Chance Flooding Event

NORTH CAROLINA



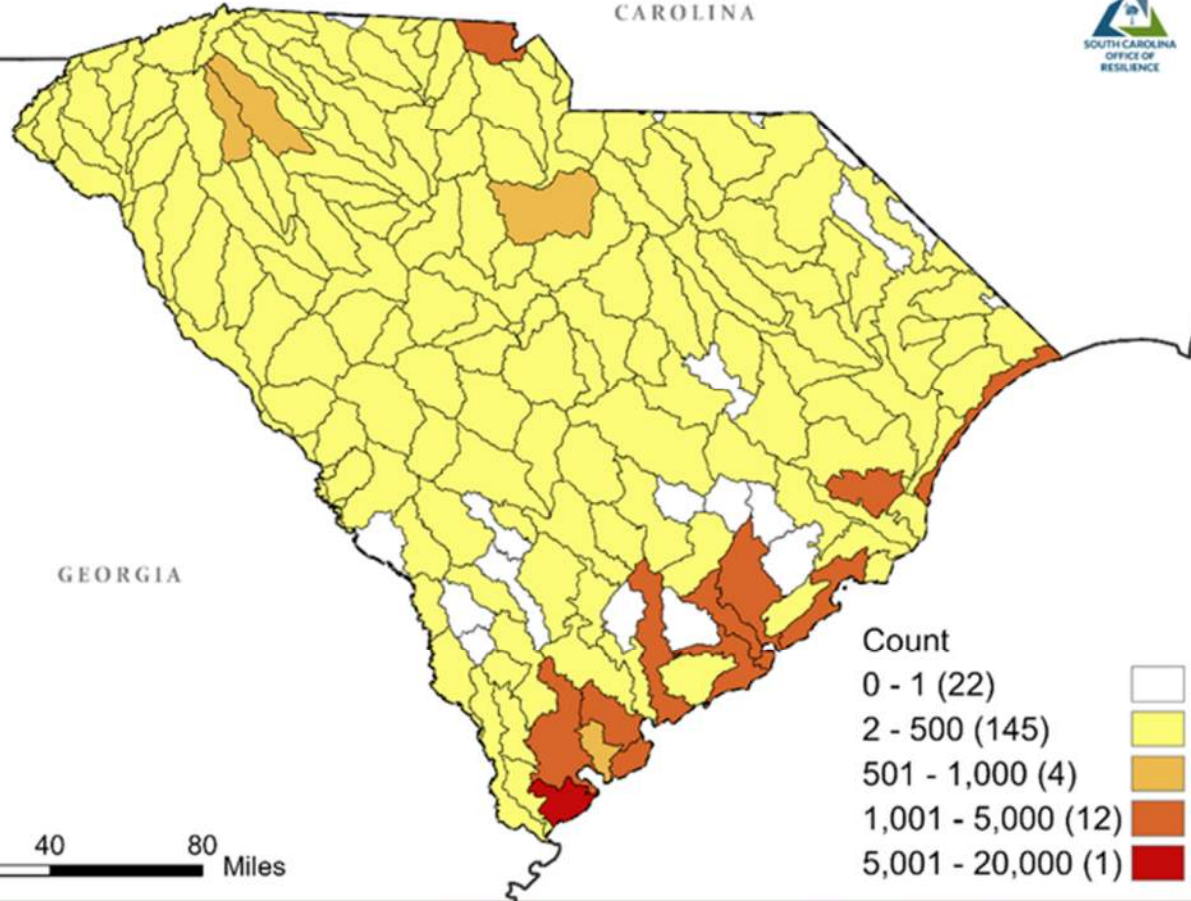
GEORGIA



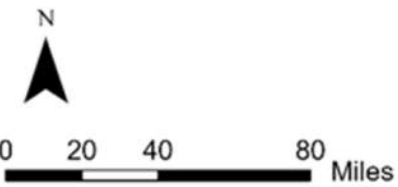
Parcel Count by HUC10 - Inundation Greater than 6 feet

2022 - 1% Annual Chance Flooding Event

NORTH CAROLINA



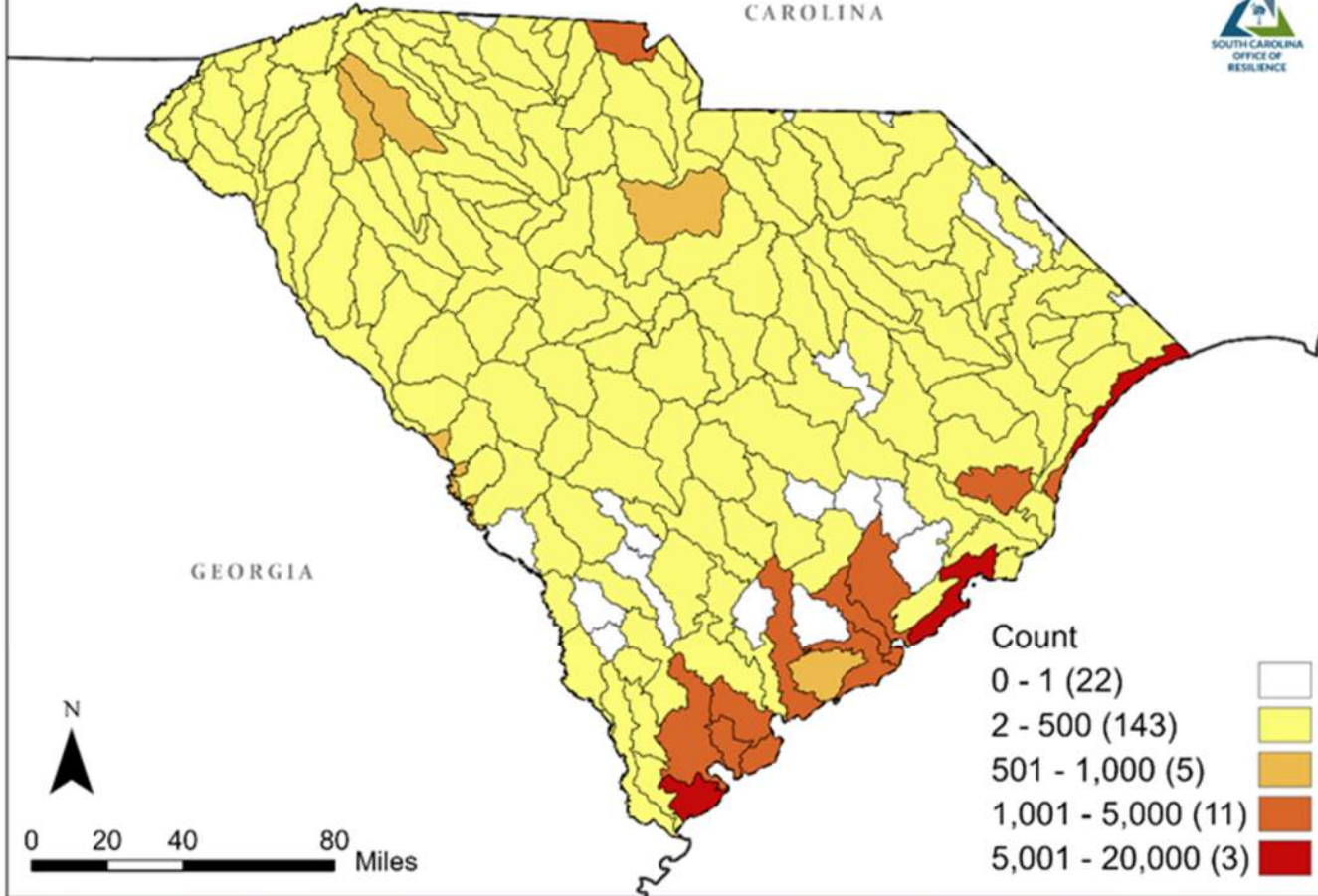
GEORGIA



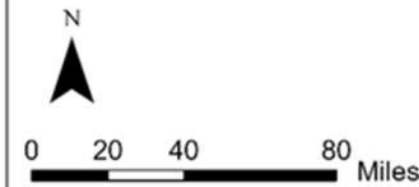
Parcel Count by HUC10 - Inundation Greater than 6 feet

2052 - 1% Annual Chance Flooding Event

NORTH CAROLINA

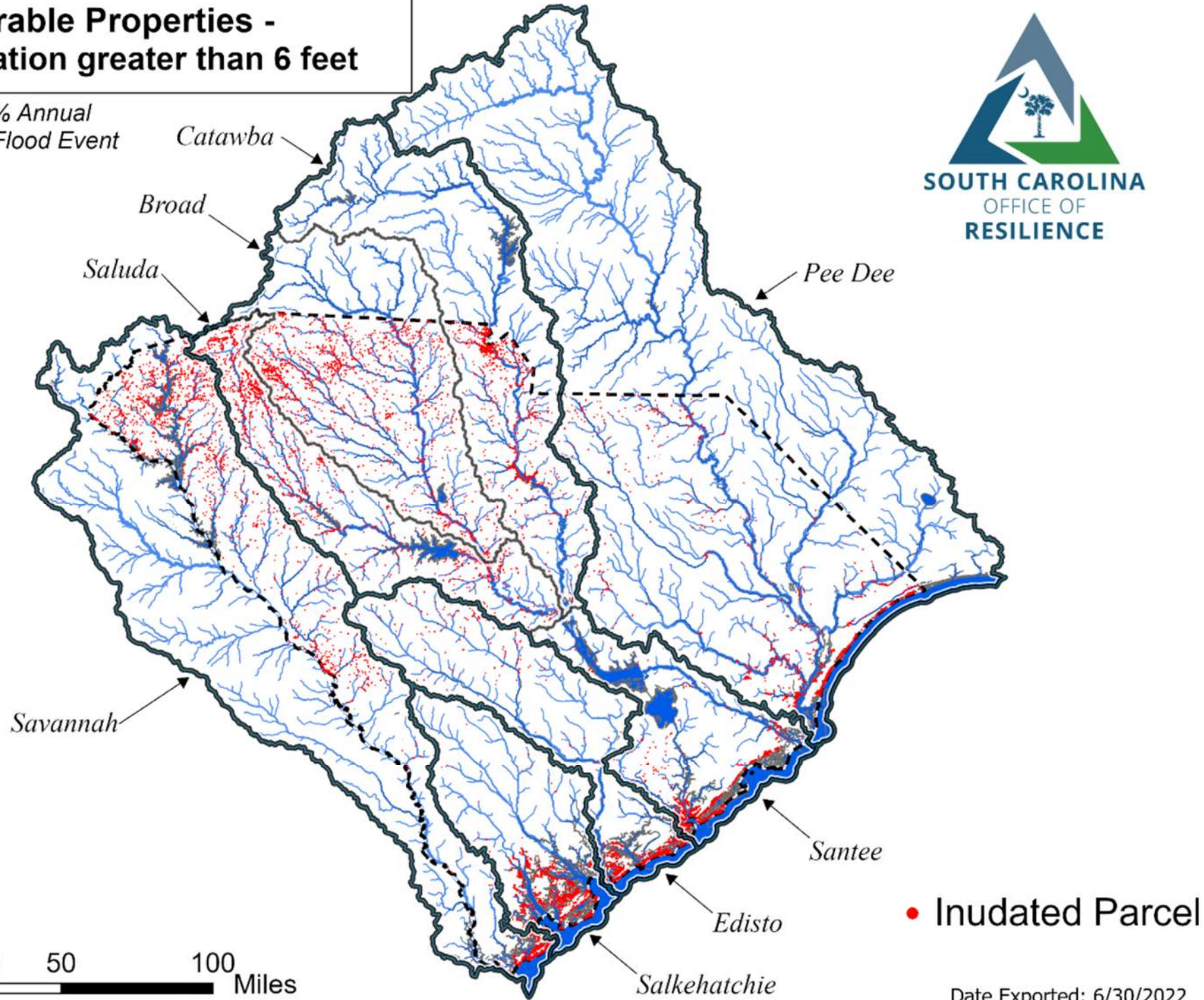


GEORGIA



Vulnerable Properties - Inundation greater than 6 feet

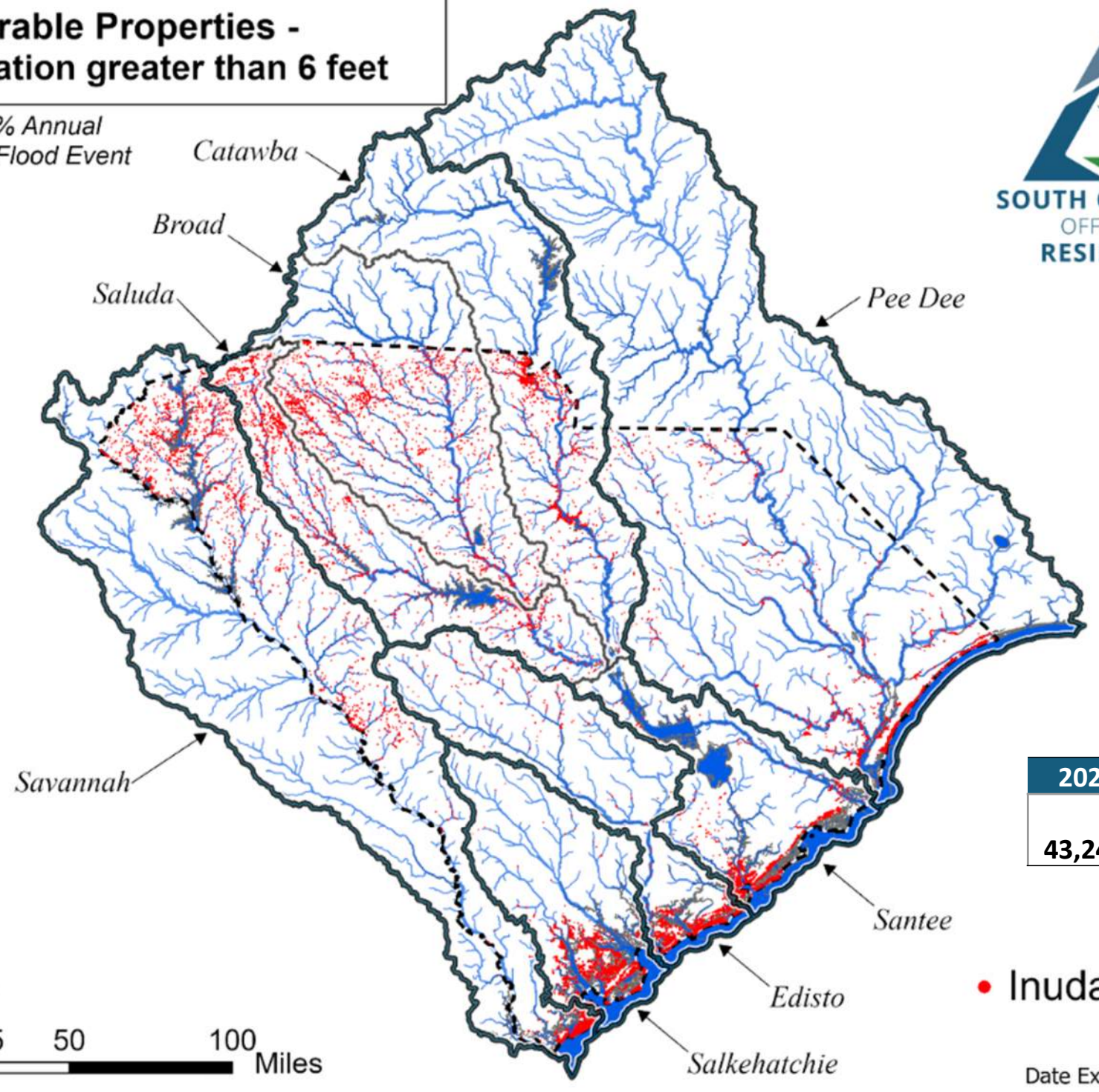
2022 - 1% Annual
Chance Flood Event



Date Exported: 6/30/2022

Vulnerable Properties - Inundation greater than 6 feet

2052 - 1% Annual
Chance Flood Event



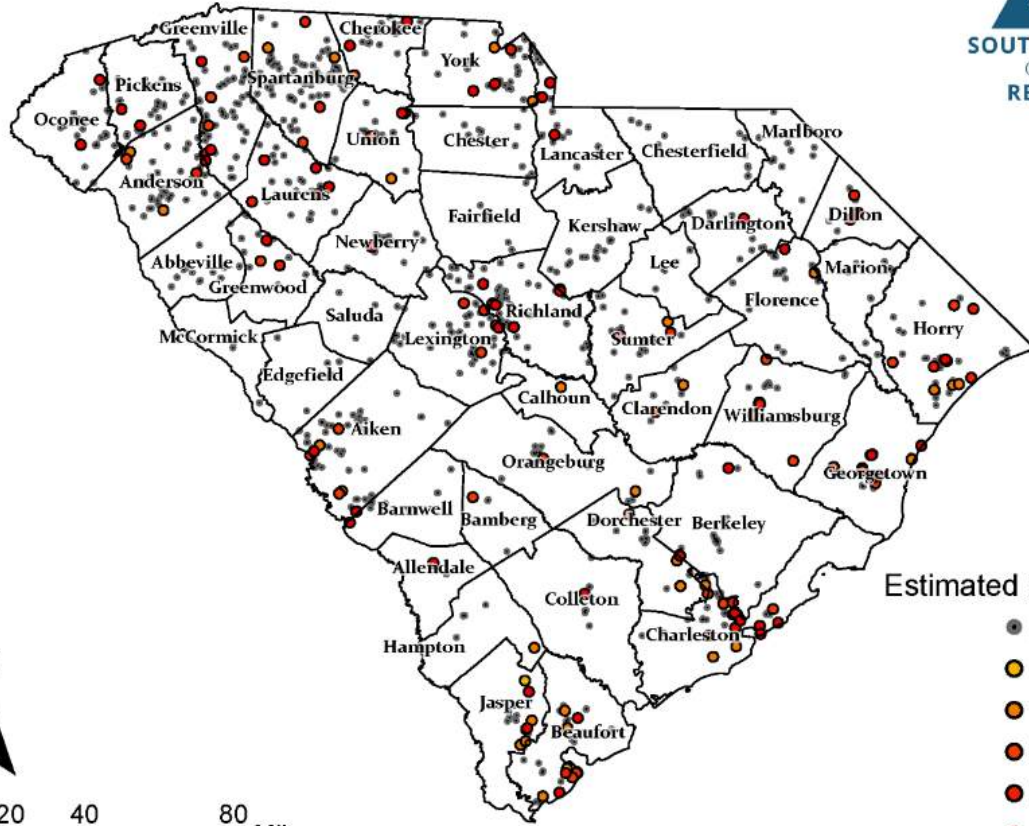
2022	2052
43,246	63,762

● Inudated Parcel

Date Exported: 6/30/2022

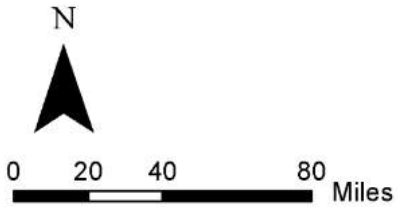
Solid Waste Facilities

2022 - 1% Annual Chance Flooding Event



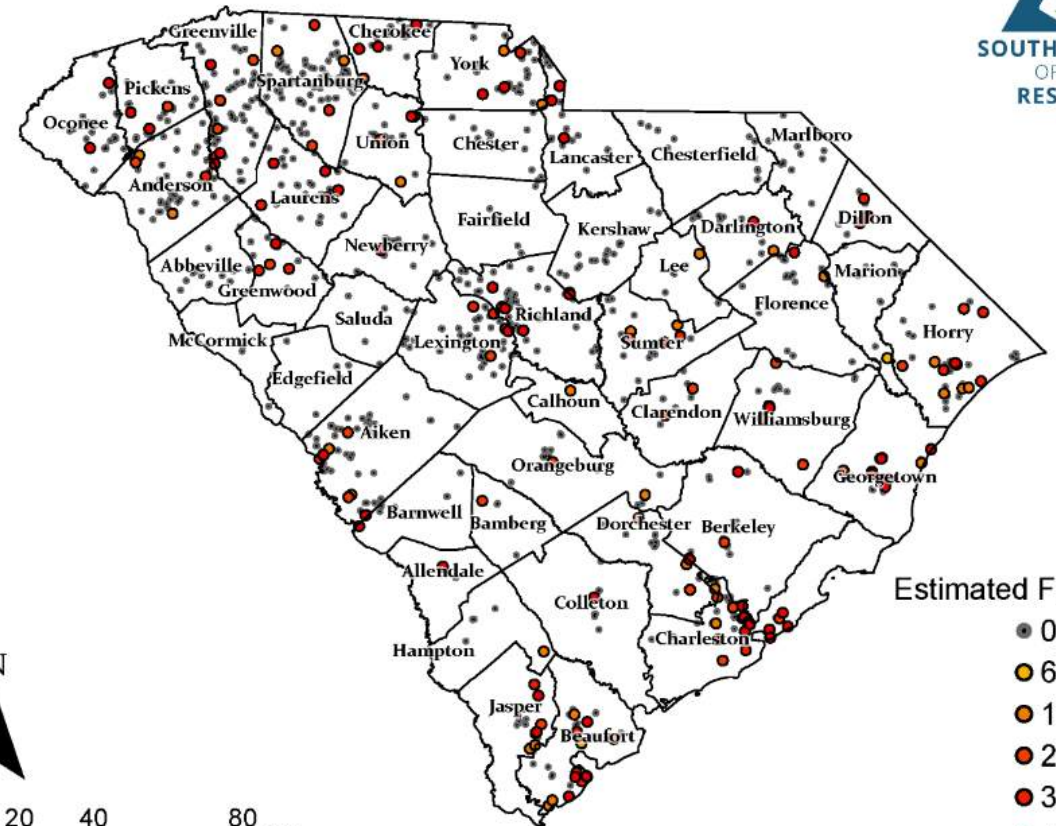
Estimated Flood Depth

- 0 ft (1,199)
- 6 in (2)
- 1 ft (43)
- 2 ft (42)
- 3 ft (21)
- +3 ft (67)



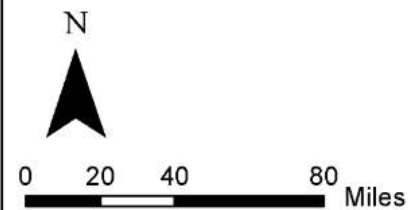
Solid Waste Facilities

2052 - 1% Annual Chance Flooding Event

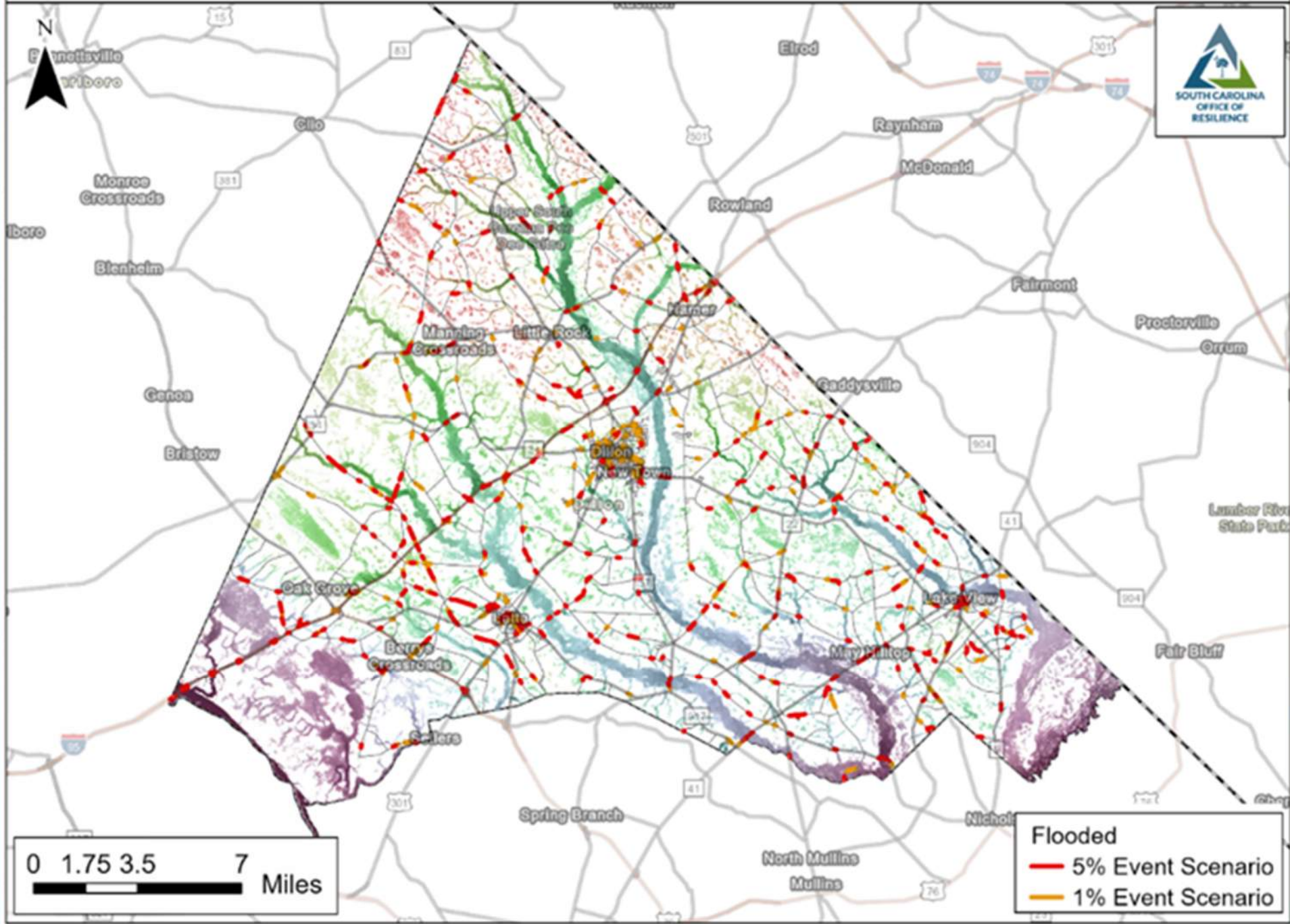


Estimated Flood Depth

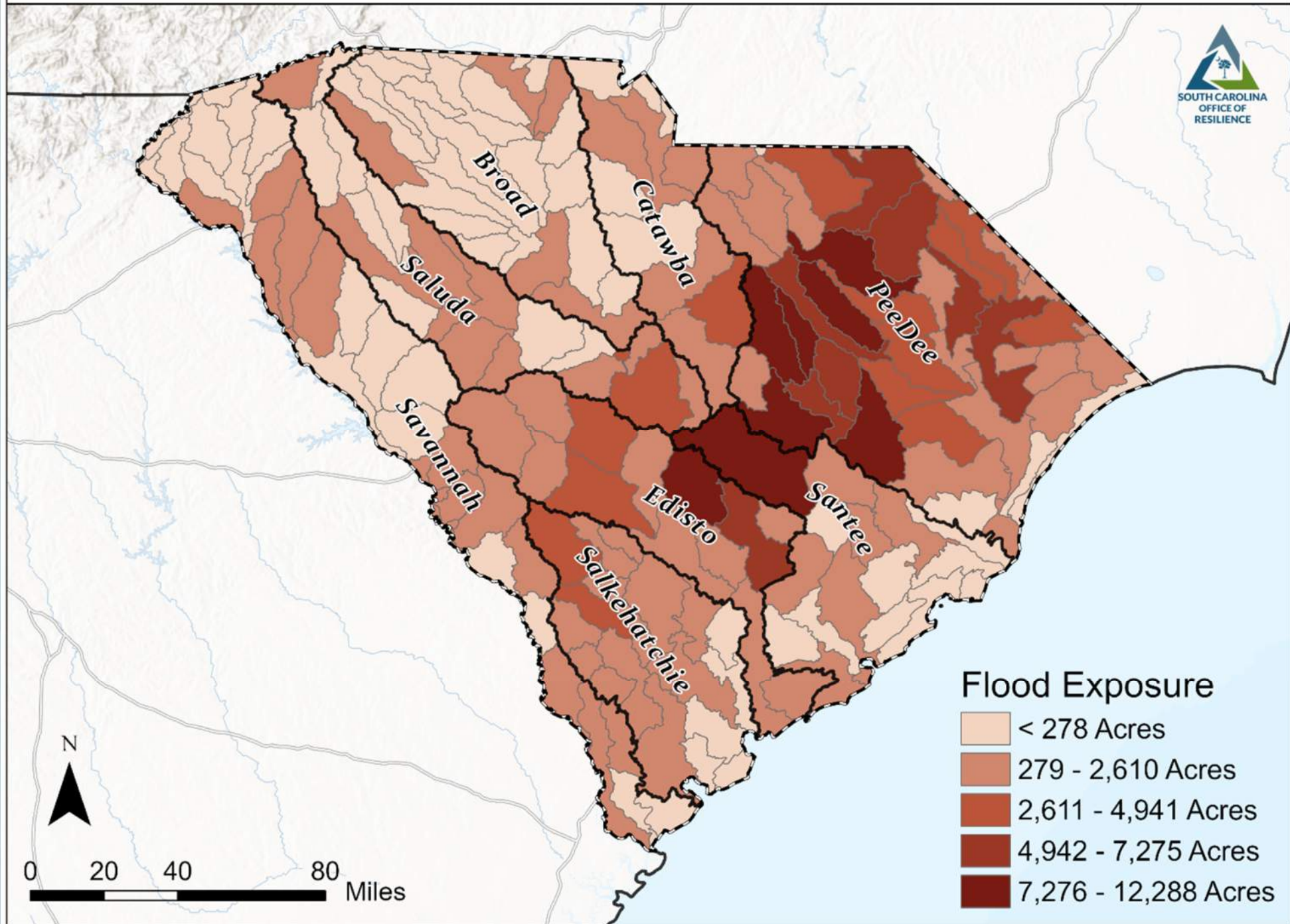
- 0 ft (1,183)
- 6 in (2)
- 1 ft (40)
- 2 ft (45)
- 3 ft (25)
- +3 ft (79)



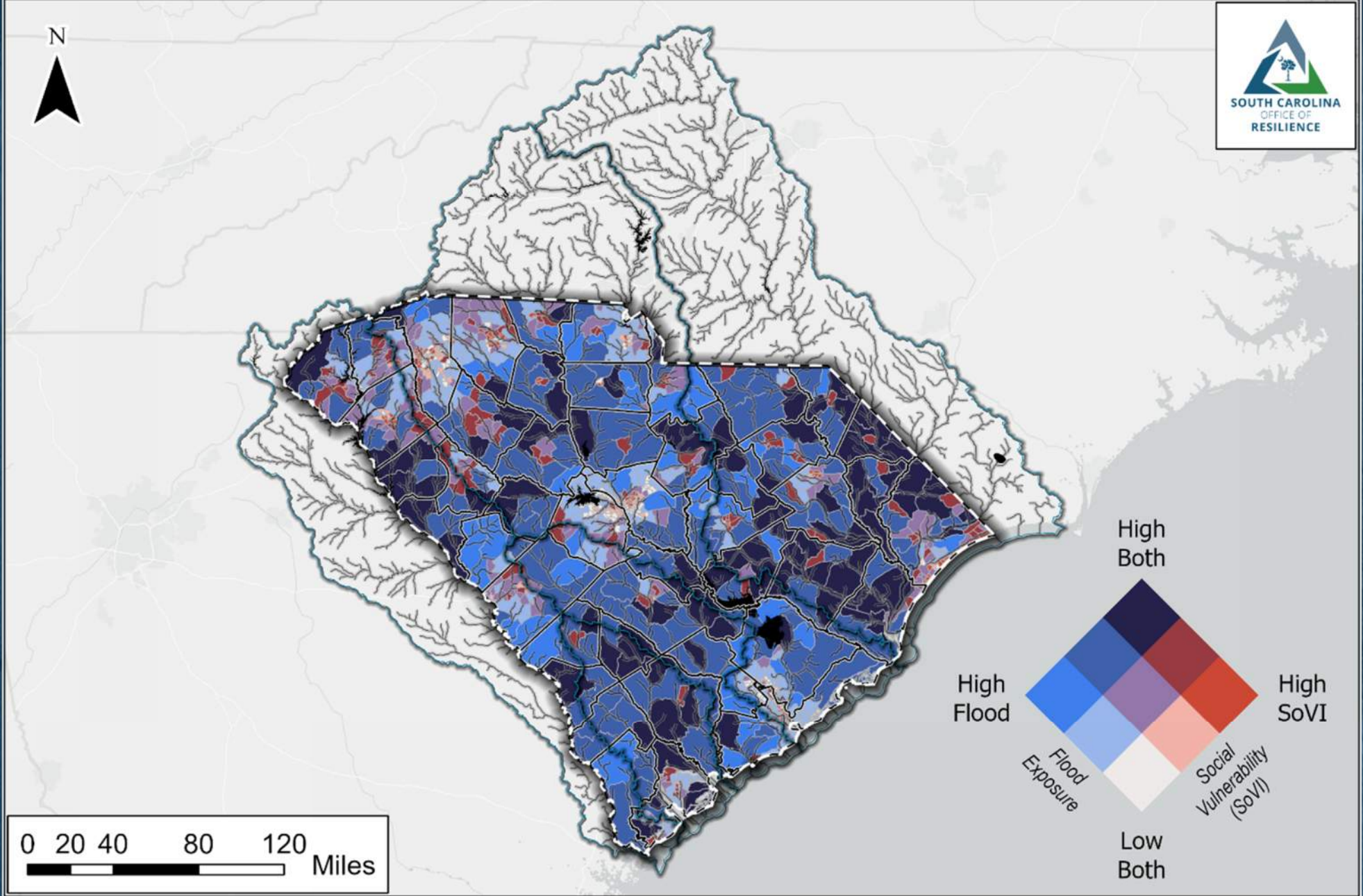
Dillon County Flooded Roadways - First Street Model



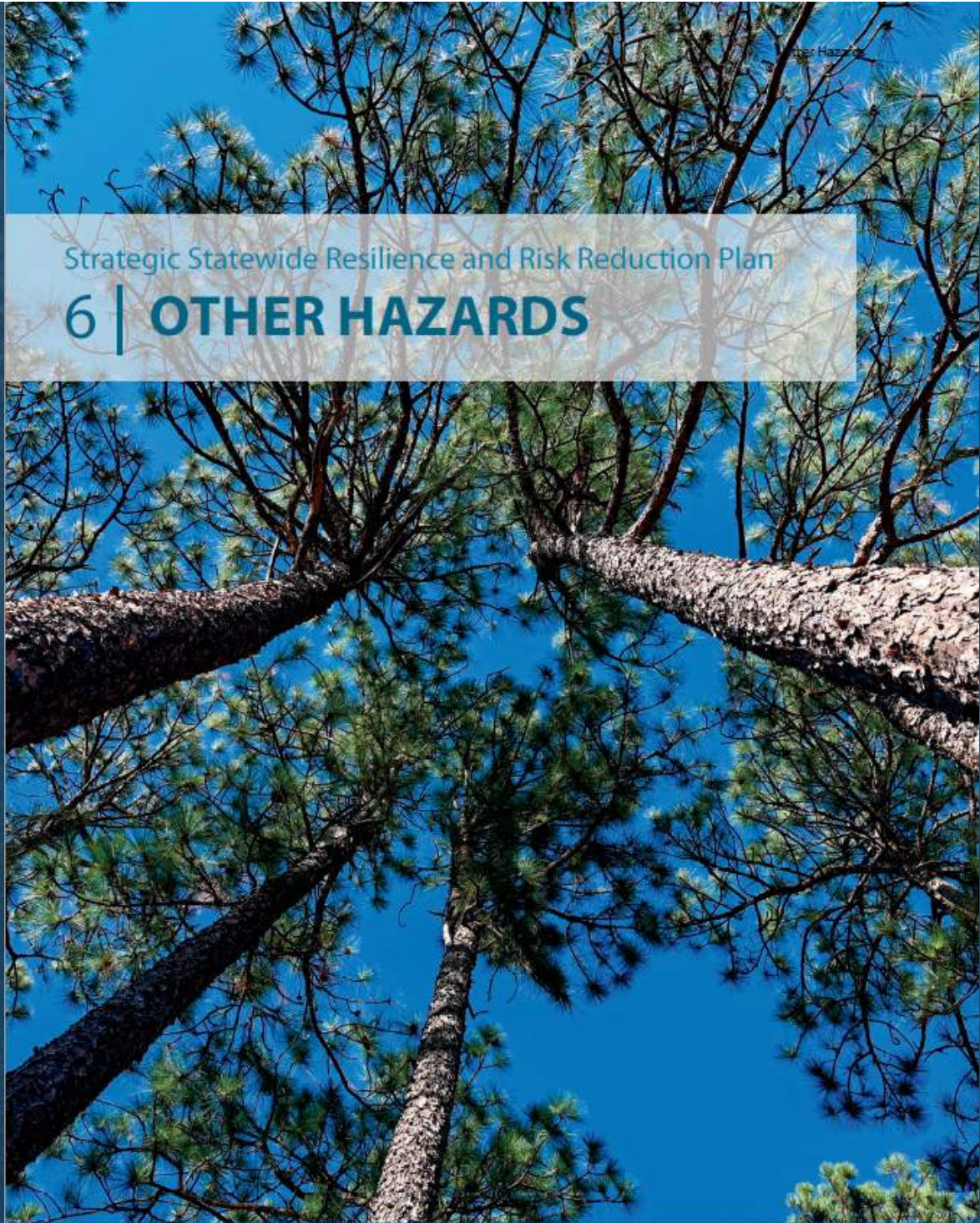
Cropland Flood Exposure by HUC-10 Watershed



Flooding Exposure and Social Vulnerability



Flood Exposure is calculated as the percentage of the Census Tract flooded at a depth greater than 6 inches during a 1% Annual Chance Flood according to the First Street Foundation Flood Model. Social Vulnerability (SoVI) was distributed by the FEMA National Risk Index. SoVI scores are classified by the tract's ranking relative to the rest of South Carolina.

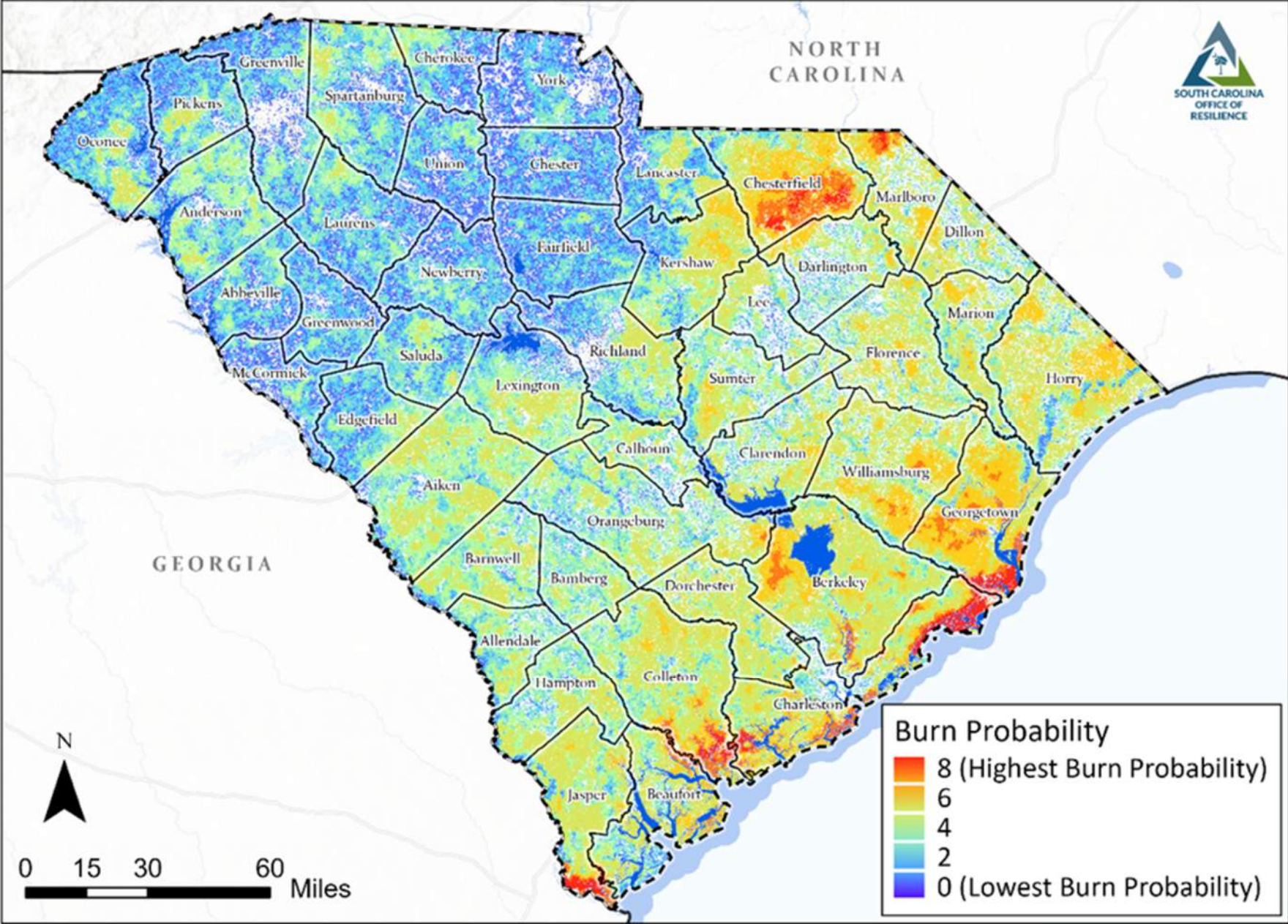


Other Hazards

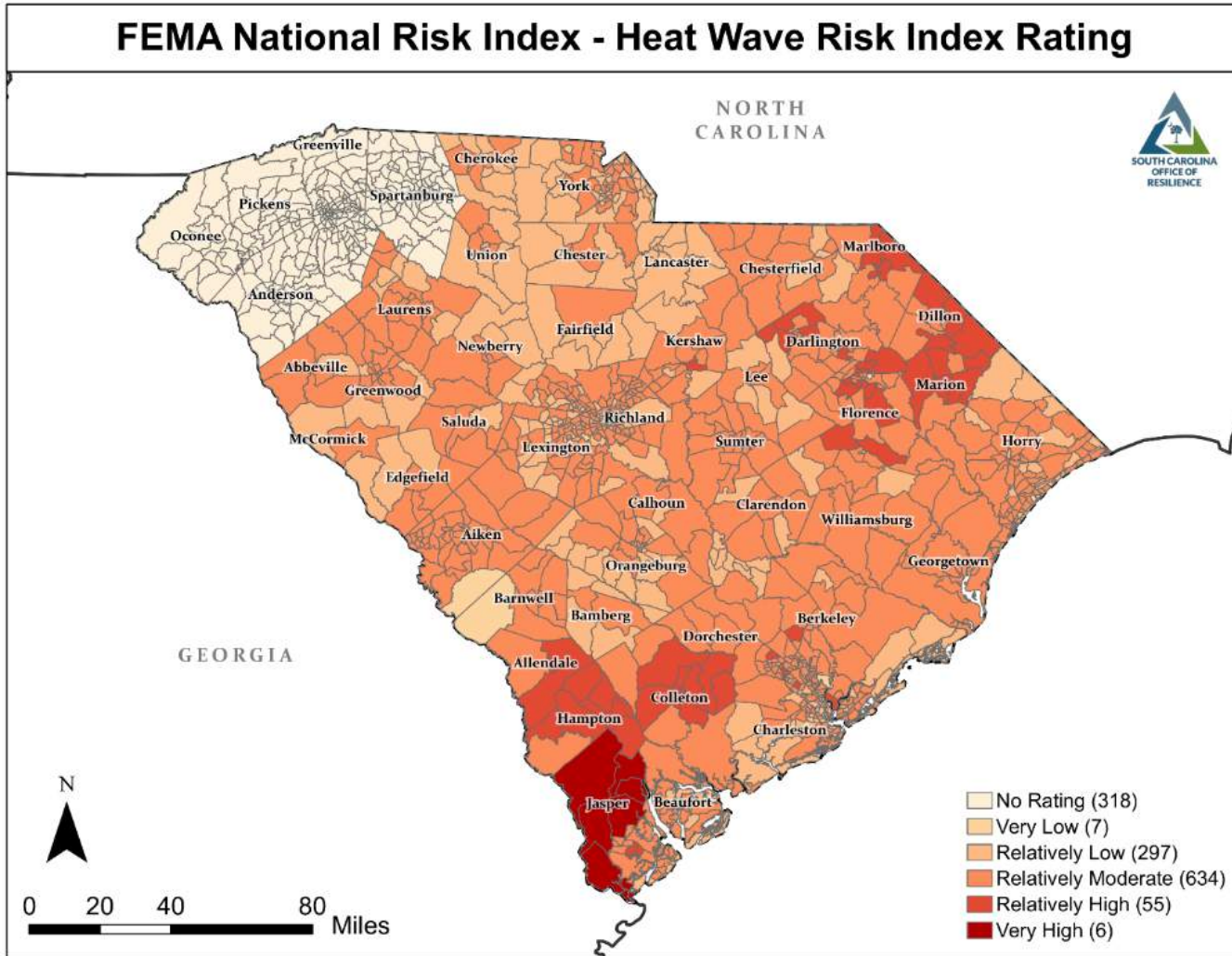
Strategic Statewide Resilience and Risk Reduction Plan

6 | OTHER HAZARDS

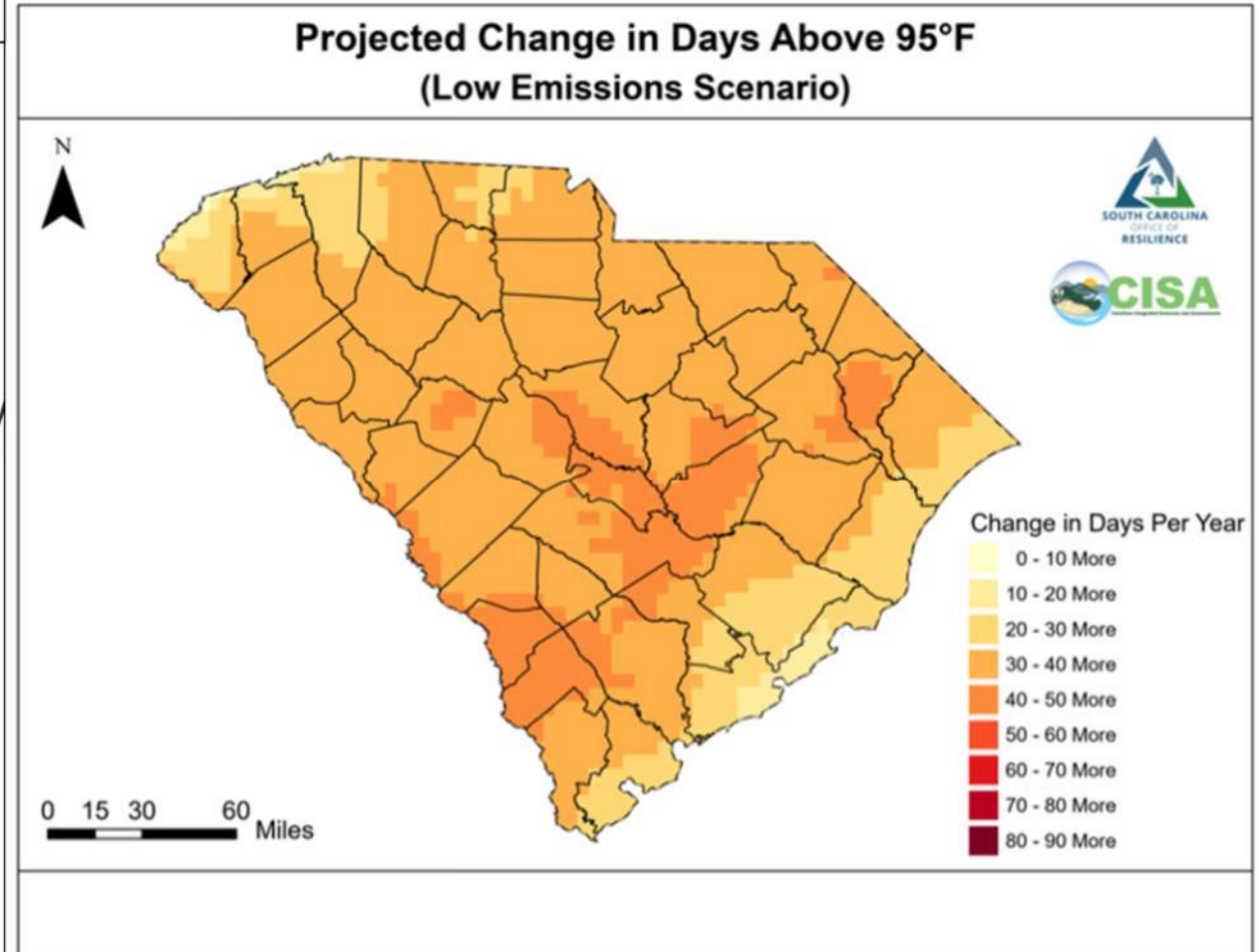
South Carolina Wildfire Burn Probability



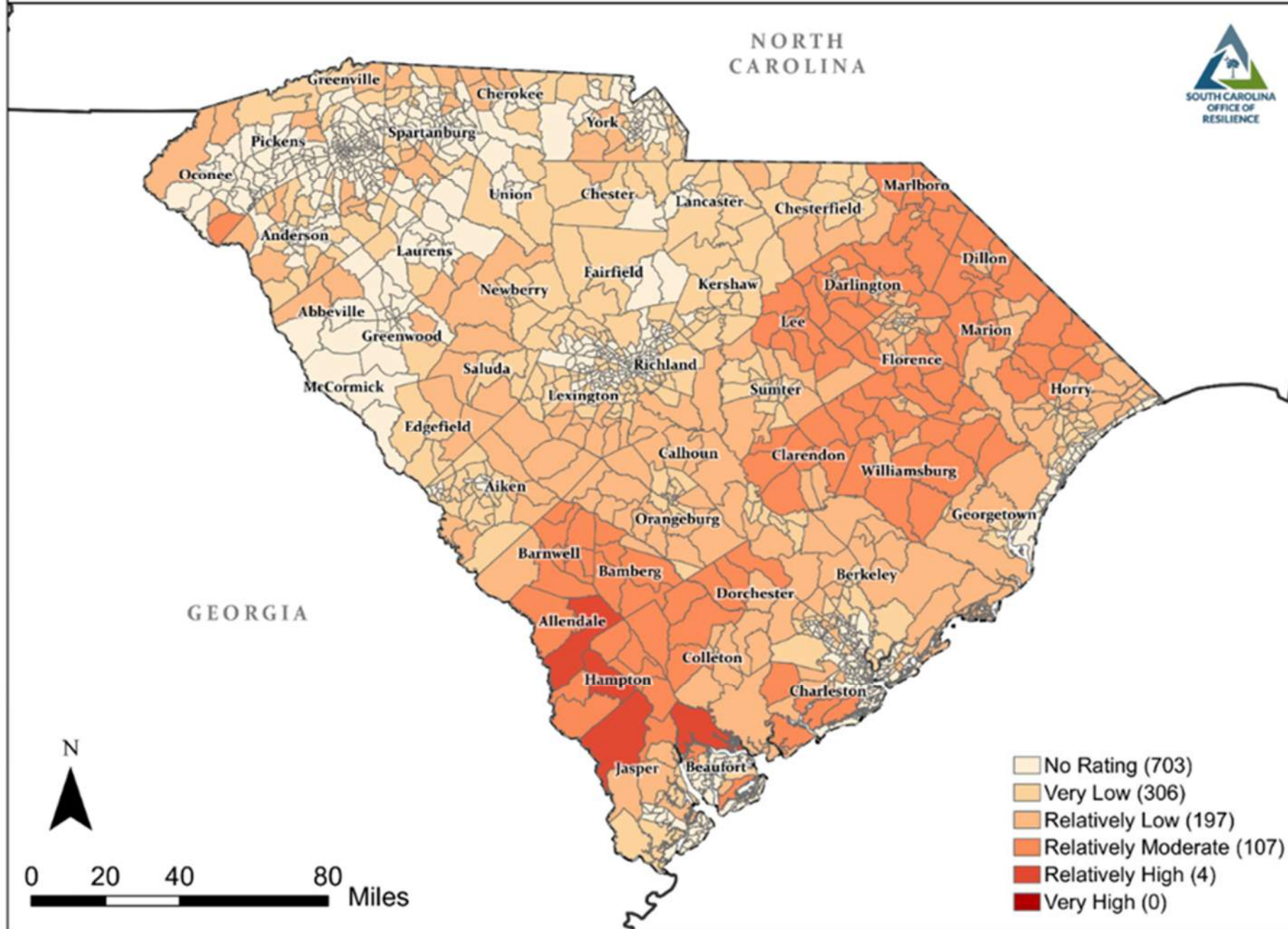
FEMA National Risk Index - Heat Wave Risk Index Rating



Projected Change in Days Above 95°F (Low Emissions Scenario)



FEMA National Risk Index - Drought Risk Index Rating



Strategic Statewide Resilience and Risk Reduction Plan

7 | CURRENT PROCESSES



Current Process Contents

Anticipate

- Land Use Planning & Regulations
- Hazard Mitigation Planning
- State Water Planning
- Other Statewide Planning Efforts Related to Resilience
- Floodplain Management Regulations
- Community Rating System
- Real Estate Disclosure
- Data

Absorb

- Stormwater Management Regulations
- Stormwater Infrastructure Design
- Green Stormwater Infrastructure Design
- Building Codes
- Coastal Zone Management
- Protection of Wetlands

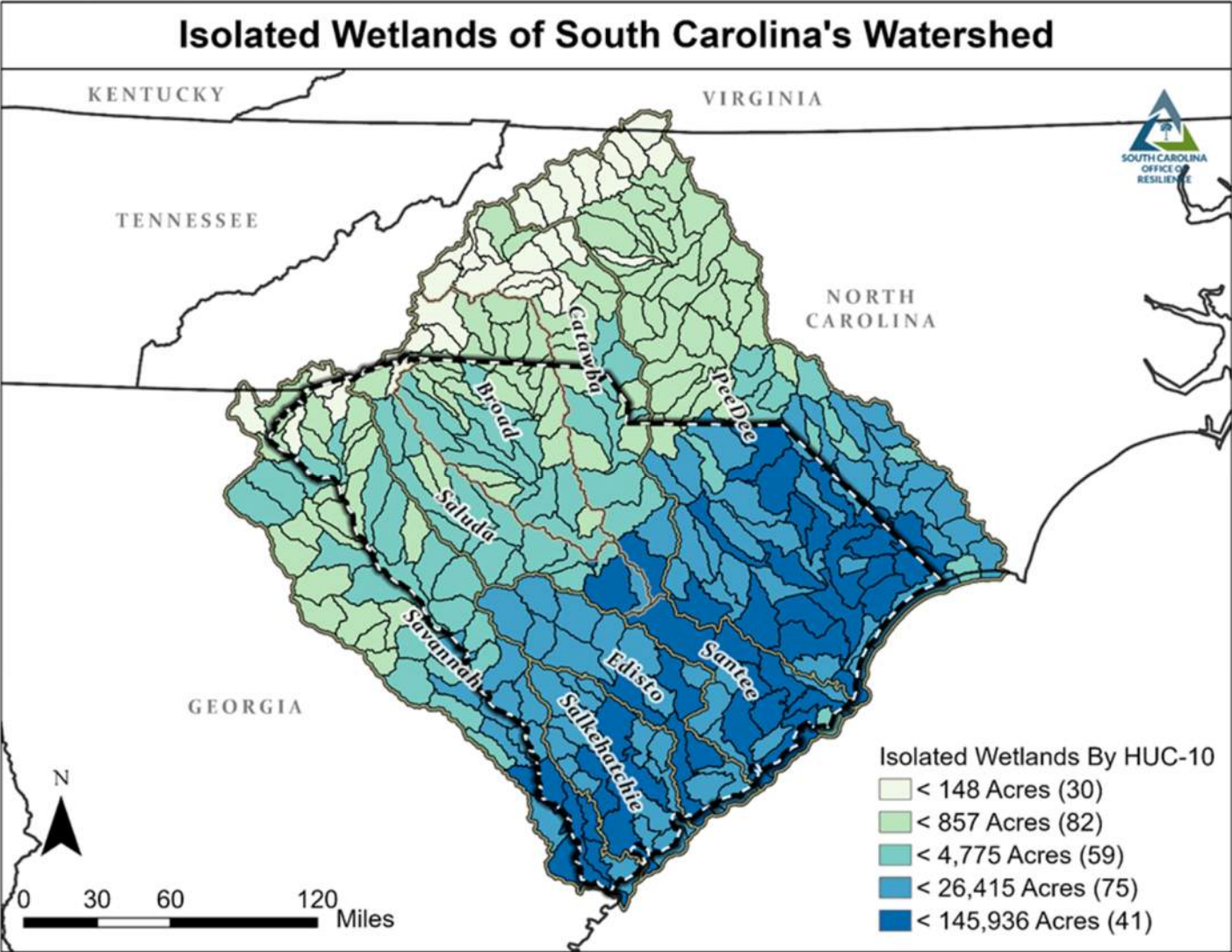
Recover

- National Disaster Response & Recovery Framework
- State Coordination of Recovery
- Complicating Factors for Recovery
- Non-Profit Partners in Recovery

Thrive

- Community Co-Benefits
- Economic Co-Benefits
- Ecosystem Co-Benefits

PROTECTION OF WETLANDS



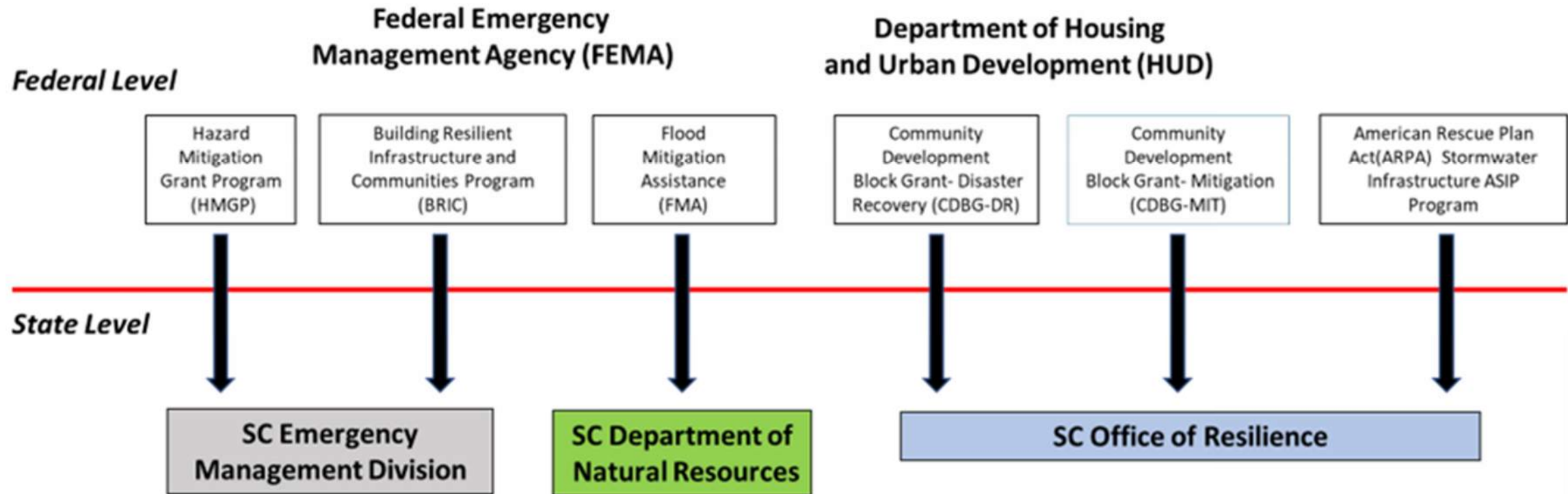
Preliminary Visualization of Isolated Wetlands in South Carolina



Strategic Statewide Resilience and Risk Reduction Plan

8 | **FUNDING**

Federal Funding





Strategic Statewide Resilience and Risk Reduction Plan

9 | RECOMMENDATIONS

Recommendation Themes

Improve Data Collection and Coordination

Increase Education, Outreach, and Disclosure

Coordinate Watershed-Based Resilience Planning and Projects

Incorporate Resilience into Planning, Land Use and Other Regulatory Processes

Maintain and Strengthen Building Codes

Incorporate Resilience into Infrastructure Design

Maintain Natural Flood Protection Through Conservation

Incorporate Resilience into Housing Recovery

Establish a Voluntary Pre-Disaster Buyout Program

Identify and Maximize All Available Funding Sources For Resilience Activities

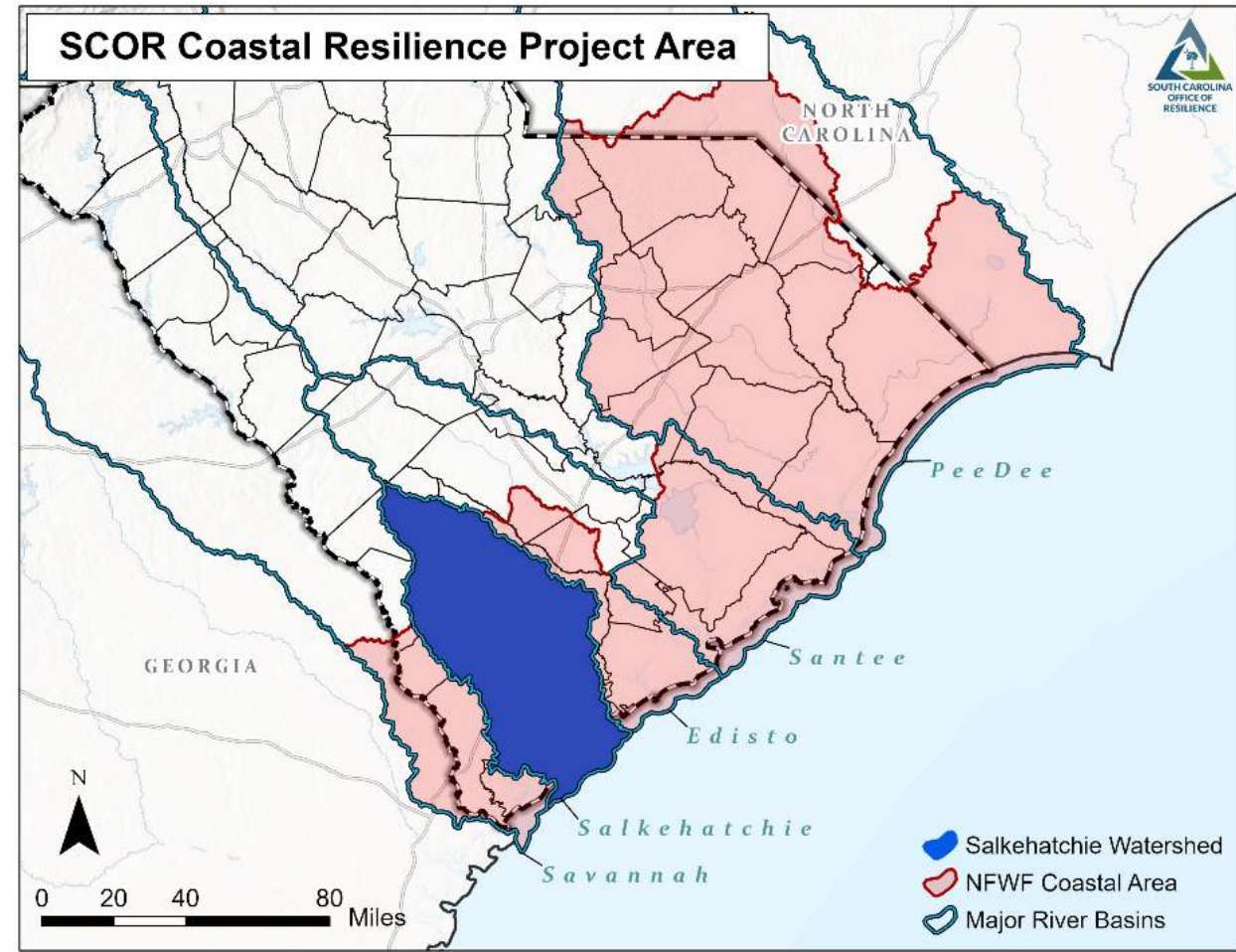
Watershed-Based Resilience Planning

Coordinate with communities at the watershed level to identify risk & vulnerability, develop actionable flood mitigation and resilience solutions and build community capacity by leveraging local, regional and state partnerships.



South Carolina Resilient Coastal Communities Collaborative Program

- Watershed-based planning process in the Salkehatchie River basin, as a pilot program for future watershed-based resilience planning efforts.
- Working with partners at S.C. Sea Grant Consortium and S.C. Beach Advocates.
- Will provide technical assistance to 10 underserved communities to complete community risk assessments, grounded in local engagement, leading to a portfolio of resilience projects.
- Creation of a comprehensive Salkehatchie Watershed Resilience Plan.
- Continued coordination between other proposals/projects.



Grant Administration

Awarded Grants with SCOR involvement

- EPA- Climate Pollution Reduction Grant -\$3M (DHEC/SC Ports Authority)
- National Fish & Wildlife Foundation- National Coastal Resilience Fund \$896,675 (S.C. Sea Grant, S.C. Beach Advocates)
- EPA Office of Community Revitalization- \$100,000
- SC Commission on National & Community Service (AmeriCorps Planning Grant) - \$83,000
- NOAA- Coastal Resilience-\$6.2M (The Nature Conservancy, lead)
- Robert Wood Johnson Foundation- \$250,000 (Departmentt of Insurance, lead)

Grant Applications Submitted/In Development

- FHWA PROTECT Grant \$60M
- EPA Solar For All \$200M
- HUD PRO Housing \$6.5M
- FEMA BRIC

Questions?